

Grade 6 Foundation Workbook

27 lessons · printable · answer key at the back

Name _____

Date _____

Contents (1 of 2)

Chapter 1 · Ratio and Percent	
1-1 Ratio	1
1-2 Percents	2
Chapter 2 · Integers and Operations	
2-1 Positive and Negative Numbers	3
2-2 Multiplying Integers	4
2-3 Absolute Value	5
2-4 Order of Operations	6
Chapter 3 · Number Theory	
3-1 Exponents	7
3-2 Greatest Common Factor	8
3-3 Lowest Common Multiple	9
3-4 Factors and Multiples	10
3-5 Prime and Composite Numbers	11
Chapter 4 · Fractions and Decimals	
4-1 Dividing Fractions	13
4-2 Dividing Decimals	15
Chapter 5 · Expressions	
5-1 Evaluating Expressions	16

Contents (2 of 2)

Chapter 5 · Expressions 18

5-2 Like Terms and the Distributive Property 18

Chapter 6 · Equations 20

6-1 Solving Equations 20

6-2 Inequalities 21

Chapter 7 · Geometry and Measurement 22

7-1 Area of Composite Shapes 22

7-2 Area of Figures 24

7-3 Missing Sides 26

7-4 Volume of Prisms 28

7-5 Surface Area 30

Chapter 8 · Data 32

8-1 Finding the Mean 32

8-2 Median and Range 35

8-3 Histograms 38

8-4 Statistics Word Problems 40

Chapter 9 · Reasoning 43

9-1 Look for the Structure 43

WORKED EXAMPLE

$$9 : 24 = \underline{3 : 8}$$

1. Simplifying a ratio

Write each ratio in its simplest form.

- | | | | |
|----------------------|----------------------|----------------------|----------------------|
| 1 $4 : 10 =$ _____ | 2 $15 : 35 =$ _____ | 3 $2 : 6 =$ _____ | 4 $18 : 30 =$ _____ |
| 5 $5 : 10 =$ _____ | 6 $6 : 16 =$ _____ | 7 $12 : 15 =$ _____ | 8 $15 : 40 =$ _____ |
| 9 $9 : 12 =$ _____ | 10 $5 : 30 =$ _____ | 11 $10 : 16 =$ _____ | 12 $12 : 32 =$ _____ |
| 13 $9 : 15 =$ _____ | 14 $10 : 25 =$ _____ | 15 $2 : 10 =$ _____ | 16 $2 : 4 =$ _____ |
| 17 $18 : 24 =$ _____ | 18 $6 : 8 =$ _____ | 19 $4 : 24 =$ _____ | 20 $4 : 8 =$ _____ |
| 21 $4 : 12 =$ _____ | 22 $25 : 30 =$ _____ | 23 $18 : 42 =$ _____ | 24 $6 : 30 =$ _____ |
| 25 $2 : 12 =$ _____ | 26 $4 : 6 =$ _____ | 27 $6 : 36 =$ _____ | 28 $8 : 12 =$ _____ |
| 29 $3 : 18 =$ _____ | 30 $15 : 24 =$ _____ | 31 $10 : 12 =$ _____ | 32 $2 : 8 =$ _____ |
| 33 $6 : 14 =$ _____ | 34 $3 : 9 =$ _____ | 35 $12 : 16 =$ _____ | 36 $5 : 25 =$ _____ |
| 37 $12 : 18 =$ _____ | 38 $25 : 40 =$ _____ | 39 $12 : 20 =$ _____ | 40 $24 : 30 =$ _____ |
| 41 $20 : 32 =$ _____ | 42 $4 : 16 =$ _____ | 43 $12 : 30 =$ _____ | 44 $18 : 48 =$ _____ |
| 45 $3 : 12 =$ _____ | 46 $8 : 10 =$ _____ | 47 $20 : 24 =$ _____ | 48 $8 : 20 =$ _____ |
| 49 $15 : 18 =$ _____ | 50 $9 : 21 =$ _____ | | |

2. Unit rates

Find the unit rate for each.

- | | | |
|----------------------------|----------------------------|----------------------------|
| 51 \$42 for 6 = _____ each | 52 \$9 for 3 = _____ each | 53 \$8 for 4 = _____ each |
| 54 \$18 for 3 = _____ each | 55 \$55 for 5 = _____ each | 56 \$18 for 2 = _____ each |
| 57 \$40 for 5 = _____ each | 58 \$35 for 7 = _____ each | 59 \$21 for 7 = _____ each |
| 60 \$56 for 7 = _____ each | 61 \$80 for 8 = _____ each | 62 \$24 for 3 = _____ each |

WORKED EXAMPLE

$0.2 = \underline{20\%}$

3. Decimals as percents

Write each decimal as a percent.

- | | | | |
|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| 1 $0.72 = \underline{\hspace{1cm}}$ | 2 $0.95 = \underline{\hspace{1cm}}$ | 3 $0.08 = \underline{\hspace{1cm}}$ | 4 $0.98 = \underline{\hspace{1cm}}$ |
| 5 $0.4 = \underline{\hspace{1cm}}$ | 6 $0.88 = \underline{\hspace{1cm}}$ | 7 $0.87 = \underline{\hspace{1cm}}$ | 8 $0.48 = \underline{\hspace{1cm}}$ |
| 9 $0.63 = \underline{\hspace{1cm}}$ | 10 $0.31 = \underline{\hspace{1cm}}$ | 11 $0.94 = \underline{\hspace{1cm}}$ | 12 $0.06 = \underline{\hspace{1cm}}$ |
| 13 $0.75 = \underline{\hspace{1cm}}$ | 14 $0.09 = \underline{\hspace{1cm}}$ | 15 $0.36 = \underline{\hspace{1cm}}$ | 16 $0.21 = \underline{\hspace{1cm}}$ |
| 17 $0.07 = \underline{\hspace{1cm}}$ | 18 $0.17 = \underline{\hspace{1cm}}$ | 19 $0.80 = \underline{\hspace{1cm}}$ | 20 $0.43 = \underline{\hspace{1cm}}$ |
| 21 $0.97 = \underline{\hspace{1cm}}$ | 22 $0.44 = \underline{\hspace{1cm}}$ | 23 $0.46 = \underline{\hspace{1cm}}$ | 24 $0.77 = \underline{\hspace{1cm}}$ |
| 25 $0.10 = \underline{\hspace{1cm}}$ | 26 $0.66 = \underline{\hspace{1cm}}$ | 27 $0.86 = \underline{\hspace{1cm}}$ | 28 $0.54 = \underline{\hspace{1cm}}$ |
| 29 $0.13 = \underline{\hspace{1cm}}$ | 30 $0.70 = \underline{\hspace{1cm}}$ | 31 $0.6 = \underline{\hspace{1cm}}$ | 32 $0.61 = \underline{\hspace{1cm}}$ |
| 33 $0.73 = \underline{\hspace{1cm}}$ | 34 $0.11 = \underline{\hspace{1cm}}$ | 35 $0.92 = \underline{\hspace{1cm}}$ | 36 $0.27 = \underline{\hspace{1cm}}$ |
| 37 $0.52 = \underline{\hspace{1cm}}$ | 38 $0.19 = \underline{\hspace{1cm}}$ | 39 $0.76 = \underline{\hspace{1cm}}$ | 40 $0.59 = \underline{\hspace{1cm}}$ |
| 41 $0.47 = \underline{\hspace{1cm}}$ | 42 $0.82 = \underline{\hspace{1cm}}$ | 43 $0.65 = \underline{\hspace{1cm}}$ | 44 $0.68 = \underline{\hspace{1cm}}$ |
| 45 $0.81 = \underline{\hspace{1cm}}$ | 46 $0.30 = \underline{\hspace{1cm}}$ | 47 $0.42 = \underline{\hspace{1cm}}$ | 48 $0.69 = \underline{\hspace{1cm}}$ |
| 49 $0.24 = \underline{\hspace{1cm}}$ | 50 $0.85 = \underline{\hspace{1cm}}$ | | |

4. Percent

Find the percent of each number.

- | | | |
|--|--|--|
| 51 $40\% \text{ of } 120 = \underline{\hspace{1cm}}$ | 52 $60\% \text{ of } 160 = \underline{\hspace{1cm}}$ | 53 $60\% \text{ of } 195 = \underline{\hspace{1cm}}$ |
| 54 $25\% \text{ of } 80 = \underline{\hspace{1cm}}$ | 55 $60\% \text{ of } 105 = \underline{\hspace{1cm}}$ | 56 $25\% \text{ of } 44 = \underline{\hspace{1cm}}$ |
| 57 $40\% \text{ of } 135 = \underline{\hspace{1cm}}$ | 58 $80\% \text{ of } 60 = \underline{\hspace{1cm}}$ | 59 $75\% \text{ of } 92 = \underline{\hspace{1cm}}$ |
| 60 $50\% \text{ of } 48 = \underline{\hspace{1cm}}$ | 61 $50\% \text{ of } 194 = \underline{\hspace{1cm}}$ | 62 $40\% \text{ of } 75 = \underline{\hspace{1cm}}$ |

Positive and Negative Numbers

WORKED EXAMPLE

$$-11 + 1 = \underline{-10}$$

5. Add and subtract integers

Add or subtract the integers.

1 $-1 + 1 = \underline{\quad}$

4 $-2 + 10 = \underline{\quad}$

7 $-2 + 13 = \underline{\quad}$

10 $1 - 2 = \underline{\quad}$

13 $-20 + 10 = \underline{\quad}$

16 $-1 + 9 = \underline{\quad}$

19 $-2 + 7 = \underline{\quad}$

22 $-7 + 4 = \underline{\quad}$

25 $2 - 7 = \underline{\quad}$

28 $-8 + 14 = \underline{\quad}$

31 $-12 + 9 = \underline{\quad}$

34 $3 - 4 = \underline{\quad}$

37 $-11 + 4 = \underline{\quad}$

40 $-16 + 9 = \underline{\quad}$

43 $1 - 5 = \underline{\quad}$

46 $3 - 5 = \underline{\quad}$

49 $-13 + 4 = \underline{\quad}$

2 $-13 + 7 = \underline{\quad}$

5 $-19 + 2 = \underline{\quad}$

8 $-19 + 10 = \underline{\quad}$

11 $-16 + 11 = \underline{\quad}$

14 $-13 + 16 = \underline{\quad}$

17 $-3 + 3 = \underline{\quad}$

20 $-6 + 2 = \underline{\quad}$

23 $-8 + 7 = \underline{\quad}$

26 $-1 + 3 = \underline{\quad}$

29 $-4 + 10 = \underline{\quad}$

32 $-7 + 16 = \underline{\quad}$

35 $3 - 10 = \underline{\quad}$

38 $-17 + 17 = \underline{\quad}$

41 $-12 + 8 = \underline{\quad}$

44 $-8 + 9 = \underline{\quad}$

47 $-20 + 1 = \underline{\quad}$

50 $-17 + 10 = \underline{\quad}$

3 $-19 + 14 = \underline{\quad}$

6 $-13 + 9 = \underline{\quad}$

9 $-15 + 6 = \underline{\quad}$

12 $-16 + 1 = \underline{\quad}$

15 $-7 + 7 = \underline{\quad}$

18 $-8 + 15 = \underline{\quad}$

21 $-18 + 11 = \underline{\quad}$

24 $-11 + 9 = \underline{\quad}$

27 $-20 + 3 = \underline{\quad}$

30 $-9 + 5 = \underline{\quad}$

33 $-2 + 5 = \underline{\quad}$

36 $-9 + 8 = \underline{\quad}$

39 $-18 + 6 = \underline{\quad}$

42 $-18 + 13 = \underline{\quad}$

45 $6 - 12 = \underline{\quad}$

48 $-6 + 14 = \underline{\quad}$

Multiplying Integers

WORKED EXAMPLE

$$5 \times (-11) = \underline{-55}$$

6. Multiplying integers

Multiply. Remember what two negative signs make.

- | | | |
|---|---|--|
| 1 $6 \times (-10) = \underline{\hspace{2cm}}$ | 2 $2 \times (-12) = \underline{\hspace{2cm}}$ | 3 $9 \times (-2) = \underline{\hspace{2cm}}$ |
| 4 $2 \times (-5) = \underline{\hspace{2cm}}$ | 5 $-3 \times 7 = \underline{\hspace{2cm}}$ | 6 $5 \times (-5) = \underline{\hspace{2cm}}$ |
| 7 $-2 \times (-6) = \underline{\hspace{2cm}}$ | 8 $-8 \times 3 = \underline{\hspace{2cm}}$ | 9 $-4 \times 2 = \underline{\hspace{2cm}}$ |
| 10 $-4 \times 4 = \underline{\hspace{2cm}}$ | 11 $10 \times (-10) = \underline{\hspace{2cm}}$ | 12 $-8 \times 2 = \underline{\hspace{2cm}}$ |
| 13 $-8 \times 5 = \underline{\hspace{2cm}}$ | 14 $12 \times (-4) = \underline{\hspace{2cm}}$ | 15 $-11 \times 2 = \underline{\hspace{2cm}}$ |
| 16 $-10 \times 2 = \underline{\hspace{2cm}}$ | 17 $6 \times (-8) = \underline{\hspace{2cm}}$ | 18 $10 \times (-3) = \underline{\hspace{2cm}}$ |
| 19 $4 \times (-10) = \underline{\hspace{2cm}}$ | 20 $2 \times (-7) = \underline{\hspace{2cm}}$ | 21 $-8 \times 10 = \underline{\hspace{2cm}}$ |
| 22 $7 \times (-6) = \underline{\hspace{2cm}}$ | 23 $6 \times (-4) = \underline{\hspace{2cm}}$ | 24 $7 \times (-5) = \underline{\hspace{2cm}}$ |
| 25 $-12 \times 9 = \underline{\hspace{2cm}}$ | 26 $-2 \times (-2) = \underline{\hspace{2cm}}$ | 27 $6 \times (-11) = \underline{\hspace{2cm}}$ |
| 28 $12 \times (-11) = \underline{\hspace{2cm}}$ | 29 $2 \times (-6) = \underline{\hspace{2cm}}$ | 30 $7 \times (-10) = \underline{\hspace{2cm}}$ |
| 31 $7 \times (-2) = \underline{\hspace{2cm}}$ | 32 $-3 \times 12 = \underline{\hspace{2cm}}$ | 33 $-8 \times 6 = \underline{\hspace{2cm}}$ |
| 34 $4 \times (-12) = \underline{\hspace{2cm}}$ | 35 $8 \times (-6) = \underline{\hspace{2cm}}$ | 36 $5 \times (-12) = \underline{\hspace{2cm}}$ |
| 37 $-2 \times 4 = \underline{\hspace{2cm}}$ | 38 $-5 \times 9 = \underline{\hspace{2cm}}$ | 39 $-3 \times 6 = \underline{\hspace{2cm}}$ |
| 40 $-3 \times 5 = \underline{\hspace{2cm}}$ | | |

7. Simplifying a ratio

Write each ratio in its simplest form.

- | | | | |
|---|---|---|---|
| 41 $4 : 10 = \underline{\hspace{2cm}}$ | 42 $5 : 10 = \underline{\hspace{2cm}}$ | 43 $5 : 20 = \underline{\hspace{2cm}}$ | 44 $12 : 15 = \underline{\hspace{2cm}}$ |
| 45 $15 : 40 = \underline{\hspace{2cm}}$ | 46 $5 : 30 = \underline{\hspace{2cm}}$ | 47 $12 : 32 = \underline{\hspace{2cm}}$ | 48 $9 : 15 = \underline{\hspace{2cm}}$ |
| 49 $3 : 6 = \underline{\hspace{2cm}}$ | 50 $10 : 25 = \underline{\hspace{2cm}}$ | | |

Absolute Value

WORKED EXAMPLE

$$|-4| + |9| = \underline{13}$$

8. Absolute value

Work out each one. The bars ask how far the number is from zero.

- 1 $|4 - 14| = \underline{\quad}$
- 2 $|12 - 13| = \underline{\quad}$
- 3 How far apart are -1 and 5 on the number line? $\underline{\quad}$
- 4 $|7 - 20| = \underline{\quad}$
- 5 $|-18| = \underline{\quad}$
- 6 $|12 - 19| = \underline{\quad}$
- 7 $|-2| + |12| = \underline{\quad}$
- 8 $|3 - 10| = \underline{\quad}$
- 9 $|10 - 11| = \underline{\quad}$
- 10 $|8 - 19| = \underline{\quad}$
- 11 $|3| + |-7| = \underline{\quad}$
- 12 $|14 - 20| = \underline{\quad}$
- 13 $|10 - 16| = \underline{\quad}$
- 14 $|6| + |-8| = \underline{\quad}$
- 15 $|2| + |-1| = \underline{\quad}$
- 16 $|2 - 9| = \underline{\quad}$
- 17 $|11 - 18| = \underline{\quad}$
- 18 $|-4| + |5| = \underline{\quad}$
- 19 $|9 - 11| = \underline{\quad}$
- 20 $|2 - 11| = \underline{\quad}$

9. Decimals as percents

Write each decimal as a percent.

- | | | | |
|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| 21 $0.72 = \underline{\quad}$ | 22 $0.3 = \underline{\quad}$ | 23 $0.87 = \underline{\quad}$ | 24 $0.02 = \underline{\quad}$ |
| 25 $0.7 = \underline{\quad}$ | 26 $0.48 = \underline{\quad}$ | 27 $0.63 = \underline{\quad}$ | 28 $0.31 = \underline{\quad}$ |
| 29 $0.94 = \underline{\quad}$ | 30 $0.49 = \underline{\quad}$ | | |

Order of Operations

WORKED EXAMPLE

$$5 - 10 \div 2 = \underline{0}$$

10. Order of operations

Follow the order of operations to solve each problem.

1 $24 \div 8 + 9 = \underline{\quad}$

4 $7 - 10 \div 2 = \underline{\quad}$

7 $25 \div 5 + 8 = \underline{\quad}$

10 $5 - 27 \div 9 = \underline{\quad}$

13 $14 \div 2 + 5 = \underline{\quad}$

16 $20 \div 5 + 5 = \underline{\quad}$

19 $6 + 27 \div 9 = \underline{\quad}$

22 $4 + 64 \div 8 = \underline{\quad}$

25 $6 \times 2 + 9 = \underline{\quad}$

28 $2 \times 9 + 2 = \underline{\quad}$

31 $21 \div 3 + 5 = \underline{\quad}$

34 $24 \div 8 + 5 = \underline{\quad}$

37 $3 + 9 \div 3 = \underline{\quad}$

2 $45 \div 5 + 3 = \underline{\quad}$

5 $8 \div 4 + 9 = \underline{\quad}$

8 $30 \div 6 + 2 = \underline{\quad}$

11 $7 + 64 \div 8 = \underline{\quad}$

14 $6 + 3 \times 6 = \underline{\quad}$

17 $5 + 18 \div 3 = \underline{\quad}$

20 $5 + 2 \times 3 = \underline{\quad}$

23 $21 \div 7 + 6 = \underline{\quad}$

26 $5 + 42 \div 6 = \underline{\quad}$

29 $2 + 32 \div 8 = \underline{\quad}$

32 $20 \div 4 + 9 = \underline{\quad}$

35 $4 + 36 \div 3 = \underline{\quad}$

38 $5 \times 2 + 7 = \underline{\quad}$

3 $88 \div 8 + 6 = \underline{\quad}$

6 $2 + 18 \div 3 = \underline{\quad}$

9 $8 - 10 \div 5 = \underline{\quad}$

12 $6 - 18 \div 9 = \underline{\quad}$

15 $8 - 24 \div 8 = \underline{\quad}$

18 $4 + 2 \times 7 = \underline{\quad}$

21 $6 + 7 \times 3 = \underline{\quad}$

24 $2 + 36 \div 4 = \underline{\quad}$

27 $18 \div 3 + 6 = \underline{\quad}$

30 $4 + 6 \div 2 = \underline{\quad}$

33 $5 + 24 \div 4 = \underline{\quad}$

36 $15 \div 5 + 4 = \underline{\quad}$

11. Add and subtract integers

Add or subtract the integers.

39 $-14 + 10 = \underline{\quad}$

40 $-9 + 3 = \underline{\quad}$

41 $-12 + 11 = \underline{\quad}$

42 $-17 + 7 = \underline{\quad}$

43 $-16 + 10 = \underline{\quad}$

44 $-5 + 9 = \underline{\quad}$

45 $7 - 12 = \underline{\quad}$

46 $0 - 2 = \underline{\quad}$

47 $-2 + 9 = \underline{\quad}$

48 $-17 + 5 = \underline{\quad}$

Exponents

12. Exponents

Find the value of each square.

- | | | | | |
|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|-------------------------------------|
| 1 $3^2 = \underline{\hspace{1cm}}$ | 2 $17^2 = \underline{\hspace{1cm}}$ | 3 $5^2 = \underline{\hspace{1cm}}$ | 4 $8^2 = \underline{\hspace{1cm}}$ | 5 $10^2 = \underline{\hspace{1cm}}$ |
| 6 $7^2 = \underline{\hspace{1cm}}$ | 7 $4^2 = \underline{\hspace{1cm}}$ | 8 $15^2 = \underline{\hspace{1cm}}$ | 9 $19^2 = \underline{\hspace{1cm}}$ | 10 $9^2 = \underline{\hspace{1cm}}$ |
| 11 $14^2 = \underline{\hspace{1cm}}$ | 12 $12^2 = \underline{\hspace{1cm}}$ | 13 $2^2 = \underline{\hspace{1cm}}$ | 14 $18^2 = \underline{\hspace{1cm}}$ | 15 $6^2 = \underline{\hspace{1cm}}$ |
| 16 $16^2 = \underline{\hspace{1cm}}$ | 17 $13^2 = \underline{\hspace{1cm}}$ | 18 $20^2 = \underline{\hspace{1cm}}$ | 19 $11^2 = \underline{\hspace{1cm}}$ | |

13. Add and subtract integers

Add or subtract the integers.

- | | | | |
|--|--|---|---|
| 20 $-4 + 9 = \underline{\hspace{1cm}}$ | 21 $-20 + 2 = \underline{\hspace{1cm}}$ | 22 $3 - 11 = \underline{\hspace{1cm}}$ | 23 $-20 + 7 = \underline{\hspace{1cm}}$ |
| 24 $-3 + 2 = \underline{\hspace{1cm}}$ | 25 $-1 + 7 = \underline{\hspace{1cm}}$ | 26 $6 - 8 = \underline{\hspace{1cm}}$ | 27 $-6 + 7 = \underline{\hspace{1cm}}$ |
| 28 $-8 + 1 = \underline{\hspace{1cm}}$ | 29 $-15 + 6 = \underline{\hspace{1cm}}$ | 30 $-2 + 12 = \underline{\hspace{1cm}}$ | 31 $-13 + 6 = \underline{\hspace{1cm}}$ |
| 32 $-7 + 9 = \underline{\hspace{1cm}}$ | 33 $-19 + 11 = \underline{\hspace{1cm}}$ | 34 $-16 + 3 = \underline{\hspace{1cm}}$ | 35 $-5 + 8 = \underline{\hspace{1cm}}$ |
| 36 $-9 + 1 = \underline{\hspace{1cm}}$ | 37 $-12 + 11 = \underline{\hspace{1cm}}$ | 38 $-12 + 7 = \underline{\hspace{1cm}}$ | 39 $0 - 3 = \underline{\hspace{1cm}}$ |

Greatest Common Factor

WORKED EXAMPLE

16, 28 → 4

14. Greatest common factor

Find the greatest common factor (GCF) of each set of numbers.

- | | | | |
|------------------|------------------|------------------|------------------|
| 1 6, 15 → ____ | 2 12, 15 → ____ | 3 20, 24 → ____ | 4 8, 12 → ____ |
| 5 4, 6 → ____ | 6 8, 10 → ____ | 7 15, 21 → ____ | 8 8, 14 → ____ |
| 9 4, 14 → ____ | 10 6, 8 → ____ | 11 9, 21 → ____ | 12 6, 14 → ____ |
| 13 12, 14 → ____ | 14 8, 20 → ____ | 15 10, 12 → ____ | 16 9, 15 → ____ |
| 17 6, 9 → ____ | 18 10, 25 → ____ | 19 9, 12 → ____ | 20 10, 15 → ____ |
| 21 16, 20 → ____ | 22 6, 10 → ____ | 23 4, 10 → ____ | 24 10, 14 → ____ |
| 25 15, 25 → ____ | 26 25, 30 → ____ | 27 12, 21 → ____ | 28 20, 25 → ____ |
| 29 10, 35 → ____ | 30 12, 18 → ____ | 31 12, 16 → ____ | 32 20, 28 → ____ |
| 33 15, 18 → ____ | 34 6, 21 → ____ | 35 12, 30 → ____ | 36 18, 21 → ____ |
| 37 12, 20 → ____ | 38 30, 35 → ____ | 39 18, 24 → ____ | 40 15, 20 → ____ |
| 41 24, 28 → ____ | 42 25, 35 → ____ | 43 30, 36 → ____ | 44 8, 28 → ____ |
| 45 15, 35 → ____ | 46 12, 28 → ____ | 47 18, 30 → ____ | 48 24, 30 → ____ |

15. Prime or composite

Circle whether each number is prime or composite.

- | | |
|-------------------------|-------------------------|
| 49 4 Prime / Composite | 50 28 Prime / Composite |
| 51 17 Prime / Composite | 52 8 Prime / Composite |
| 53 18 Prime / Composite | 54 16 Prime / Composite |
| 55 44 Prime / Composite | 56 20 Prime / Composite |
| 57 30 Prime / Composite | 58 34 Prime / Composite |
| 59 5 Prime / Composite | 60 10 Prime / Composite |
| 61 22 Prime / Composite | 62 38 Prime / Composite |
| 63 14 Prime / Composite | 64 12 Prime / Composite |
| 65 26 Prime / Composite | 66 3 Prime / Composite |
| 67 24 Prime / Composite | 68 36 Prime / Composite |

Lowest Common Multiple

16. Least common multiple

Find the least common multiple (LCM) of each set of numbers.

- | | | | |
|------------------|------------------|------------------|------------------|
| 1 6, 8 → ____ | 2 8, 12 → ____ | 3 9, 15 → ____ | 4 4, 6 → ____ |
| 5 4, 10 → ____ | 6 6, 9 → ____ | 7 10, 25 → ____ | 8 6, 10 → ____ |
| 9 6, 15 → ____ | 10 10, 15 → ____ | 11 9, 12 → ____ | 12 12, 20 → ____ |
| 13 8, 20 → ____ | 14 12, 16 → ____ | 15 15, 20 → ____ | 16 8, 10 → ____ |
| 17 15, 25 → ____ | 18 16, 20 → ____ | 19 12, 15 → ____ | 20 20, 25 → ____ |

17. Greatest common factor

Find the greatest common factor (GCF) of each set of numbers.

- | | | | |
|------------------|------------------|------------------|-----------------|
| 21 8, 14 → ____ | 22 10, 15 → ____ | 23 6, 21 → ____ | 24 6, 9 → ____ |
| 25 8, 10 → ____ | 26 12, 14 → ____ | 27 12, 21 → ____ | 28 6, 15 → ____ |
| 29 10, 12 → ____ | 30 6, 10 → ____ | 31 15, 21 → ____ | 32 4, 10 → ____ |
| 33 12, 15 → ____ | 34 10, 25 → ____ | 35 4, 14 → ____ | 36 9, 12 → ____ |
| 37 4, 6 → ____ | 38 20, 24 → ____ | 39 9, 15 → ____ | 40 6, 8 → ____ |

Factors and Multiples

WORKED EXAMPLE

 $4 \rightarrow \underline{1, 2, 4}$

18. List the factors

List all the factors of each number.

- 1 $2 \rightarrow$ _____
- 2 $29 \rightarrow$ _____
- 3 $6 \rightarrow$ _____
- 4 $3 \rightarrow$ _____
- 5 $17 \rightarrow$ _____
- 6 $13 \rightarrow$ _____
- 7 $38 \rightarrow$ _____
- 8 $11 \rightarrow$ _____
- 9 $37 \rightarrow$ _____
- 10 $19 \rightarrow$ _____
- 11 $26 \rightarrow$ _____
- 12 $31 \rightarrow$ _____

19. Is it a multiple?

Circle Yes or No for each question.

- 13 Is 16 a multiple of 4? Yes / No
- 14 Is 14 a multiple of 2? Yes / No
- 15 Is 20 a multiple of 10? Yes / No
- 16 Is 5 a multiple of 5? Yes / No
- 17 Is 16 a multiple of 2? Yes / No
- 18 Is 8 a multiple of 2? Yes / No
- 19 Is 24 a multiple of 4? Yes / No
- 20 Is 9 a multiple of 8? Yes / No
- 21 Is 10 a multiple of 5? Yes / No
- 22 Is 2 a multiple of 2? Yes / No

Prime and Composite Numbers

WORKED EXAMPLE

29

Prime

/ Composite

20. Prime or composite

Circle whether each number is prime or composite.

1 6 Prime / Composite

3 48 Prime / Composite

5 20 Prime / Composite

7 38 Prime / Composite

9 16 Prime / Composite

11 5 Prime / Composite

13 30 Prime / Composite

15 12 Prime / Composite

17 18 Prime / Composite

19 8 Prime / Composite

21 42 Prime / Composite

23 10 Prime / Composite

25 27 Prime / Composite

27 7 Prime / Composite

29 13 Prime / Composite

31 43 Prime / Composite

33 40 Prime / Composite

35 46 Prime / Composite

2 28 Prime / Composite

4 14 Prime / Composite

6 24 Prime / Composite

8 36 Prime / Composite

10 26 Prime / Composite

12 32 Prime / Composite

14 19 Prime / Composite

16 4 Prime / Composite

18 2 Prime / Composite

20 22 Prime / Composite

22 34 Prime / Composite

24 11 Prime / Composite

26 17 Prime / Composite

28 41 Prime / Composite

30 44 Prime / Composite

32 50 Prime / Composite

34 9 Prime / Composite

36 47 Prime / Composite

21. Multiplying integers

Multiply. Remember what two negative signs make.

37 $-10 \times 7 = \underline{\hspace{2cm}}$

38 $6 \times (-2) = \underline{\hspace{2cm}}$

39 $-10 \times 12 = \underline{\hspace{2cm}}$

40 $-2 \times 2 = \underline{\hspace{2cm}}$

41 $7 \times (-9) = \underline{\hspace{2cm}}$

42 $-2 \times 5 = \underline{\hspace{2cm}}$

21. Multiplying integers (continued)

Multiply. Remember what two negative signs make.

43 $-4 \times 9 =$ _____

44 $2 \times (-4) =$ _____

45 $3 \times (-10) =$ _____

46 $-11 \times 5 =$ _____

Dividing Fractions

WORKED EXAMPLE

$$\frac{7}{8} \div \frac{6}{8} = \frac{7}{6}$$

22. Dividing fractions

Divide. Write each answer in simplest form.

1 $\frac{5}{6} \div \frac{2}{6} = \underline{\hspace{1cm}}$

4 $\frac{1}{6} \div \frac{1}{5} = \underline{\hspace{1cm}}$

7 $\frac{3}{4} \div \frac{2}{6} = \underline{\hspace{1cm}}$

10 $\frac{3}{7} \div \frac{4}{5} = \underline{\hspace{1cm}}$

13 $\frac{1}{7} \div \frac{2}{7} = \underline{\hspace{1cm}}$

16 $\frac{1}{8} \div \frac{3}{5} = \underline{\hspace{1cm}}$

19 $\frac{1}{7} \div \frac{1}{8} = \underline{\hspace{1cm}}$

22 $\frac{6}{7} \div \frac{4}{6} = \underline{\hspace{1cm}}$

25 $\frac{1}{4} \div \frac{2}{4} = \underline{\hspace{1cm}}$

28 $\frac{3}{4} \div \frac{7}{8} = \underline{\hspace{1cm}}$

31 $\frac{1}{6} \div \frac{4}{8} = \underline{\hspace{1cm}}$

34 $\frac{5}{7} \div \frac{1}{3} = \underline{\hspace{1cm}}$

37 $\frac{1}{4} \div \frac{2}{6} = \underline{\hspace{1cm}}$

40 $\frac{2}{5} \div \frac{3}{8} = \underline{\hspace{1cm}}$

43 $\frac{2}{6} \div \frac{3}{4} = \underline{\hspace{1cm}}$

2 $\frac{2}{4} \div \frac{1}{3} = \underline{\hspace{1cm}}$

5 $\frac{4}{8} \div \frac{7}{8} = \underline{\hspace{1cm}}$

8 $\frac{7}{8} \div \frac{2}{5} = \underline{\hspace{1cm}}$

11 $\frac{3}{5} \div \frac{1}{4} = \underline{\hspace{1cm}}$

14 $\frac{3}{8} \div \frac{1}{6} = \underline{\hspace{1cm}}$

17 $\frac{5}{7} \div \frac{1}{7} = \underline{\hspace{1cm}}$

20 $\frac{4}{8} \div \frac{2}{8} = \underline{\hspace{1cm}}$

23 $\frac{4}{5} \div \frac{1}{3} = \underline{\hspace{1cm}}$

26 $\frac{1}{2} \div \frac{4}{7} = \underline{\hspace{1cm}}$

29 $\frac{3}{5} \div \frac{2}{7} = \underline{\hspace{1cm}}$

32 $\frac{2}{4} \div \frac{1}{5} = \underline{\hspace{1cm}}$

35 $\frac{3}{6} \div \frac{1}{5} = \underline{\hspace{1cm}}$

38 $\frac{2}{3} \div \frac{3}{6} = \underline{\hspace{1cm}}$

41 $\frac{3}{6} \div \frac{2}{8} = \underline{\hspace{1cm}}$

3 $\frac{3}{5} \div \frac{6}{7} = \underline{\hspace{1cm}}$

6 $\frac{6}{8} \div \frac{1}{7} = \underline{\hspace{1cm}}$

9 $\frac{5}{7} \div \frac{5}{6} = \underline{\hspace{1cm}}$

12 $\frac{3}{7} \div \frac{7}{8} = \underline{\hspace{1cm}}$

15 $\frac{1}{6} \div \frac{5}{8} = \underline{\hspace{1cm}}$

18 $\frac{1}{4} \div \frac{5}{7} = \underline{\hspace{1cm}}$

21 $\frac{1}{8} \div \frac{2}{8} = \underline{\hspace{1cm}}$

24 $\frac{5}{6} \div \frac{2}{8} = \underline{\hspace{1cm}}$

27 $\frac{1}{8} \div \frac{1}{6} = \underline{\hspace{1cm}}$

30 $\frac{2}{4} \div \frac{3}{7} = \underline{\hspace{1cm}}$

33 $\frac{2}{3} \div \frac{4}{8} = \underline{\hspace{1cm}}$

36 $\frac{5}{6} \div \frac{3}{7} = \underline{\hspace{1cm}}$

39 $\frac{7}{8} \div \frac{1}{5} = \underline{\hspace{1cm}}$

42 $\frac{1}{3} \div \frac{3}{7} = \underline{\hspace{1cm}}$

23. Absolute value

Work out each one. The bars ask how far the number is from zero.

44 $|5 - 6| = \underline{\hspace{1cm}}$

45 $|1 - 6| = \underline{\hspace{1cm}}$

46 $|-4| + |1| = \underline{\hspace{1cm}}$

47 $|7 - 20| = \underline{\hspace{1cm}}$

48 $|4 - 11| = \underline{\hspace{1cm}}$

49 $|2| = \underline{\hspace{1cm}}$

23. Absolute value (continued)

Work out each one. The bars ask how far the number is from zero.

50 $|8| + |-3| = \underline{\quad}$

51 $|4 - 13| = \underline{\quad}$

52 $|13 - 15| = \underline{\quad}$

53 $|5 - 14| = \underline{\quad}$

Dividing Decimals

WORKED EXAMPLE

$$18.6 \div 3 = \underline{6.2}$$

24. Multiply and divide decimals

Divide. Each quotient is an exact decimal.

- | | | |
|--|--|---|
| 1 $7.6 \div 2 = \underline{\hspace{2cm}}$ | 2 $29.7 \div 9 = \underline{\hspace{2cm}}$ | 3 $82.4 \div 8 = \underline{\hspace{2cm}}$ |
| 4 $19.2 \div 3 = \underline{\hspace{2cm}}$ | 5 $15.6 \div 4 = \underline{\hspace{2cm}}$ | 6 $2.4 \div 8 = \underline{\hspace{2cm}}$ |
| 7 $38.08 \div 8 = \underline{\hspace{2cm}}$ | 8 $58.0 \div 10 = \underline{\hspace{2cm}}$ | 9 $75.9 \div 11 = \underline{\hspace{2cm}}$ |
| 10 $11.2 \div 7 = \underline{\hspace{2cm}}$ | 11 $32.1 \div 3 = \underline{\hspace{2cm}}$ | 12 $20.5 \div 5 = \underline{\hspace{2cm}}$ |
| 13 $18.0 \div 4 = \underline{\hspace{2cm}}$ | 14 $7.92 \div 8 = \underline{\hspace{2cm}}$ | 15 $11.6 \div 4 = \underline{\hspace{2cm}}$ |
| 16 $60.5 \div 11 = \underline{\hspace{2cm}}$ | 17 $37.8 \div 9 = \underline{\hspace{2cm}}$ | 18 $40.5 \div 5 = \underline{\hspace{2cm}}$ |
| 19 $37.1 \div 7 = \underline{\hspace{2cm}}$ | 20 $21.6 \div 12 = \underline{\hspace{2cm}}$ | 21 $66.5 \div 7 = \underline{\hspace{2cm}}$ |
| 22 $6.3 \div 7 = \underline{\hspace{2cm}}$ | 23 $55.0 \div 11 = \underline{\hspace{2cm}}$ | 24 $31.2 \div 8 = \underline{\hspace{2cm}}$ |
| 25 $4.20 \div 5 = \underline{\hspace{2cm}}$ | 26 $47.7 \div 9 = \underline{\hspace{2cm}}$ | 27 $9.9 \div 11 = \underline{\hspace{2cm}}$ |
| 28 $16.0 \div 2 = \underline{\hspace{2cm}}$ | 29 $5.6 \div 8 = \underline{\hspace{2cm}}$ | 30 $20.4 \div 6 = \underline{\hspace{2cm}}$ |
| 31 $66.0 \div 12 = \underline{\hspace{2cm}}$ | 32 $6.00 \div 6 = \underline{\hspace{2cm}}$ | 33 $81.6 \div 12 = \underline{\hspace{2cm}}$ |
| 34 $3.60 \div 10 = \underline{\hspace{2cm}}$ | 35 $18.6 \div 2 = \underline{\hspace{2cm}}$ | 36 $28.0 \div 7 = \underline{\hspace{2cm}}$ |
| 37 $57.0 \div 10 = \underline{\hspace{2cm}}$ | 38 $50.5 \div 5 = \underline{\hspace{2cm}}$ | 39 $48.0 \div 10 = \underline{\hspace{2cm}}$ |
| 40 $11.0 \div 5 = \underline{\hspace{2cm}}$ | 41 $1.8 \div 6 = \underline{\hspace{2cm}}$ | 42 $21.89 \div 11 = \underline{\hspace{2cm}}$ |
| 43 $2.8 \div 2 = \underline{\hspace{2cm}}$ | 44 $18.3 \div 3 = \underline{\hspace{2cm}}$ | 45 $29.1 \div 3 = \underline{\hspace{2cm}}$ |
| 46 $30.8 \div 7 = \underline{\hspace{2cm}}$ | 47 $1.08 \div 2 = \underline{\hspace{2cm}}$ | 48 $97.9 \div 11 = \underline{\hspace{2cm}}$ |
| 49 $47.3 \div 11 = \underline{\hspace{2cm}}$ | 50 $1.92 \div 4 = \underline{\hspace{2cm}}$ | |

25. Order of operations

Follow the order of operations to solve each problem.

- | | | |
|---|---|---|
| 51 $18 \div 3 + 5 = \underline{\hspace{2cm}}$ | 52 $32 \div 4 + 4 = \underline{\hspace{2cm}}$ | 53 $2 + 44 \div 4 = \underline{\hspace{2cm}}$ |
| 54 $7 + 10 \div 5 = \underline{\hspace{2cm}}$ | 55 $4 - 21 \div 7 = \underline{\hspace{2cm}}$ | 56 $5 - 27 \div 9 = \underline{\hspace{2cm}}$ |
| 57 $40 \div 4 + 5 = \underline{\hspace{2cm}}$ | 58 $6 + 12 \div 3 = \underline{\hspace{2cm}}$ | 59 $6 + 28 \div 7 = \underline{\hspace{2cm}}$ |
| 60 $3 + 9 \div 3 = \underline{\hspace{2cm}}$ | | |

Evaluating Expressions

WORKED EXAMPLE

$$x = 2 \quad 6x + 6 = \underline{18}$$

$6x + 6$ with $x = 2$

$$6 \times 2 = 12$$

$$12 + 6 = 18$$

$$6x + 6 = 18$$

26. Evaluate expressions

Put the number in place of the letter, then work each one out.

1 $x = 7 \quad 2x + 5 = \underline{\quad}$

2 $x = 10 \quad 2x - 17 = \underline{\quad}$

3 $a = 2, b = 7 \quad 6a + b = \underline{\quad}$

4 $x = 5 \quad 2x + 10 = \underline{\quad}$

5 $x = 12 \quad 3x - 16 = \underline{\quad}$

6 $x = 3 \quad 7x + 3 = \underline{\quad}$

7 $x = 8 \quad 2x + 12 = \underline{\quad}$

8 $x = 4 \quad 6x - 8 = \underline{\quad}$

9 $x = 2 \quad 8x - 5 = \underline{\quad}$

10 $x = 2 \quad 9x + 6 = \underline{\quad}$

11 $a = 4, b = 3 \quad 2a + b = \underline{\quad}$

12 $x = 2 \quad 9x - 18 = \underline{\quad}$

26. Evaluate expressions (continued)

Put the number in place of the letter, then work each one out.

13 $x = 6$ $2x - 5 =$ ____

14 $x = 7$ $2x + 14 =$ ____

15 $x = 8$ $3x =$ ____

16 $x = 2$ $7x =$ ____

17 $x = 2$ $2x - 3 =$ ____

18 $x = 2$ $9x + 16 =$ ____

19 $x = 2$ $8x - 1 =$ ____

20 $x = 4$ $4x - 2 =$ ____

27. Exponents

Find the value of each square.

21 $3^2 =$ ____

22 $17^2 =$ ____

23 $5^2 =$ ____

24 $8^2 =$ ____

25 $10^2 =$ ____

26 $7^2 =$ ____

27 $4^2 =$ ____

28 $15^2 =$ ____

29 $19^2 =$ ____

30 $9^2 =$ ____

Like Terms and the Distributive Property

WORKED EXAMPLE

$$10 + 4x + 4 + 6x$$

$$4 + 6 = 10$$

$$10 + 4 = 14$$

$$10x + 14$$

28. Collect like terms

Collect the like terms.

1 $8x + 2x + 13$

2 $6x + 3x + 12$

3 $5x + 18 - 2x$

4 $5 + 3x + 11 + 2x$

5 $8 + 2x + 3 + 9x$

6 $5x + 12 - 3x$

7 $8x + 9 - 4x - 7$

8 $11 + 2x + 5 + x$

9 $3 + 4x + 7 + 5x$

10 $10 + 5x + 7 + 3x$

11 $6x + 15 - 2x - 10$

12 $9x + 13 - 8x$

13 $4 + 3x + 6 + 4x$

14 $10x + 4 - 8x - 2$

15 $6x + 2x + 4$

16 $5x + 2x + 20$

29. Multiply out brackets

Multiply out each bracket.

17 $2(9x + 3)$

18 $8(2x - 2)$

19 $6(4x + 7)$

20 $3(x - 7)$

21 $2(2x - 11)$

22 $7(2 + x)$

23 $2(6 + 9x)$

24 $2(4x + 5)$

25 $4(3 + 2x)$

26 $5(6x + 3)$

27 $5(6x + 4)$

28 $2(8x + 11)$

29 $4(x + 9)$

30 $3(5x + 12)$

31 $2(4x - 7)$

32 $4(2x + 2)$

Solving Equations

WORKED EXAMPLE

$$x + 29 = 44 \quad \underline{15}$$

30. Solving equations

Solve each equation for x .

- | | | |
|-----------------------|-----------------------|-----------------------|
| 1 $x + 40 = 45$ ____ | 2 $x + 12 = 13$ ____ | 3 $x + 17 = 32$ ____ |
| 4 $x - 5 = 6$ ____ | 5 $x + 44 = 50$ ____ | 6 $35 - x = 22$ ____ |
| 7 $x - 18 = 9$ ____ | 8 $x - 9 = 4$ ____ | 9 $x + 16 = 24$ ____ |
| 10 $23 - x = 16$ ____ | 11 $25 - x = 6$ ____ | 12 $x + 20 = 31$ ____ |
| 13 $50 - x = 47$ ____ | 14 $x + 4 = 18$ ____ | 15 $x + 24 = 25$ ____ |
| 16 $29 - x = 17$ ____ | 17 $x + 28 = 33$ ____ | 18 $x + 1 = 15$ ____ |
| 19 $x - 9 = 1$ ____ | 20 $39 - x = 37$ ____ | 21 $29 - x = 8$ ____ |
| 22 $38 - x = 37$ ____ | 23 $x + 18 = 29$ ____ | 24 $15 - x = 9$ ____ |
| 25 $x + 5 = 34$ ____ | 26 $x + 14 = 19$ ____ | 27 $x - 2 = 1$ ____ |
| 28 $x + 15 = 43$ ____ | 29 $8 - x = 7$ ____ | 30 $26 - x = 19$ ____ |
| 31 $x + 34 = 38$ ____ | 32 $44 - x = 24$ ____ | 33 $x + 19 = 24$ ____ |
| 34 $8 - x = 3$ ____ | 35 $x + 10 = 35$ ____ | 36 $22 - x = 14$ ____ |
| 37 $34 - x = 29$ ____ | 38 $x - 13 = 9$ ____ | 39 $x + 37 = 39$ ____ |
| 40 $38 - x = 30$ ____ | 41 $46 - x = 40$ ____ | 42 $x + 12 = 35$ ____ |
| 43 $x + 6 = 13$ ____ | 44 $16 - x = 3$ ____ | 45 $31 - x = 7$ ____ |
| 46 $x + 17 = 19$ ____ | 47 $x - 6 = 2$ ____ | 48 $49 - x = 21$ ____ |
| 49 $39 - x = 32$ ____ | 50 $x + 10 = 23$ ____ | |

31. Greatest common factor

Find the greatest common factor (GCF) of each set of numbers.

- | | | | |
|------------------------------|----------------------------|------------------------------|-----------------------------|
| 51 $12, 14 \rightarrow$ ____ | 52 $6, 9 \rightarrow$ ____ | 53 $12, 20 \rightarrow$ ____ | 54 $6, 14 \rightarrow$ ____ |
| 55 $6, 10 \rightarrow$ ____ | 56 $6, 8 \rightarrow$ ____ | 57 $20, 25 \rightarrow$ ____ | 58 $8, 10 \rightarrow$ ____ |
| 59 $10, 14 \rightarrow$ ____ | 60 $4, 6 \rightarrow$ ____ | | |

Inequalities

WORKED EXAMPLE

$$4x \leq 4 \quad x \leq 1$$

$$4 \div 4 = 1$$

$$x \leq 1$$

32. Inequalities

Solve each one, then write $>$, $<$, $\geq$ or $\leq$ in the box.

1 $4x > 24 \quad x \boxed{} 6$

2 $2x \geq 18 \quad x \boxed{} 9$

3 $3x \leq 42 \quad x \boxed{} 14$

4 $2x \leq 8 \quad x \boxed{} 4$

5 $2x < 12 \quad x \boxed{} 6$

6 $6x \leq 42 \quad x \boxed{} 7$

7 $-5x < -5 \quad x \boxed{} 1$

8 $2x < -12 \quad x \boxed{} -6$

9 $3x < 24 \quad x \boxed{} 8$

10 $7x \leq 14 \quad x \boxed{} 2$

11 $-4x \geq -16 \quad x \boxed{} 4$

12 $2x > -12 \quad x \boxed{} -6$

13 $4x < -32 \quad x \boxed{} -8$

14 $2x \leq -36 \quad x \boxed{} -18$

15 $9x \geq -27 \quad x \boxed{} -3$

16 $3x > 3 \quad x \boxed{} 1$

17 $9x \geq 9 \quad x \boxed{} 1$

18 $4x > -40 \quad x \boxed{} -10$

19 $5x > -15 \quad x \boxed{} -3$

20 $3x \geq 15 \quad x \boxed{} 5$

21 $2x \leq -44 \quad x \boxed{} -22$

22 $2x > 12 \quad x \boxed{} 6$

23 $4x \leq -36 \quad x \boxed{} -9$

33. Least common multiple

Find the least common multiple (LCM) of each set of numbers.

24 $6, 10 \rightarrow \underline{\hspace{1cm}}$

25 $10, 15 \rightarrow \underline{\hspace{1cm}}$

26 $12, 16 \rightarrow \underline{\hspace{1cm}}$

27 $6, 8 \rightarrow \underline{\hspace{1cm}}$

28 $6, 9 \rightarrow \underline{\hspace{1cm}}$

29 $4, 10 \rightarrow \underline{\hspace{1cm}}$

30 $8, 10 \rightarrow \underline{\hspace{1cm}}$

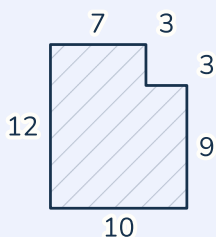
31 $6, 15 \rightarrow \underline{\hspace{1cm}}$

32 $4, 6 \rightarrow \underline{\hspace{1cm}}$

33 $8, 12 \rightarrow \underline{\hspace{1cm}}$

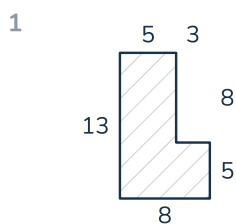
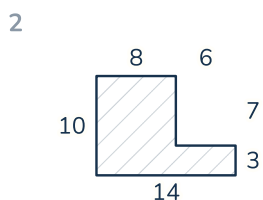
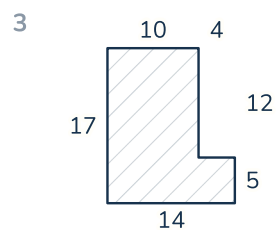
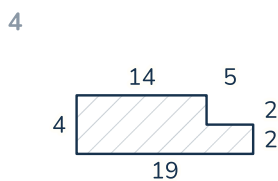
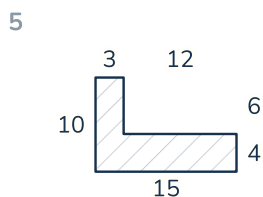
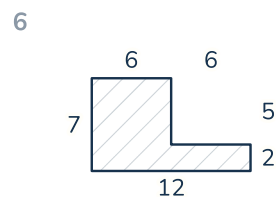
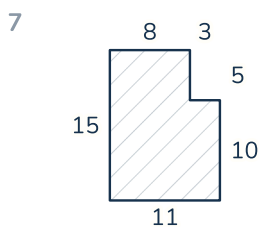
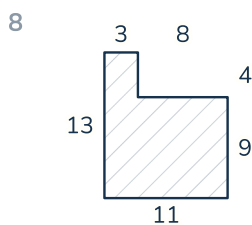
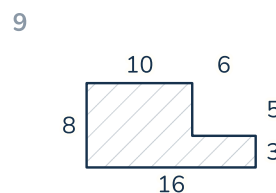
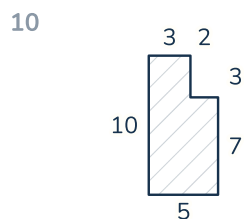
Area of Composite Shapes

WORKED EXAMPLE

**111** cm²

34. Area of composite figures

Find the area of each figure. All lengths are in centimeters.

_____ cm²_____ cm²_____ cm²_____ cm²_____ cm²_____ cm²_____ cm²_____ cm²_____ cm²_____ cm²

35. Is it a multiple?

Circle Yes or No for each question.

- 11 Is 6 a multiple of 3? Yes / No
- 12 Is 12 a multiple of 2? Yes / No
- 13 Is 20 a multiple of 3? Yes / No
- 14 Is 9 a multiple of 8? Yes / No
- 15 Is 13 a multiple of 2? Yes / No
- 16 Is 12 a multiple of 3? Yes / No
- 17 Is 20 a multiple of 10? Yes / No
- 18 Is 8 a multiple of 2? Yes / No
- 19 Is 5 a multiple of 5? Yes / No
- 20 Is 4 a multiple of 4? Yes / No

Area of Figures

WORKED EXAMPLE



18 cm²

36. Area

Find the area. Lengths are in cm; the dashed line is the height.

1



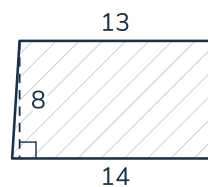
_____ cm²

2



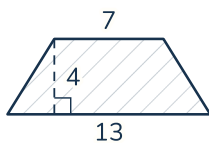
_____ cm²

3



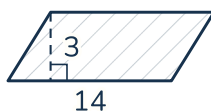
_____ cm²

4



_____ cm²

5



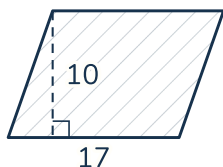
_____ cm²

6



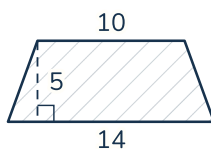
_____ cm²

7



_____ cm²

8



_____ cm²

9



_____ cm²

10



_____ cm²

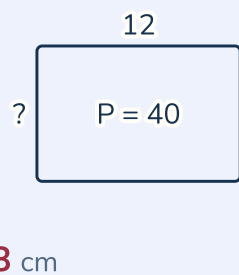
37. List the factors

List all the factors of each number.

- 11 **2** → _____
- 12 **23** → _____
- 13 **14** → _____
- 14 **7** → _____
- 15 **19** → _____
- 16 **5** → _____
- 17 **21** → _____
- 18 **37** → _____
- 19 **31** → _____
- 20 **11** → _____

Missing Sides

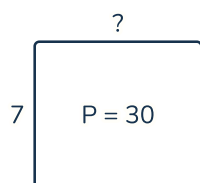
WORKED EXAMPLE



38. Find the missing side

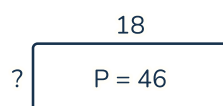
Find the missing side. All lengths are in centimeters.

1



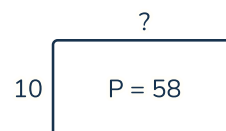
_____ cm

2



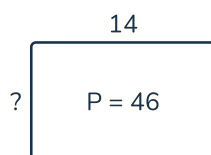
_____ cm

3



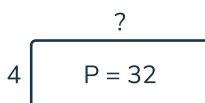
_____ cm

4



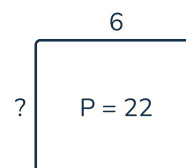
_____ cm

5



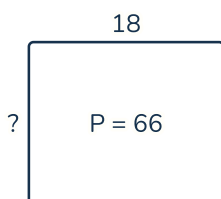
_____ cm

6



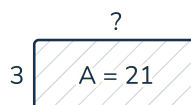
_____ cm

7



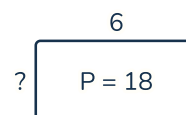
_____ cm

8



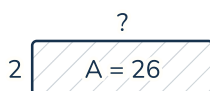
_____ cm

9



_____ cm

10



_____ cm

39. Prime or composite

Circle whether each number is prime or composite.

¹¹ 26 Prime / Composite

¹³ 46 Prime / Composite

¹⁵ 30 Prime / Composite

¹⁷ 48 Prime / Composite

¹⁹ 16 Prime / Composite

¹² 28 Prime / Composite

¹⁴ 12 Prime / Composite

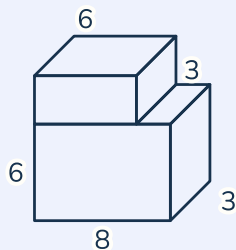
¹⁶ 10 Prime / Composite

¹⁸ 36 Prime / Composite

²⁰ 8 Prime / Composite

Volume of Prisms

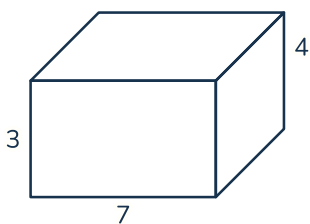
WORKED EXAMPLE

**198** cm³

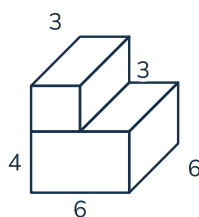
40. Volume of a rectangular prism

Find the volume of each box. All lengths are in centimeters.

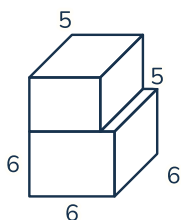
1

_____ cm³

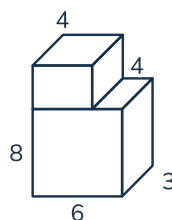
2

_____ cm³

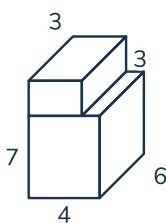
3

_____ cm³

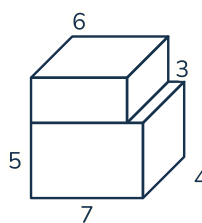
4

_____ cm³

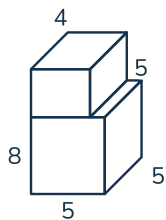
5

_____ cm³

6

_____ cm³

7

_____ cm³

41. Dividing fractions

Divide. Write each answer in simplest form.

$$8 \quad \frac{1}{5} \div \frac{3}{6} = \text{---}$$

$$9 \quad \frac{1}{8} \div \frac{4}{6} = \text{---}$$

$$10 \quad \frac{2}{4} \div \frac{3}{5} = \text{---}$$

$$11 \quad \frac{5}{7} \div \frac{6}{8} = \text{---}$$

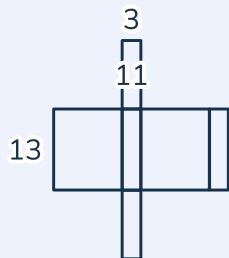
$$12 \quad \frac{4}{7} \div \frac{2}{4} = \text{---}$$

$$13 \quad \frac{5}{7} \div \frac{1}{6} = \text{---}$$

$$14 \quad \frac{4}{5} \div \frac{1}{5} = \text{---}$$

Surface Area

WORKED EXAMPLE

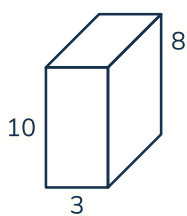


430 cm²

42. Surface area of a box

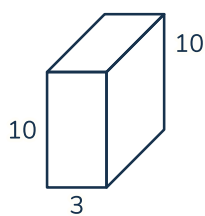
Find the surface area of each box. All lengths are in centimeters.

1



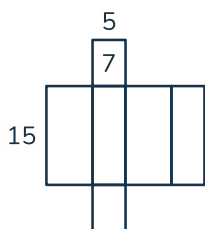
_____ cm²

2



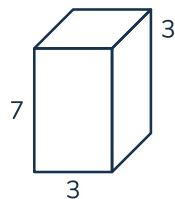
_____ cm²

3



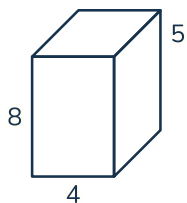
_____ cm²

4



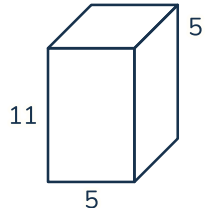
_____ cm²

5



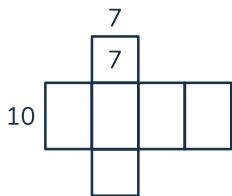
_____ cm²

6



_____ cm²

7



_____ cm²

43. Multiply and divide decimals

Divide. Each quotient is an exact decimal.

8 $17.0 \div 10 = \underline{\hspace{2cm}}$

9 $37.8 \div 9 = \underline{\hspace{2cm}}$

10 $3.06 \div 3 = \underline{\hspace{2cm}}$

11 $23.4 \div 9 = \underline{\hspace{2cm}}$

12 $6.3 \div 9 = \underline{\hspace{2cm}}$

13 $21.6 \div 12 = \underline{\hspace{2cm}}$

14 $19.8 \div 2 = \underline{\hspace{2cm}}$

Finding the Mean

WORKED EXAMPLE

Mean

38, 30, 22, 38, 12

$$38 + 30 + 22 + 38 + 12 = 140$$

$$140 \div 5 = 28$$

28

44. The mean

Find the mean of each set of numbers.

1 Mean

4, 35, 4, 30, 32

2 Mean

36, 33, 23, 4, 4

3 Mean

42, 45, 30, 6, 42

4 Mean

17, 2, 17, 34, 25

5 Mean

30, 16, 35, 39, 30

6 Mean

30, 30, 34, 4, 22

7 Mean

37, 42, 45, 13, 13

8 Mean

39, 20, 33, 20, 18

9 Mean

26, 9, 32, 39, 9

10 Mean

38, 32, 38, 19, 33

11 Mean

15, 41, 34, 14, 41

12 Mean

25, 14, 34, 32, 25

44. The mean (continued)

Find the mean of each set of numbers.

13 Mean
28, 39, 18, 18, 32

15 Mean
24, 17, 15, 15, 9

17 Mean
30, 30, 7, 24, 4

19 Mean
28, 29, 1, 28, 24

21 Mean
17, 15, 45, 26, 17

23 Mean
3, 11, 7, 18, 11

25 Mean
31, 37, 41, 37, 34

27 Mean
13, 10, 15, 13, 4

14 Mean
30, 44, 46, 11, 44

16 Mean
14, 21, 25, 5, 25

18 Mean
28, 10, 45, 37, 10

20 Mean
27, 37, 37, 26, 13

22 Mean
16, 16, 11, 38, 39

24 Mean
16, 27, 27, 10, 30

26 Mean
6, 32, 28, 32, 12

28 Mean
35, 46, 35, 31, 13

44. The mean (continued)

Find the mean of each set of numbers.

29 Mean
28, 22, 29, 29, 12

31 Mean
9, 34, 34, 30, 18

33 Mean
31, 36, 4, 38, 36

30 Mean
33, 26, 33, 3, 20

32 Mean
24, 43, 17, 33, 43

34 Mean
13, 1, 20, 20, 31

45. Evaluate expressions

Put the number in place of the letter, then work each one out.

35 $x = 11$ $2x - 15 =$ _____

36 $x = 3$ $7x - 10 =$ _____

37 $x = 7$ $4x - 5 =$ _____

38 $x = 3$ $8x - 17 =$ _____

39 $x = 3$ $7x + 1 =$ _____

40 $x = 3$ $5x - 13 =$ _____

41 $x = 6$ $6x + 1 =$ _____

42 $x = 6$ $3x + 6 =$ _____

43 $a = 2, b = 5$ $2a + b =$ _____

44 $x = 2$ $7x - 9 =$ _____

WORKED EXAMPLE

Median

17, 21, 9, 17, 16

given: 17 21 9 17 16

sorted: 9 16 17 17 21

17

46. The median

Find the median of each set of numbers.

- 1

Median

16, 1, 30, 29, 29

- 2

Median

31, 38, 22, 7, 7

- 3

Median

14, 8, 42, 14, 37

- 4

Median

24, 33, 26, 24, 28

- 5

Median

14, 14, 18, 11, 3

- 6

Median

5, 26, 17, 17, 30

- 7

Median

5, 40, 2, 33, 40

- 8

Median

28, 35, 16, 35, 36

- 9

Median

29, 16, 29, 23, 18

- 10

Median

27, 27, 18, 10, 23

- 11

Median

40, 40, 14, 25, 6

- 12

Median

28, 20, 21, 20, 31

- 13

Median

23, 4, 8, 20, 20

- 14

Median

24, 2, 24, 21, 44

- 15

Median

4, 8, 4, 10, 19

- 16

Median

3, 33, 37, 33, 14

- 17

Median

4, 32, 18, 9, 32

- 18

Median

45, 13, 45, 20, 27

46. The median (continued)

Find the median of each set of numbers.

- 19

Median

38, 32, 32, 5, 23

- 20

Median

33, 38, 29, 22, 38

- 21

Median

5, 4, 37, 42, 37

- 22

Median

21, 15, 37, 15, 12

- 23

Median

15, 23, 3, 21, 23

- 24

Median

29, 6, 11, 17, 17

47. The range

Find the range of each set of numbers.

- 25

Range

15, 19, 33, 15, 3

- 26

Range

2, 19, 11, 17, 11

- 27

Range

44, 27, 16, 41, 27

- 28

Range

29, 29, 37, 18, 32

- 29

Range

16, 24, 33, 34, 33

- 30

Range

24, 34, 22, 24, 26

- 31

Range

38, 41, 1, 45, 45

- 32

Range

12, 32, 24, 16, 16

- 33

Range

14, 28, 37, 23, 28

- 34

Range

4, 10, 35, 36, 10

- 35

Range

24, 13, 24, 42, 37

- 36

Range

24, 26, 27, 37, 26

- 37

Range

31, 26, 34, 18, 31

- 38

Range

38, 15, 40, 38, 44

- 39

Range

39, 11, 10, 14, 11

- 40

Range

17, 3, 17, 29, 39

- 41

Range

11, 22, 37, 37, 33

- 42

Range

24, 8, 45, 38, 45

- 43

Range

2, 1, 9, 1, 27

- 44

Range

12, 1, 17, 8, 17

- 45

Range

44, 14, 11, 12, 44

- 46

Range

16, 26, 28, 17, 28

- 47

Range

7, 7, 37, 9, 25

- 48

Range

11, 32, 7, 9, 11

48. Multiply out brackets

Multiply out each bracket.

49 $2(6x - 3)$

50 $4(6x + 6)$

51 $4(4 + 6x)$

52 $2(6 + x)$

53 $9(x + 2)$

54 $5(2x + 4)$

55 $7(4x + 3)$

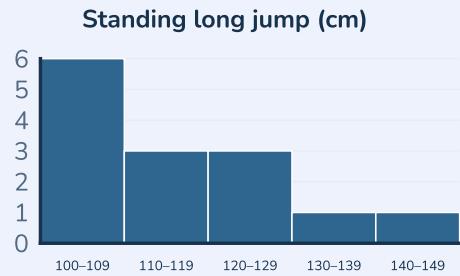
56 $2(5 + 6x)$

57 $3(6x + 3)$

58 $5(4x - 2)$

Histograms

WORKED EXAMPLE

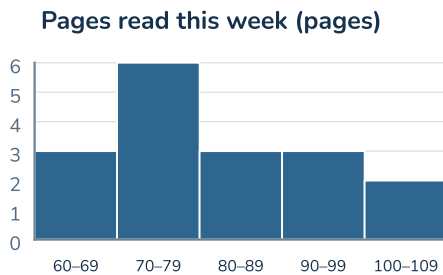


Which interval holds the most?

100-109

49. Histograms

Read each histogram and answer the question.

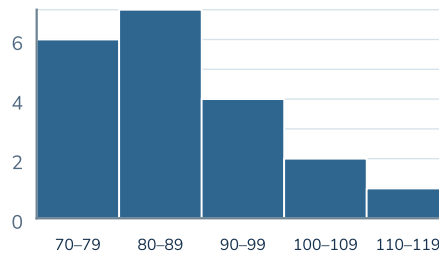


- 1 How many readers are in the 60-69 interval?

- 2 Which interval holds the most?

- 3 How many readers were measured altogether?

Scores on the science quiz (points)



- 4 How many students were measured altogether?

50. Collect like terms

Collect the like terms.

5 $4 + 3x + 8 + 2x$

6 $2 + 2x + 4 + 3x$

7 $9x + 14 - 8x - 8$

8 $10x + 4 - 7x$

Statistics Word Problems

WORKED EXAMPLE

In five weeks one summer, a garden grew 21, 16, 10, 6 and 10 tomatoes.

Find the median.

ANSWER: Ordered: 6, 10, 10, 16, 21; the middle value is 10.

51. Word problems: statistics

Read each problem. Write the answer.

- 1 The tomatoes a garden grew over five weeks one summer were 19, 20, 21, 18 and 19.

Find the range.

- 2 The kites a store sold over five days one vacation week were 12, 10, 9, 21 and 9.

Find the median.

- 3 Across five days one week, a library lent out 16, 26, 11, 16 and 9 books.

What is the median number of books?

- 4 A record from five days one week shows that a library lent out 15, 21, 26, 14 and 14 books.

What is the mode?

- 5 Over five mornings one spring, a farm collected 15, 15, 8, 7 and 12 eggs.

Which number of eggs was the mode?

- 6 A store sold 12, 7, 7, 9 and 11 kites over five days one vacation week.

What was the median number of kites?

51. Word problems: statistics (continued)

Read each problem. Write the answer.

- 7 A bakery sold 13, 14, 15, 19 and 14 cakes over five days at the market.
What was the median number of cakes?

- 8 In five days at the market, a bakery sold 30, 19, 8, 19 and 25 cakes.
Which number of cakes came up most often?

- 9 The books a library lent out over five days one week were 13, 15, 11, 21 and 13.
Find the range.

- 10 Across five mornings one spring, a farm collected 10, 8, 10, 14 and 30 eggs.
What is the median number of eggs?

- 11 A record from five days at the market shows that a bakery sold 20, 5, 15, 15 and 7 cakes.
What is the median number of cakes?

- 12 Across five weeks one summer, a garden grew 21, 29, 16, 20 and 20 tomatoes.
What is the range?

- 13 A farm collected 27, 14, 26, 30 and 14 eggs over five mornings one spring.
What is the range of the five counts?

- 14 In five days one vacation week, a store sold 10, 19, 10, 15 and 23 kites.
Find the median.

52. Solving equations

Solve each equation for x.

15 $x + 31 = 40$ _____

18 $x + 20 = 31$ _____

21 $45 - x = 29$ _____

24 $x + 33 = 35$ _____

16 $39 - x = 37$ _____

19 $42 - x = 35$ _____

22 $x + 41 = 47$ _____

17 $x + 1 = 26$ _____

20 $16 - x = 5$ _____

23 $x - 6 = 7$ _____

Look for the Structure

53. Look for the structure

Read each question and write what you work out.

- 1 A number that is a multiple of both 2 and 3 is a multiple of 6.

☐ always☐ sometimes☐ never

Why?

- 2 The difference between two multiples of 3 is a multiple of 3.

☐ always☐ sometimes☐ never

Why?

- 3 The product of two consecutive numbers is even.

☐ always☐ sometimes☐ never

Why?

- 4 Adding up the odd numbers starting from 1 gives a square number.

☐ always☐ sometimes☐ never

Why?

- 5 The sum of four consecutive numbers is a multiple of 4.

☐ always☐ sometimes☐ never

Why?

- 6 The product of three consecutive numbers is a multiple of 6.

☐ always☐ sometimes☐ never

Why?

- 7 A number that is a multiple of both 3 and 4 is a multiple of 12.

☐ always☐ sometimes☐ never

Why?

- 8 The sum of five consecutive numbers is a multiple of 5.

☐ always☐ sometimes☐ never

Why?

Answer Key (1 of 13)

Ratio

Simplifying a ratio

1. $4 : 10 = 2 : 5$
2. $15 : 35 = 3 : 7$
3. $2 : 6 = 1 : 3$
4. $18 : 30 = 3 : 5$
5. $5 : 10 = 1 : 2$
6. $6 : 16 = 3 : 8$
7. $12 : 15 = 4 : 5$
8. $15 : 40 = 3 : 8$
9. $9 : 12 = 3 : 4$
10. $5 : 30 = 1 : 6$
11. $10 : 16 = 5 : 8$
12. $12 : 32 = 3 : 8$
13. $9 : 15 = 3 : 5$
14. $10 : 25 = 2 : 5$
15. $2 : 10 = 1 : 5$
16. $2 : 4 = 1 : 2$
17. $18 : 24 = 3 : 4$
18. $6 : 8 = 3 : 4$
19. $4 : 24 = 1 : 6$
20. $4 : 8 = 1 : 2$
21. $4 : 12 = 1 : 3$
22. $25 : 30 = 5 : 6$
23. $18 : 42 = 3 : 7$
24. $6 : 30 = 1 : 5$
25. $2 : 12 = 1 : 6$
26. $4 : 6 = 2 : 3$
27. $6 : 36 = 1 : 6$
28. $8 : 12 = 2 : 3$
29. $3 : 18 = 1 : 6$
30. $15 : 24 = 5 : 8$
31. $10 : 12 = 5 : 6$
32. $2 : 8 = 1 : 4$
33. $6 : 14 = 3 : 7$
34. $3 : 9 = 1 : 3$
35. $12 : 16 = 3 : 4$
36. $5 : 25 = 1 : 5$
37. $12 : 18 = 2 : 3$
38. $25 : 40 = 5 : 8$
39. $12 : 20 = 3 : 5$
40. $24 : 30 = 4 : 5$
41. $20 : 32 = 5 : 8$
42. $4 : 16 = 1 : 4$
43. $12 : 30 = 2 : 5$
44. $18 : 48 = 3 : 8$
45. $3 : 12 = 1 : 4$

Ratio (continued)

Simplifying a ratio (continued)

46. $8 : 10 = 4 : 5$
47. $20 : 24 = 5 : 6$
48. $8 : 20 = 2 : 5$
49. $15 : 18 = 5 : 6$
50. $9 : 21 = 3 : 7$

Unit rates

51. \$42 for 6 = \$7 each
52. \$9 for 3 = \$3 each
53. \$8 for 4 = \$2 each
54. \$18 for 3 = \$6 each
55. \$55 for 5 = \$11 each
56. \$18 for 2 = \$9 each
57. \$40 for 5 = \$8 each
58. \$35 for 7 = \$5 each
59. \$21 for 7 = \$3 each
60. \$56 for 7 = \$8 each
61. \$80 for 8 = \$10 each
62. \$24 for 3 = \$8 each

Percents

Decimals as percents

1. $0.72 = 72\%$
2. $0.95 = 95\%$
3. $0.08 = 8\%$
4. $0.98 = 98\%$
5. $0.4 = 40\%$
6. $0.88 = 88\%$
7. $0.87 = 87\%$
8. $0.48 = 48\%$
9. $0.63 = 63\%$
10. $0.31 = 31\%$
11. $0.94 = 94\%$
12. $0.06 = 6\%$
13. $0.75 = 75\%$
14. $0.09 = 9\%$
15. $0.36 = 36\%$
16. $0.21 = 21\%$
17. $0.07 = 7\%$
18. $0.17 = 17\%$
19. $0.80 = 80\%$
20. $0.43 = 43\%$
21. $0.97 = 97\%$
22. $0.44 = 44\%$
23. $0.46 = 46\%$
24. $0.77 = 77\%$

Answer Key (2 of 13)

Percents (continued)

Decimals as percents (continued)

25. $0.10 = 10\%$
26. $0.66 = 66\%$
27. $0.86 = 86\%$
28. $0.54 = 54\%$
29. $0.13 = 13\%$
30. $0.70 = 70\%$
31. $0.6 = 60\%$
32. $0.61 = 61\%$
33. $0.73 = 73\%$
34. $0.11 = 11\%$
35. $0.92 = 92\%$
36. $0.27 = 27\%$
37. $0.52 = 52\%$
38. $0.19 = 19\%$
39. $0.76 = 76\%$
40. $0.59 = 59\%$
41. $0.47 = 47\%$
42. $0.82 = 82\%$
43. $0.65 = 65\%$
44. $0.68 = 68\%$
45. $0.81 = 81\%$
46. $0.30 = 30\%$
47. $0.42 = 42\%$
48. $0.69 = 69\%$
49. $0.24 = 24\%$
50. $0.85 = 85\%$

Percent

51. 40% of 120 = 48
52. 60% of 160 = 96
53. 60% of 195 = 117
54. 25% of 80 = 20
55. 60% of 105 = 63
56. 25% of 44 = 11
57. 40% of 135 = 54
58. 80% of 60 = 48
59. 75% of 92 = 69
60. 50% of 48 = 24
61. 50% of 194 = 97
62. 40% of 75 = 30

Positive and Negative Numbers

Add and subtract integers

1. $-1 + 1 = 0$
2. $-13 + 7 = -6$
3. $-19 + 14 = -5$

Positive and Negative Numbers (continued)

Add and subtract integers (continued)

4. $-2 + 10 = 8$
5. $-19 + 2 = -17$
6. $-13 + 9 = -4$
7. $-2 + 13 = 11$
8. $-19 + 10 = -9$
9. $-15 + 6 = -9$
10. $1 - 2 = -1$
11. $-16 + 11 = -5$
12. $-16 + 1 = -15$
13. $-20 + 10 = -10$
14. $-13 + 16 = 3$
15. $-7 + 7 = 0$
16. $-1 + 9 = 8$
17. $-3 + 3 = 0$
18. $-8 + 15 = 7$
19. $-2 + 7 = 5$
20. $-6 + 2 = -4$
21. $-18 + 11 = -7$
22. $-7 + 4 = -3$
23. $-8 + 7 = -1$
24. $-11 + 9 = -2$
25. $2 - 7 = -5$
26. $-1 + 3 = 2$
27. $-20 + 3 = -17$
28. $-8 + 14 = 6$
29. $-4 + 10 = 6$
30. $-9 + 5 = -4$
31. $-12 + 9 = -3$
32. $-7 + 16 = 9$
33. $-2 + 5 = 3$
34. $3 - 4 = -1$
35. $3 - 10 = -7$
36. $-9 + 8 = -1$
37. $-11 + 4 = -7$
38. $-17 + 17 = 0$
39. $-18 + 6 = -12$
40. $-16 + 9 = -7$
41. $-12 + 8 = -4$
42. $-18 + 13 = -5$
43. $1 - 5 = -4$
44. $-8 + 9 = 1$
45. $6 - 12 = -6$
46. $3 - 5 = -2$
47. $-20 + 1 = -19$
48. $-6 + 14 = 8$

Answer Key (3 of 13)

Positive and Negative Numbers (continued)

Add and subtract integers (continued)

49. $-13 + 4 = -9$

50. $-17 + 10 = -7$

Multiplying Integers

Multiplying integers

1. $6 \times -10 = -60$

2. $2 \times -12 = -24$

3. $9 \times -2 = -18$

4. $2 \times -5 = -10$

5. $-3 \times 7 = -21$

6. $5 \times -5 = -25$

7. $-2 \times -6 = 12$

8. $-8 \times 3 = -24$

9. $-4 \times 2 = -8$

10. $-4 \times 4 = -16$

11. $10 \times -10 = -100$

12. $-8 \times 2 = -16$

13. $-8 \times 5 = -40$

14. $12 \times -4 = -48$

15. $-11 \times 2 = -22$

16. $-10 \times 2 = -20$

17. $6 \times -8 = -48$

18. $10 \times -3 = -30$

19. $4 \times -10 = -40$

20. $2 \times -7 = -14$

21. $-8 \times 10 = -80$

22. $7 \times -6 = -42$

23. $6 \times -4 = -24$

24. $7 \times -5 = -35$

25. $-12 \times 9 = -108$

26. $-2 \times -2 = 4$

27. $6 \times -11 = -66$

28. $12 \times -11 = -132$

29. $2 \times -6 = -12$

30. $7 \times -10 = -70$

31. $7 \times -2 = -14$

32. $-3 \times 12 = -36$

33. $-8 \times 6 = -48$

34. $4 \times -12 = -48$

35. $8 \times -6 = -48$

36. $5 \times -12 = -60$

37. $-2 \times 4 = -8$

38. $-5 \times 9 = -45$

39. $-3 \times 6 = -18$

40. $-3 \times 5 = -15$

Multiplying Integers (continued)

Simplifying a ratio

41. $4 : 10 = 2 : 5$

42. $5 : 10 = 1 : 2$

43. $5 : 20 = 1 : 4$

44. $12 : 15 = 4 : 5$

45. $15 : 40 = 3 : 8$

46. $5 : 30 = 1 : 6$

47. $12 : 32 = 3 : 8$

48. $9 : 15 = 3 : 5$

49. $3 : 6 = 1 : 2$

50. $10 : 25 = 2 : 5$

Absolute Value

Absolute value

1. $|4 - 14| \rightarrow 10$

2. $|12 - 13| \rightarrow 1$

3. How far apart are -1 and 5 on the number line? $\rightarrow 6$

4. $|7 - 20| \rightarrow 13$

5. $|-18| \rightarrow 18$

6. $|12 - 19| \rightarrow 7$

7. $|-2| + |12| \rightarrow 14$

8. $|3 - 10| \rightarrow 7$

9. $|10 - 11| \rightarrow 1$

10. $|8 - 19| \rightarrow 11$

11. $|3| + |-7| \rightarrow 10$

12. $|14 - 20| \rightarrow 6$

13. $|10 - 16| \rightarrow 6$

14. $|6| + |-8| \rightarrow 14$

15. $|2| + |-1| \rightarrow 3$

16. $|2 - 9| \rightarrow 7$

17. $|11 - 18| \rightarrow 7$

18. $|-4| + |5| \rightarrow 9$

19. $|9 - 11| \rightarrow 2$

20. $|2 - 11| \rightarrow 9$

Decimals as percents

21. $0.72 = 72\%$

22. $0.3 = 30\%$

23. $0.87 = 87\%$

24. $0.02 = 2\%$

25. $0.7 = 70\%$

26. $0.48 = 48\%$

27. $0.63 = 63\%$

28. $0.31 = 31\%$

29. $0.94 = 94\%$

30. $0.49 = 49\%$

Answer Key (4 of 13)

Order of Operations

Order of operations

1. $24 \div 8 + 9 = 12$
2. $45 \div 5 + 3 = 12$
3. $88 \div 8 + 6 = 17$
4. $7 - 10 \div 2 = 2$
5. $8 \div 4 + 9 = 11$
6. $2 + 18 \div 3 = 8$
7. $25 \div 5 + 8 = 13$
8. $30 \div 6 + 2 = 7$
9. $8 - 10 \div 5 = 6$
10. $5 - 27 \div 9 = 2$
11. $7 + 64 \div 8 = 15$
12. $6 - 18 \div 9 = 4$
13. $14 \div 2 + 5 = 12$
14. $6 + 3 \times 6 = 24$
15. $8 - 24 \div 8 = 5$
16. $20 \div 5 + 5 = 9$
17. $5 + 18 \div 3 = 11$
18. $4 + 2 \times 7 = 18$
19. $6 + 27 \div 9 = 9$
20. $5 + 2 \times 3 = 11$
21. $6 + 7 \times 3 = 27$
22. $4 + 64 \div 8 = 12$
23. $21 \div 7 + 6 = 9$
24. $2 + 36 \div 4 = 11$
25. $6 \times 2 + 9 = 21$
26. $5 + 42 \div 6 = 12$
27. $18 \div 3 + 6 = 12$
28. $2 \times 9 + 2 = 20$
29. $2 + 32 \div 8 = 6$
30. $4 + 6 \div 2 = 7$
31. $21 \div 3 + 5 = 12$
32. $20 \div 4 + 9 = 14$
33. $5 + 24 \div 4 = 11$
34. $24 \div 8 + 5 = 8$
35. $4 + 36 \div 3 = 16$
36. $15 \div 5 + 4 = 7$
37. $3 + 9 \div 3 = 6$
38. $5 \times 2 + 7 = 17$

Add and subtract integers

39. $-14 + 10 = -4$
40. $-9 + 3 = -6$
41. $-12 + 11 = -1$
42. $-17 + 7 = -10$
43. $-16 + 10 = -6$
44. $-5 + 9 = 4$

Order of Operations (continued)

Add and subtract integers (continued)

45. $7 - 12 = -5$
46. $0 - 2 = -2$
47. $-2 + 9 = 7$
48. $-17 + 5 = -12$

Exponents

Exponents

1. $3^2 = 9$
2. $17^2 = 289$
3. $5^2 = 25$
4. $8^2 = 64$
5. $10^2 = 100$
6. $7^2 = 49$
7. $4^2 = 16$
8. $15^2 = 225$
9. $19^2 = 361$
10. $9^2 = 81$
11. $14^2 = 196$
12. $12^2 = 144$
13. $2^2 = 4$
14. $18^2 = 324$
15. $6^2 = 36$
16. $16^2 = 256$
17. $13^2 = 169$
18. $20^2 = 400$
19. $11^2 = 121$

Add and subtract integers

20. $-4 + 9 = 5$
21. $-20 + 2 = -18$
22. $3 - 11 = -8$
23. $-20 + 7 = -13$
24. $-3 + 2 = -1$
25. $-1 + 7 = 6$
26. $6 - 8 = -2$
27. $-6 + 7 = 1$
28. $-8 + 1 = -7$
29. $-15 + 6 = -9$
30. $-2 + 12 = 10$
31. $-13 + 6 = -7$
32. $-7 + 9 = 2$
33. $-19 + 11 = -8$
34. $-16 + 3 = -13$
35. $-5 + 8 = 3$
36. $-9 + 1 = -8$
37. $-12 + 11 = -1$

Answer Key (5 of 13)

Exponents (continued)

Add and subtract integers (continued)

38. $-12 + 7 = -5$

39. $0 - 3 = -3$

Greatest Common Factor

Greatest common factor

1. $6, 15 \rightarrow 3$

2. $12, 15 \rightarrow 3$

3. $20, 24 \rightarrow 4$

4. $8, 12 \rightarrow 4$

5. $4, 6 \rightarrow 2$

6. $8, 10 \rightarrow 2$

7. $15, 21 \rightarrow 3$

8. $8, 14 \rightarrow 2$

9. $4, 14 \rightarrow 2$

10. $6, 8 \rightarrow 2$

11. $9, 21 \rightarrow 3$

12. $6, 14 \rightarrow 2$

13. $12, 14 \rightarrow 2$

14. $8, 20 \rightarrow 4$

15. $10, 12 \rightarrow 2$

16. $9, 15 \rightarrow 3$

17. $6, 9 \rightarrow 3$

18. $10, 25 \rightarrow 5$

19. $9, 12 \rightarrow 3$

20. $10, 15 \rightarrow 5$

21. $16, 20 \rightarrow 4$

22. $6, 10 \rightarrow 2$

23. $4, 10 \rightarrow 2$

24. $10, 14 \rightarrow 2$

25. $15, 25 \rightarrow 5$

26. $25, 30 \rightarrow 5$

27. $12, 21 \rightarrow 3$

28. $20, 25 \rightarrow 5$

29. $10, 35 \rightarrow 5$

30. $12, 18 \rightarrow 6$

31. $12, 16 \rightarrow 4$

32. $20, 28 \rightarrow 4$

33. $15, 18 \rightarrow 3$

34. $6, 21 \rightarrow 3$

35. $12, 30 \rightarrow 6$

36. $18, 21 \rightarrow 3$

37. $12, 20 \rightarrow 4$

38. $30, 35 \rightarrow 5$

39. $18, 24 \rightarrow 6$

40. $15, 20 \rightarrow 5$

Greatest Common Factor (continued)

Greatest common factor (continued)

41. $24, 28 \rightarrow 4$

42. $25, 35 \rightarrow 5$

43. $30, 36 \rightarrow 6$

44. $8, 28 \rightarrow 4$

45. $15, 35 \rightarrow 5$

46. $12, 28 \rightarrow 4$

47. $18, 30 \rightarrow 6$

48. $24, 30 \rightarrow 6$

Prime or composite

49. $4 \rightarrow \text{Composite } (2 \times 2)$

50. $28 \rightarrow \text{Composite } (2 \times 14)$

51. $17 \rightarrow \text{Prime}$

52. $8 \rightarrow \text{Composite } (2 \times 4)$

53. $18 \rightarrow \text{Composite } (2 \times 9)$

54. $16 \rightarrow \text{Composite } (2 \times 8)$

55. $44 \rightarrow \text{Composite } (2 \times 22)$

56. $20 \rightarrow \text{Composite } (2 \times 10)$

57. $30 \rightarrow \text{Composite } (2 \times 15)$

58. $34 \rightarrow \text{Composite } (2 \times 17)$

59. $5 \rightarrow \text{Prime}$

60. $10 \rightarrow \text{Composite } (2 \times 5)$

61. $22 \rightarrow \text{Composite } (2 \times 11)$

62. $38 \rightarrow \text{Composite } (2 \times 19)$

63. $14 \rightarrow \text{Composite } (2 \times 7)$

64. $12 \rightarrow \text{Composite } (2 \times 6)$

65. $26 \rightarrow \text{Composite } (2 \times 13)$

66. $3 \rightarrow \text{Prime}$

67. $24 \rightarrow \text{Composite } (2 \times 12)$

68. $36 \rightarrow \text{Composite } (2 \times 18)$

Lowest Common Multiple

Least common multiple

1. $6, 8 \rightarrow 24$

2. $8, 12 \rightarrow 24$

3. $9, 15 \rightarrow 45$

4. $4, 6 \rightarrow 12$

5. $4, 10 \rightarrow 20$

6. $6, 9 \rightarrow 18$

7. $10, 25 \rightarrow 50$

8. $6, 10 \rightarrow 30$

9. $6, 15 \rightarrow 30$

10. $10, 15 \rightarrow 30$

11. $9, 12 \rightarrow 36$

12. $12, 20 \rightarrow 60$

13. $8, 20 \rightarrow 40$

Answer Key (6 of 13)

Lowest Common Multiple (continued)

Least common multiple (continued)

14. 12, 16 → 48
15. 15, 20 → 60
16. 8, 10 → 40
17. 15, 25 → 75
18. 16, 20 → 80
19. 12, 15 → 60
20. 20, 25 → 100

Greatest common factor

21. 8, 14 → 2
22. 10, 15 → 5
23. 6, 21 → 3
24. 6, 9 → 3
25. 8, 10 → 2
26. 12, 14 → 2
27. 12, 21 → 3
28. 6, 15 → 3
29. 10, 12 → 2
30. 6, 10 → 2
31. 15, 21 → 3
32. 4, 10 → 2
33. 12, 15 → 3
34. 10, 25 → 5
35. 4, 14 → 2
36. 9, 12 → 3
37. 4, 6 → 2
38. 20, 24 → 4
39. 9, 15 → 3
40. 6, 8 → 2

Factors and Multiples

List the factors

1. 2 → 1, 2
2. 29 → 1, 29
3. 6 → 1, 2, 3, 6
4. 3 → 1, 3
5. 17 → 1, 17
6. 13 → 1, 13
7. 38 → 1, 2, 19, 38
8. 11 → 1, 11
9. 37 → 1, 37
10. 19 → 1, 19
11. 26 → 1, 2, 13, 26
12. 31 → 1, 31

Is it a multiple?

13. Is 16 a multiple of 4? → Yes

Factors and Multiples (continued)

Is it a multiple? (continued)

14. Is 14 a multiple of 2? → Yes
15. Is 20 a multiple of 10? → Yes
16. Is 5 a multiple of 5? → Yes
17. Is 16 a multiple of 2? → Yes
18. Is 8 a multiple of 2? → Yes
19. Is 24 a multiple of 4? → Yes
20. Is 9 a multiple of 8? → No
21. Is 10 a multiple of 5? → Yes
22. Is 2 a multiple of 2? → Yes

Prime and Composite Numbers

Prime or composite

1. 6 → Composite (2×3)
2. 28 → Composite (2×14)
3. 48 → Composite (2×24)
4. 14 → Composite (2×7)
5. 20 → Composite (2×10)
6. 24 → Composite (2×12)
7. 38 → Composite (2×19)
8. 36 → Composite (2×18)
9. 16 → Composite (2×8)
10. 26 → Composite (2×13)
11. 5 → Prime
12. 32 → Composite (2×16)
13. 30 → Composite (2×15)
14. 19 → Prime
15. 12 → Composite (2×6)
16. 4 → Composite (2×2)
17. 18 → Composite (2×9)
18. 2 → Prime
19. 8 → Composite (2×4)
20. 22 → Composite (2×11)
21. 42 → Composite (2×21)
22. 34 → Composite (2×17)
23. 10 → Composite (2×5)
24. 11 → Prime
25. 27 → Composite (3×9)
26. 17 → Prime
27. 7 → Prime
28. 41 → Prime
29. 13 → Prime
30. 44 → Composite (2×22)
31. 43 → Prime
32. 50 → Composite (2×25)
33. 40 → Composite (2×20)

Answer Key (7 of 13)

Prime and Composite Numbers (continued)

Prime or composite (continued)

- 34. $9 \rightarrow \text{Composite } (3 \times 3)$
- 35. $46 \rightarrow \text{Composite } (2 \times 23)$
- 36. $47 \rightarrow \text{Prime}$

Multiplying integers

- 37. $-10 \times 7 = -70$
- 38. $6 \times -2 = -12$
- 39. $-10 \times 12 = -120$
- 40. $-2 \times 2 = -4$
- 41. $7 \times -9 = -63$
- 42. $-2 \times 5 = -10$
- 43. $-4 \times 9 = -36$
- 44. $2 \times -4 = -8$
- 45. $3 \times -10 = -30$
- 46. $-11 \times 5 = -55$

Dividing Fractions

Dividing fractions

- 1. $5/6 \div 2/6 = 5/2$
- 2. $2/4 \div 1/3 = 3/2$
- 3. $3/5 \div 6/7 = 7/10$
- 4. $1/6 \div 1/5 = 5/6$
- 5. $4/8 \div 7/8 = 4/7$
- 6. $6/8 \div 1/7 = 21/4$
- 7. $3/4 \div 2/6 = 9/4$
- 8. $7/8 \div 2/5 = 35/16$
- 9. $5/7 \div 5/6 = 6/7$
- 10. $3/7 \div 4/5 = 15/28$
- 11. $3/5 \div 1/4 = 12/5$
- 12. $3/7 \div 7/8 = 24/49$
- 13. $1/7 \div 2/7 = 1/2$
- 14. $3/8 \div 1/6 = 9/4$
- 15. $1/6 \div 5/8 = 4/15$
- 16. $1/8 \div 3/5 = 5/24$
- 17. $5/7 \div 1/7 = 5$
- 18. $1/4 \div 5/7 = 7/20$
- 19. $1/7 \div 1/8 = 8/7$
- 20. $4/8 \div 2/8 = 2$
- 21. $1/8 \div 2/8 = 1/2$
- 22. $6/7 \div 4/6 = 9/7$
- 23. $4/5 \div 1/3 = 12/5$
- 24. $5/6 \div 2/8 = 10/3$
- 25. $1/4 \div 2/4 = 1/2$
- 26. $1/2 \div 4/7 = 7/8$
- 27. $1/8 \div 1/6 = 3/4$
- 28. $3/4 \div 7/8 = 6/7$

Dividing Fractions (continued)

Dividing fractions (continued)

- 29. $3/5 \div 2/7 = 21/10$
- 30. $2/4 \div 3/7 = 7/6$
- 31. $1/6 \div 4/8 = 1/3$
- 32. $2/4 \div 1/5 = 5/2$
- 33. $2/3 \div 4/8 = 4/3$
- 34. $5/7 \div 1/3 = 15/7$
- 35. $3/6 \div 1/5 = 5/2$
- 36. $5/6 \div 3/7 = 35/18$
- 37. $1/4 \div 2/6 = 3/4$
- 38. $2/3 \div 3/6 = 4/3$
- 39. $7/8 \div 1/5 = 35/8$
- 40. $2/5 \div 3/8 = 16/15$
- 41. $3/6 \div 2/8 = 2$
- 42. $1/3 \div 3/7 = 7/9$
- 43. $2/6 \div 3/4 = 4/9$

Absolute value

- 44. $|5 - 6| \rightarrow 1$
- 45. $|1 - 6| \rightarrow 5$
- 46. $|-4| + |1| \rightarrow 5$
- 47. $|7 - 20| \rightarrow 13$
- 48. $|4 - 11| \rightarrow 7$
- 49. $|2| \rightarrow 2$
- 50. $|8| + |-3| \rightarrow 11$
- 51. $|4 - 13| \rightarrow 9$
- 52. $|13 - 15| \rightarrow 2$
- 53. $|5 - 14| \rightarrow 9$

Dividing Decimals

Multiply and divide decimals

- 1. $7.6 \div 2 = 3.8$
- 2. $29.7 \div 9 = 3.3$
- 3. $82.4 \div 8 = 10.3$
- 4. $19.2 \div 3 = 6.4$
- 5. $15.6 \div 4 = 3.9$
- 6. $2.4 \div 8 = 0.3$
- 7. $38.08 \div 8 = 4.76$
- 8. $58.0 \div 10 = 5.8$
- 9. $75.9 \div 11 = 6.9$
- 10. $11.2 \div 7 = 1.6$
- 11. $32.1 \div 3 = 10.7$
- 12. $20.5 \div 5 = 4.1$
- 13. $18.0 \div 4 = 4.5$
- 14. $7.92 \div 8 = 0.99$
- 15. $11.6 \div 4 = 2.9$
- 16. $60.5 \div 11 = 5.5$

Answer Key (8 of 13)

Dividing Decimals (continued)

Multiply and divide decimals (continued)

17. $37.8 \div 9 = 4.2$
18. $40.5 \div 5 = 8.1$
19. $37.1 \div 7 = 5.3$
20. $21.6 \div 12 = 1.8$
21. $66.5 \div 7 = 9.5$
22. $6.3 \div 7 = 0.9$
23. $55.0 \div 11 = 5.0$
24. $31.2 \div 8 = 3.9$
25. $4.20 \div 5 = 0.84$
26. $47.7 \div 9 = 5.3$
27. $9.9 \div 11 = 0.9$
28. $16.0 \div 2 = 8.0$
29. $5.6 \div 8 = 0.7$
30. $20.4 \div 6 = 3.4$
31. $66.0 \div 12 = 5.5$
32. $6.00 \div 6 = 1.00$
33. $81.6 \div 12 = 6.8$
34. $3.60 \div 10 = 0.36$
35. $18.6 \div 2 = 9.3$
36. $28.0 \div 7 = 4.0$
37. $57.0 \div 10 = 5.7$
38. $50.5 \div 5 = 10.1$
39. $48.0 \div 10 = 4.8$
40. $11.0 \div 5 = 2.2$
41. $1.8 \div 6 = 0.3$
42. $21.89 \div 11 = 1.99$
43. $2.8 \div 2 = 1.4$
44. $18.3 \div 3 = 6.1$
45. $29.1 \div 3 = 9.7$
46. $30.8 \div 7 = 4.4$
47. $1.08 \div 2 = 0.54$
48. $97.9 \div 11 = 8.9$
49. $47.3 \div 11 = 4.3$
50. $1.92 \div 4 = 0.48$

Order of operations

51. $18 \div 3 + 5 = 11$
52. $32 \div 4 + 4 = 12$
53. $2 + 44 \div 4 = 13$
54. $7 + 10 \div 5 = 9$
55. $4 - 21 \div 7 = 1$
56. $5 - 27 \div 9 = 2$
57. $40 \div 4 + 5 = 15$
58. $6 + 12 \div 3 = 10$
59. $6 + 28 \div 7 = 10$
60. $3 + 9 \div 3 = 6$

Evaluating Expressions

Evaluate expressions

1. $2x + 5$ ($x = 7$) $\rightarrow 19$
2. $2x - 17$ ($x = 10$) $\rightarrow 3$
3. $6a + b$ ($a = 2$, $b = 7$) $\rightarrow 19$
4. $2x + 10$ ($x = 5$) $\rightarrow 20$
5. $3x - 16$ ($x = 12$) $\rightarrow 20$
6. $7x + 3$ ($x = 3$) $\rightarrow 24$
7. $2x + 12$ ($x = 8$) $\rightarrow 28$
8. $6x - 8$ ($x = 4$) $\rightarrow 16$
9. $8x - 5$ ($x = 2$) $\rightarrow 11$
10. $9x + 6$ ($x = 2$) $\rightarrow 24$
11. $2a + b$ ($a = 4$, $b = 3$) $\rightarrow 11$
12. $9x - 18$ ($x = 2$) $\rightarrow 0$
13. $2x - 5$ ($x = 6$) $\rightarrow 7$
14. $2x + 14$ ($x = 7$) $\rightarrow 28$
15. $3x$ ($x = 8$) $\rightarrow 24$
16. $7x$ ($x = 2$) $\rightarrow 14$
17. $2x - 3$ ($x = 2$) $\rightarrow 1$
18. $9x + 16$ ($x = 2$) $\rightarrow 34$
19. $8x - 1$ ($x = 2$) $\rightarrow 15$
20. $4x - 2$ ($x = 4$) $\rightarrow 14$

Exponents

21. $3^2 = 9$
22. $17^2 = 289$
23. $5^2 = 25$
24. $8^2 = 64$
25. $10^2 = 100$
26. $7^2 = 49$
27. $4^2 = 16$
28. $15^2 = 225$
29. $19^2 = 361$
30. $9^2 = 81$

Like Terms and the Distributive Property

Collect like terms

1. $8x + 2x + 13 \rightarrow 10x + 13$
2. $6x + 3x + 12 \rightarrow 9x + 12$
3. $5x + 18 - 2x \rightarrow 3x + 18$
4. $5 + 3x + 11 + 2x \rightarrow 5x + 16$
5. $8 + 2x + 3 + 9x \rightarrow 11x + 11$
6. $5x + 12 - 3x \rightarrow 2x + 12$
7. $8x + 9 - 4x - 7 \rightarrow 4x + 2$
8. $11 + 2x + 5 + x \rightarrow 3x + 16$
9. $3 + 4x + 7 + 5x \rightarrow 9x + 10$
10. $10 + 5x + 7 + 3x \rightarrow 8x + 17$
11. $6x + 15 - 2x - 10 \rightarrow 4x + 5$

Answer Key (9 of 13)

Like Terms and the Distributive Property (continued)

Collect like terms (continued)

12. $9x + 13 - 8x \rightarrow 1x + 13$
13. $4 + 3x + 6 + 4x \rightarrow 7x + 10$
14. $10x + 4 - 8x - 2 \rightarrow 2x + 2$
15. $6x + 2x + 4 \rightarrow 8x + 4$
16. $5x + 2x + 20 \rightarrow 7x + 20$

Multiply out brackets

17. $2(9x + 3) \rightarrow 18x + 6$
18. $8(2x - 2) \rightarrow 16x - 16$
19. $6(4x + 7) \rightarrow 24x + 42$
20. $3(x - 7) \rightarrow 3x - 21$
21. $2(2x - 11) \rightarrow 4x - 22$
22. $7(2 + x) \rightarrow 7x + 14$
23. $2(6 + 9x) \rightarrow 18x + 12$
24. $2(4x + 5) \rightarrow 8x + 10$
25. $4(3 + 2x) \rightarrow 8x + 12$
26. $5(6x + 3) \rightarrow 30x + 15$
27. $5(6x + 4) \rightarrow 30x + 20$
28. $2(8x + 11) \rightarrow 16x + 22$
29. $4(x + 9) \rightarrow 4x + 36$
30. $3(5x + 12) \rightarrow 15x + 36$
31. $2(4x - 7) \rightarrow 8x - 14$
32. $4(2x + 2) \rightarrow 8x + 8$

Solving Equations

Solving equations

1. $x + 40 = 45 \rightarrow x = 5$
2. $x + 12 = 13 \rightarrow x = 1$
3. $x + 17 = 32 \rightarrow x = 15$
4. $x - 5 = 6 \rightarrow x = 11$
5. $x + 44 = 50 \rightarrow x = 6$
6. $35 - x = 22 \rightarrow x = 13$
7. $x - 18 = 9 \rightarrow x = 27$
8. $x - 9 = 4 \rightarrow x = 13$
9. $x + 16 = 24 \rightarrow x = 8$
10. $23 - x = 16 \rightarrow x = 7$
11. $25 - x = 6 \rightarrow x = 19$
12. $x + 20 = 31 \rightarrow x = 11$
13. $50 - x = 47 \rightarrow x = 3$
14. $x + 4 = 18 \rightarrow x = 14$
15. $x + 24 = 25 \rightarrow x = 1$
16. $29 - x = 17 \rightarrow x = 12$
17. $x + 28 = 33 \rightarrow x = 5$
18. $x + 1 = 15 \rightarrow x = 14$
19. $x - 9 = 1 \rightarrow x = 10$
20. $39 - x = 37 \rightarrow x = 2$

Solving Equations (continued)

Solving equations (continued)

21. $29 - x = 8 \rightarrow x = 21$
22. $38 - x = 37 \rightarrow x = 1$
23. $x + 18 = 29 \rightarrow x = 11$
24. $15 - x = 9 \rightarrow x = 6$
25. $x + 5 = 34 \rightarrow x = 29$
26. $x + 14 = 19 \rightarrow x = 5$
27. $x - 2 = 1 \rightarrow x = 3$
28. $x + 15 = 43 \rightarrow x = 28$
29. $8 - x = 7 \rightarrow x = 1$
30. $26 - x = 19 \rightarrow x = 7$
31. $x + 34 = 38 \rightarrow x = 4$
32. $44 - x = 24 \rightarrow x = 20$
33. $x + 19 = 24 \rightarrow x = 5$
34. $8 - x = 3 \rightarrow x = 5$
35. $x + 10 = 35 \rightarrow x = 25$
36. $22 - x = 14 \rightarrow x = 8$
37. $34 - x = 29 \rightarrow x = 5$
38. $x - 13 = 9 \rightarrow x = 22$
39. $x + 37 = 39 \rightarrow x = 2$
40. $38 - x = 30 \rightarrow x = 8$
41. $46 - x = 40 \rightarrow x = 6$
42. $x + 12 = 35 \rightarrow x = 23$
43. $x + 6 = 13 \rightarrow x = 7$
44. $16 - x = 3 \rightarrow x = 13$
45. $31 - x = 7 \rightarrow x = 24$
46. $x + 17 = 19 \rightarrow x = 2$
47. $x - 6 = 2 \rightarrow x = 8$
48. $49 - x = 21 \rightarrow x = 28$
49. $39 - x = 32 \rightarrow x = 7$
50. $x + 10 = 23 \rightarrow x = 13$

Greatest common factor

51. $12, 14 \rightarrow 2$
52. $6, 9 \rightarrow 3$
53. $12, 20 \rightarrow 4$
54. $6, 14 \rightarrow 2$
55. $6, 10 \rightarrow 2$
56. $6, 8 \rightarrow 2$
57. $20, 25 \rightarrow 5$
58. $8, 10 \rightarrow 2$
59. $10, 14 \rightarrow 2$
60. $4, 6 \rightarrow 2$

Inequalities

Inequalities

1. $4x > 24 \rightarrow x > 6$

Answer Key (10 of 13)

Inequalities (continued)

Inequalities (continued)

2. $2x \geq 18 \rightarrow x \geq 9$
3. $3x \leq 42 \rightarrow x \leq 14$
4. $2x \leq 8 \rightarrow x \leq 4$
5. $2x < 12 \rightarrow x < 6$
6. $6x \leq 42 \rightarrow x \leq 7$
7. $-5x < -5 \rightarrow x > 1$
8. $2x < -12 \rightarrow x < -6$
9. $3x < 24 \rightarrow x < 8$
10. $7x \leq 14 \rightarrow x \leq 2$
11. $-4x \geq -16 \rightarrow x \leq 4$
12. $2x > -12 \rightarrow x > -6$
13. $4x < -32 \rightarrow x < -8$
14. $2x \leq -36 \rightarrow x \leq -18$
15. $9x \geq -27 \rightarrow x \geq -3$
16. $3x > 3 \rightarrow x > 1$
17. $9x \geq 9 \rightarrow x \geq 1$
18. $4x > -40 \rightarrow x > -10$
19. $5x > -15 \rightarrow x > -3$
20. $3x \geq 15 \rightarrow x \geq 5$
21. $2x \leq -44 \rightarrow x \leq -22$
22. $2x > 12 \rightarrow x > 6$
23. $4x \leq -36 \rightarrow x \leq -9$

Least common multiple

24. 6, 10 $\rightarrow$ 30
25. 10, 15 $\rightarrow$ 30
26. 12, 16 $\rightarrow$ 48
27. 6, 8 $\rightarrow$ 24
28. 6, 9 $\rightarrow$ 18
29. 4, 10 $\rightarrow$ 20
30. 8, 10 $\rightarrow$ 40
31. 6, 15 $\rightarrow$ 30
32. 4, 6 $\rightarrow$ 12
33. 8, 12 $\rightarrow$ 24

Area of Composite Shapes

Area of composite figures

1. 8×13 less 3×8 : 80 cm²
2. 14×10 less 6×7 : 98 cm²
3. 14×17 less 4×12 : 190 cm²
4. 19×4 less 5×2 : 66 cm²
5. 15×10 less 12×6 : 78 cm²
6. 12×7 less 6×5 : 54 cm²
7. 11×15 less 3×5 : 150 cm²
8. 11×13 less 8×4 : 111 cm²
9. 16×8 less 6×5 : 98 cm²

Area of Composite Shapes (continued)

Area of composite figures (continued)

10. 5×10 less 2×3 : 44 cm²

Is it a multiple?

11. Is 6 a multiple of 3? $\rightarrow$ Yes
12. Is 12 a multiple of 2? $\rightarrow$ Yes
13. Is 20 a multiple of 3? $\rightarrow$ No
14. Is 9 a multiple of 8? $\rightarrow$ No
15. Is 13 a multiple of 2? $\rightarrow$ No
16. Is 12 a multiple of 3? $\rightarrow$ Yes
17. Is 20 a multiple of 10? $\rightarrow$ Yes
18. Is 8 a multiple of 2? $\rightarrow$ Yes
19. Is 5 a multiple of 5? $\rightarrow$ Yes
20. Is 4 a multiple of 4? $\rightarrow$ Yes

Area of Figures

Area

1. triangle $3 \times 16 \div 2 = 24$ cm²
2. trapezoid $(4 + 8) \div 2 \times 9 = 54$ cm²
3. trapezoid $(13 + 14) \div 2 \times 8 = 108$ cm²
4. trapezoid $(7 + 13) \div 2 \times 4 = 40$ cm²
5. parallelogram $14 \times 3 = 42$ cm²
6. rectangle $15 \times 3 = 45$ cm²
7. parallelogram $17 \times 10 = 170$ cm²
8. trapezoid $(10 + 14) \div 2 \times 5 = 60$ cm²
9. parallelogram $4 \times 16 = 64$ cm²
10. rectangle $17 \times 7 = 119$ cm²

List the factors

11. $2 \rightarrow 1, 2$
12. $23 \rightarrow 1, 23$
13. $14 \rightarrow 1, 2, 7, 14$
14. $7 \rightarrow 1, 7$
15. $19 \rightarrow 1, 19$
16. $5 \rightarrow 1, 5$
17. $21 \rightarrow 1, 3, 7, 21$
18. $37 \rightarrow 1, 37$
19. $31 \rightarrow 1, 31$
20. $11 \rightarrow 1, 11$

Missing Sides

Find the missing side

1. P = 30, side 7: 8 cm
2. P = 46, side 18: 5 cm
3. P = 58, side 10: 19 cm
4. P = 46, side 14: 9 cm
5. P = 32, side 4: 12 cm
6. P = 22, side 6: 5 cm

Answer Key (11 of 13)

Missing Sides (continued)

Find the missing side (continued)

7. $P = 66$, side 18: 15 cm
8. $A = 21$, side 3: 7 cm
9. $P = 18$, side 6: 3 cm
10. $A = 26$, side 2: 13 cm

Prime or composite

11. $26 \rightarrow$ Composite (2×13)
12. $28 \rightarrow$ Composite (2×14)
13. $46 \rightarrow$ Composite (2×23)
14. $12 \rightarrow$ Composite (2×6)
15. $30 \rightarrow$ Composite (2×15)
16. $10 \rightarrow$ Composite (2×5)
17. $48 \rightarrow$ Composite (2×24)
18. $36 \rightarrow$ Composite (2×18)
19. $16 \rightarrow$ Composite (2×8)
20. $8 \rightarrow$ Composite (2×4)

Volume of Prisms

Volume of a rectangular prism

1. $7 \times 4 \times 3$: 84 cm³
2. $6 \times 6 \times 4 + 3 \times 6 \times 3$: 198 cm³
3. $6 \times 6 \times 6 + 5 \times 6 \times 5$: 366 cm³
4. $6 \times 3 \times 8 + 4 \times 3 \times 4$: 192 cm³
5. $4 \times 6 \times 7 + 3 \times 6 \times 3$: 222 cm³
6. $7 \times 4 \times 5 + 6 \times 4 \times 3$: 212 cm³
7. $5 \times 5 \times 8 + 4 \times 5 \times 5$: 300 cm³

Dividing fractions

8. $1/5 \div 3/6 = 2/5$
9. $1/8 \div 4/6 = 3/16$
10. $2/4 \div 3/5 = 5/6$
11. $5/7 \div 6/8 = 20/21$
12. $4/7 \div 2/4 = 8/7$
13. $5/7 \div 1/6 = 30/7$
14. $4/5 \div 1/5 = 4$

Surface Area

Surface area of a box

1. $3 \times 8 \times 10 \rightarrow 2(24 + 30 + 80)$: 268 cm²
2. $3 \times 10 \times 10 \rightarrow 2(30 + 30 + 100)$: 320 cm²
3. $5 \times 7 \times 15 \rightarrow 2(35 + 75 + 105)$: 430 cm²
4. $3 \times 3 \times 7 \rightarrow 2(9 + 21 + 21)$: 102 cm²
5. $4 \times 5 \times 8 \rightarrow 2(20 + 32 + 40)$: 184 cm²
6. $5 \times 5 \times 11 \rightarrow 2(25 + 55 + 55)$: 270 cm²
7. $7 \times 7 \times 10 \rightarrow 2(49 + 70 + 70)$: 378 cm²

Multiply and divide decimals

8. $17.0 \div 10 = 1.7$

Surface Area (continued)

Multiply and divide decimals (continued)

9. $37.8 \div 9 = 4.2$
10. $3.06 \div 3 = 1.02$
11. $23.4 \div 9 = 2.6$
12. $6.3 \div 9 = 0.7$
13. $21.6 \div 12 = 1.8$
14. $19.8 \div 2 = 9.9$

Finding the Mean

The mean

1. Mean of 4, 35, 4, 30, 32 = 21
2. Mean of 36, 33, 23, 4, 4 = 20
3. Mean of 42, 45, 30, 6, 42 = 33
4. Mean of 17, 2, 17, 34, 25 = 19
5. Mean of 30, 16, 35, 39, 30 = 30
6. Mean of 30, 30, 34, 4, 22 = 24
7. Mean of 37, 42, 45, 13, 13 = 30
8. Mean of 39, 20, 33, 20, 18 = 26
9. Mean of 26, 9, 32, 39, 9 = 23
10. Mean of 38, 32, 38, 19, 33 = 32
11. Mean of 15, 41, 34, 14, 41 = 29
12. Mean of 25, 14, 34, 32, 25 = 26
13. Mean of 28, 39, 18, 18, 32 = 27
14. Mean of 30, 44, 46, 11, 44 = 35
15. Mean of 24, 17, 15, 15, 9 = 16
16. Mean of 14, 21, 25, 5, 25 = 18
17. Mean of 30, 30, 7, 24, 4 = 19
18. Mean of 28, 10, 45, 37, 10 = 26
19. Mean of 28, 29, 1, 28, 24 = 22
20. Mean of 27, 37, 37, 26, 13 = 28
21. Mean of 17, 15, 45, 26, 17 = 24
22. Mean of 16, 16, 11, 38, 39 = 24
23. Mean of 3, 11, 7, 18, 11 = 10
24. Mean of 16, 27, 27, 10, 30 = 22
25. Mean of 31, 37, 41, 37, 34 = 36
26. Mean of 6, 32, 28, 32, 12 = 22
27. Mean of 13, 10, 15, 13, 4 = 11
28. Mean of 35, 46, 35, 31, 13 = 32
29. Mean of 28, 22, 29, 29, 12 = 24
30. Mean of 33, 26, 33, 3, 20 = 23
31. Mean of 9, 34, 34, 30, 18 = 25
32. Mean of 24, 43, 17, 33, 43 = 32
33. Mean of 31, 36, 4, 38, 36 = 29
34. Mean of 13, 1, 20, 20, 31 = 17

Evaluate expressions

35. $2x - 15$ ($x = 11$) $\rightarrow 7$

Answer Key (12 of 13)

Finding the Mean (continued)

Evaluate expressions (continued)

36. $7x - 10$ ($x = 3$) $\rightarrow 11$
37. $4x - 5$ ($x = 7$) $\rightarrow 23$
38. $8x - 17$ ($x = 3$) $\rightarrow 7$
39. $7x + 1$ ($x = 3$) $\rightarrow 22$
40. $5x - 13$ ($x = 3$) $\rightarrow 2$
41. $6x + 1$ ($x = 6$) $\rightarrow 37$
42. $3x + 6$ ($x = 6$) $\rightarrow 24$
43. $2a + b$ ($a = 2, b = 5$) $\rightarrow 9$
44. $7x - 9$ ($x = 2$) $\rightarrow 5$

Median and Range

The median

1. Median of 16, 1, 30, 29, 29 = 29
2. Median of 31, 38, 22, 7, 7 = 22
3. Median of 14, 8, 42, 14, 37 = 14
4. Median of 24, 33, 26, 24, 28 = 26
5. Median of 14, 14, 18, 11, 3 = 14
6. Median of 5, 26, 17, 17, 30 = 17
7. Median of 5, 40, 2, 33, 40 = 33
8. Median of 28, 35, 16, 35, 36 = 35
9. Median of 29, 16, 29, 23, 18 = 23
10. Median of 27, 27, 18, 10, 23 = 23
11. Median of 40, 40, 14, 25, 6 = 25
12. Median of 28, 20, 21, 20, 31 = 21
13. Median of 23, 4, 8, 20, 20 = 20
14. Median of 24, 2, 24, 21, 44 = 24
15. Median of 4, 8, 4, 10, 19 = 8
16. Median of 3, 33, 37, 33, 14 = 33
17. Median of 4, 32, 18, 9, 32 = 18
18. Median of 45, 13, 45, 20, 27 = 27
19. Median of 38, 32, 32, 5, 23 = 32
20. Median of 33, 38, 29, 22, 38 = 33
21. Median of 5, 4, 37, 42, 37 = 37
22. Median of 21, 15, 37, 15, 12 = 15
23. Median of 15, 23, 3, 21, 23 = 21
24. Median of 29, 6, 11, 17, 17 = 17

The range

25. Range of 15, 19, 33, 15, 3 = 30
26. Range of 2, 19, 11, 17, 11 = 17
27. Range of 44, 27, 16, 41, 27 = 28
28. Range of 29, 29, 37, 18, 32 = 19
29. Range of 16, 24, 33, 34, 33 = 18
30. Range of 24, 34, 22, 24, 26 = 12
31. Range of 38, 41, 1, 45, 45 = 44
32. Range of 12, 32, 24, 16, 16 = 20

Median and Range (continued)

The range (continued)

33. Range of 14, 28, 37, 23, 28 = 23
34. Range of 4, 10, 35, 36, 10 = 32
35. Range of 24, 13, 24, 42, 37 = 29
36. Range of 24, 26, 27, 37, 26 = 13
37. Range of 31, 26, 34, 18, 31 = 16
38. Range of 38, 15, 40, 38, 44 = 29
39. Range of 39, 11, 10, 14, 11 = 29
40. Range of 17, 3, 17, 29, 39 = 36
41. Range of 11, 22, 37, 37, 33 = 26
42. Range of 24, 8, 45, 38, 45 = 37
43. Range of 2, 1, 9, 1, 27 = 26
44. Range of 12, 1, 17, 8, 17 = 16
45. Range of 44, 14, 11, 12, 44 = 33
46. Range of 16, 26, 28, 17, 28 = 12
47. Range of 7, 7, 37, 9, 25 = 30
48. Range of 11, 32, 7, 9, 11 = 25

Multiply out brackets

49. $2(6x - 3) \rightarrow 12x - 6$
50. $4(6x + 6) \rightarrow 24x + 24$
51. $4(4 + 6x) \rightarrow 24x + 16$
52. $2(6 + x) \rightarrow 2x + 12$
53. $9(x + 2) \rightarrow 9x + 18$
54. $5(2x + 4) \rightarrow 10x + 20$
55. $7(4x + 3) \rightarrow 28x + 21$
56. $2(5 + 6x) \rightarrow 12x + 10$
57. $3(6x + 3) \rightarrow 18x + 9$
58. $5(4x - 2) \rightarrow 20x - 10$

Histograms

Histograms

1. 60–69 — 3
2. 70–79 — 6, the tallest bar
3. $3 + 6 + 3 + 3 + 2 = 17$
4. $6 + 7 + 4 + 2 + 1 = 20$

Collect like terms

5. $4 + 3x + 8 + 2x \rightarrow 5x + 12$
6. $2 + 2x + 4 + 3x \rightarrow 5x + 6$
7. $9x + 14 - 8x - 8 \rightarrow 1x + 6$
8. $10x + 4 - 7x \rightarrow 3x + 4$

Statistics Word Problems

Word problems: statistics

1. $21 - 18 = 3$.
2. Ordered: 9, 9, 10, 12, 21; the middle value is 10.
3. Ordered: 9, 11, 16, 16, 26; the middle value is 16.

Answer Key (13 of 13)

Statistics Word Problems (continued)

Word problems: statistics (continued)

4. 14 appears more often than any other value, so the mode is 14.
5. 15 appears more often than any other value, so the mode is 15.
6. Ordered: 7, 7, 9, 11, 12; the middle value is 9.
7. Ordered: 13, 14, 14, 15, 19; the middle value is 14.
8. 19 appears more often than any other value, so the mode is 19.
9. $21 - 11 = 10$.
10. Ordered: 8, 10, 10, 14, 30; the middle value is 10.
11. Ordered: 5, 7, 15, 15, 20; the middle value is 15.
12. $29 - 16 = 13$.
13. $30 - 14 = 16$.
14. Ordered: 10, 10, 15, 19, 23; the middle value is 15.

Solving equations

15. $x + 31 = 40 \rightarrow x = 9$
16. $39 - x = 37 \rightarrow x = 2$
17. $x + 1 = 26 \rightarrow x = 25$
18. $x + 20 = 31 \rightarrow x = 11$
19. $42 - x = 35 \rightarrow x = 7$
20. $16 - x = 5 \rightarrow x = 11$
21. $45 - x = 29 \rightarrow x = 16$
22. $x + 41 = 47 \rightarrow x = 6$
23. $x - 6 = 7 \rightarrow x = 13$
24. $x + 33 = 35 \rightarrow x = 2$

Look for the Structure

Look for the structure

1. A number that is a multiple of both 2 and 3 is a multiple of 6. $\rightarrow$ always
2. The difference between two multiples of 3 is a multiple of 3. $\rightarrow$ always
3. The product of two consecutive numbers is even. $\rightarrow$ always
4. Adding up the odd numbers starting from 1 gives a square number. $\rightarrow$ always
5. The sum of four consecutive numbers is a multiple of 4. $\rightarrow$ never
6. The product of three consecutive numbers is a multiple of 6. $\rightarrow$ always
7. A number that is a multiple of both 3 and 4 is a multiple of 12. $\rightarrow$ always
8. The sum of five consecutive numbers is a multiple of 5. $\rightarrow$ always

Solutions (1 of 25)

Ratio

Simplifying a ratio

1. $4 : 10 = \underline{\hspace{2cm}}$

$$\begin{array}{l} 4 : 10 \\ 4 : 10 \quad \text{both} \div 2 \\ 4 : 10 = 2 : 5 \end{array}$$

A ratio simplifies the same way a fraction does — divide BOTH sides by the same number, and it stays the same ratio.

The biggest number that goes into both 4 and 10 is 2.

$4 \div 2 = 2$ and $10 \div 2 = 5$, so $4 : 10$ is $2 : 5$. Same ratio, smaller numbers — nothing has changed except how it is written.

2. $15 : 35 = \underline{\hspace{2cm}}$

$$\begin{array}{l} 15 : 35 \\ 15 : 35 \quad \text{both} \div 5 \\ 15 : 35 = 3 : 7 \end{array}$$

A ratio simplifies the same way a fraction does — divide BOTH sides by the same number, and it stays the same ratio.

The biggest number that goes into both 15 and 35 is 5.

$15 \div 5 = 3$ and $35 \div 5 = 7$, so $15 : 35$ is $3 : 7$. Same ratio, smaller numbers — nothing has changed except how it is written.

Percents

Decimals as percents

1. $0.72 = \underline{\hspace{2cm}}$

$$\begin{array}{l} 0.72 = 72/100 \\ 72\% \end{array}$$

Percent means "out of a hundred", so the question is really: how many hundredths is 0.72? It is 72 of them.

72 out of a hundred is written 72%.

2. $0.95 = \underline{\hspace{2cm}}$

$$\begin{array}{l} 0.95 = 95/100 \\ 95\% \end{array}$$

Percent means "out of a hundred", so the question is really: how many hundredths is 0.95? It is 95 of them.

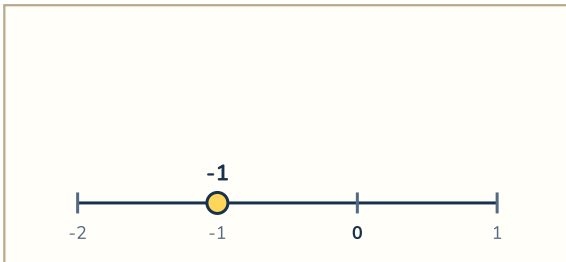
95 out of a hundred is written 95%.

Solutions (2 of 25)

Positive and Negative Numbers

Add and subtract integers

1. $-1 + 1 = \underline{\hspace{2cm}}$

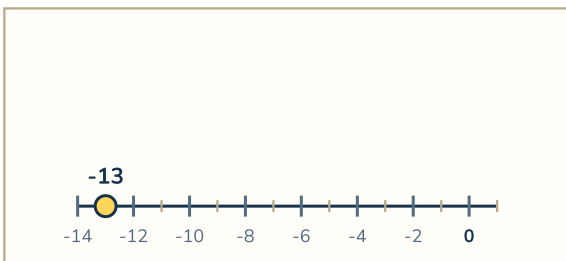


Put a counter on -1. Everything else is which way it slides and how far.

Adding a positive moves right, the way it always has.

So slide 1 to the right, from -1 to 0. $(-1) + 1 = 0$.

2. $-13 + 7 = \underline{\hspace{2cm}}$



Put a counter on -13. Everything else is which way it slides and how far.

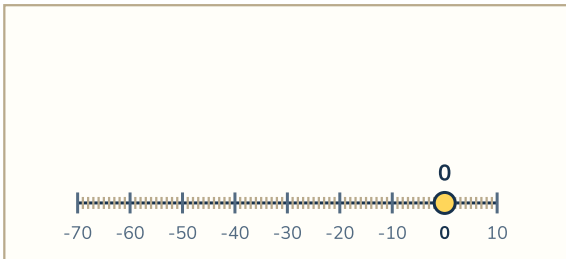
Adding a positive moves right, the way it always has.

So slide 7 to the right, from -13 to -6. $(-13) + 7 = -6$.

Multiplying Integers

Multiplying integers

1. $6 \times (-10) = \underline{\hspace{2cm}}$



$6 \times (-10)$ is 6 lots of -10. Start at 0 and take them one at a time — the size is ordinary times-tables, so what is left to settle is which way it goes.

One lot of -10 goes LEFT, landing on -10.

All 6 hops go the same way — not one of them turns round — so it can only get further from 0, never back towards it. That is the whole of why the answer is below zero.

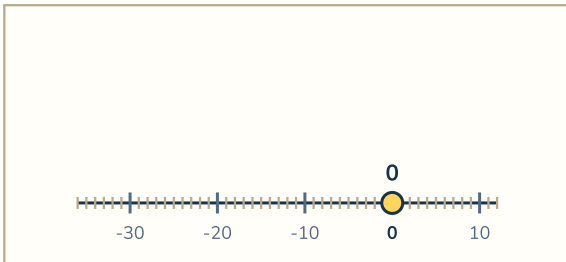
6 hops of 10 is 60 of distance, all of it on the low side. So $6 \times (-10) = -60$.

Solutions (3 of 25)

Multiplying Integers (continued)

Multiplying integers (continued)

2. $2 \times (-12) = \underline{\hspace{2cm}}$



$2 \times (-12)$ is 2 lots of -12. Start at 0 and take them one at a time — the size is ordinary times-tables, so what is left to settle is which way it goes.

One lot of -12 goes LEFT, landing on -12.

All 2 hops go the same way — not one of them turns round — so it can only get further from 0, never back towards it. That is the whole of why the answer is below zero.

2 hops of 12 is 24 of distance, all of it on the low side. So $2 \times (-12) = -24$.

Absolute Value

Absolute value

1. $|4 - 14| = \underline{\hspace{2cm}}$

$$\begin{array}{rcl} & |4 - 14| & \\ 4 & - & 14 = -10 \\ |4 - 14| & = & 10 \end{array}$$

The two bars ask for a DISTANCE: how far the thing between them is from zero. A distance is never negative, and that is a fact about distance rather than a rule about minus signs.

The bars work like brackets: everything inside gets worked out BEFORE the distance is taken. $4 - 14 = -10$.

Now the distance of that from zero: 10. Which is also how far apart 4 and 14 are — the same question read the other way round.

2. $|12 - 13| = \underline{\hspace{2cm}}$

$$\begin{array}{rcl} & |12 - 13| & \\ 12 & - & 13 = -1 \\ |12 - 13| & = & 1 \end{array}$$

The two bars ask for a DISTANCE: how far the thing between them is from zero. A distance is never negative, and that is a fact about distance rather than a rule about minus signs.

The bars work like brackets: everything inside gets worked out BEFORE the distance is taken. $12 - 13 = -1$.

Now the distance of that from zero: 1. Which is also how far apart 12 and 13 are — the same question read the other way round.

Solutions (4 of 25)

Order of Operations

Order of operations

1. $24 \div 8 + 9 = \underline{\quad}$

$$\begin{array}{ccccccc} 24 & \div & 8 & + & 9 \\ & 3 & + & 9 \\ & & 12 \end{array}$$

$\times$ and $\div$ come before $+$ and $-$, so this goes first. $24 \div 8 = 3$.

Only $+$ and $-$ are left, so work from left to right. $3 + 9 = 12$.

Nothing is left to work out, so the answer is 12.

2. $45 \div 5 + 3 = \underline{\quad}$

$$\begin{array}{ccccccc} 45 & \div & 5 & + & 3 \\ & 9 & + & 3 \\ & & 12 \end{array}$$

$\times$ and $\div$ come before $+$ and $-$, so this goes first. $45 \div 5 = 9$.

Only $+$ and $-$ are left, so work from left to right. $9 + 3 = 12$.

Nothing is left to work out, so the answer is 12.

Exponents

Exponents

1. $3^2 = \underline{\quad}$

$$\begin{array}{lcl} 3^2 & = & 3 \times 3 \\ 3 \times 3 & = & 9 \end{array}$$

The small number is a COUNT, not something to multiply by. 3^2 does not mean 3×2 — it means how many 3s to multiply together.

So write it out: 2 3s multiplied together — 3×3 .

Now it is just multiplying: $3 \times 3 = 9$.

2. $17^2 = \underline{\quad}$

$$\begin{array}{lcl} 17^2 & = & 17 \times 17 \\ 17 \times 17 & = & 289 \end{array}$$

The small number is a COUNT, not something to multiply by. 17^2 does not mean 17×2 — it means how many 17s to multiply together.

So write it out: 2 17s multiplied together — 17×17 .

Now it is just multiplying: $17 \times 17 = 289$.

Solutions (5 of 25)

Greatest Common Factor

Greatest common factor

1. 6, 15 → ____

6: 1 2 3 6
15: 1 3 5 15
GCF = 3

A factor is a number that divides in exactly. List every factor of 6.

Now every factor of 15.

Some appear in BOTH lists — 1, 3. Those are the common factors.

The greatest of them is 3, so the GCF of 6 and 15 is 3.

2. 12, 15 → ____

12: 1 2 3 4 6 12
15: 1 3 5 15
GCF = 3

A factor is a number that divides in exactly. List every factor of 12.

Now every factor of 15.

Some appear in BOTH lists — 1, 3. Those are the common factors.

The greatest of them is 3, so the GCF of 12 and 15 is 3.

Prime or composite

49. 4 Prime / Composite

tried: 2
 $4 \div 2 = 2$

A prime has exactly two factors: 1 and itself. So the question is whether anything ELSE divides into 4.

You do not have to try everything up to 4. Factors come in pairs, so if one were bigger than 2 its partner would be smaller — and you would have found that one first. Testing up to 2 is enough.

2 goes into 4 exactly ($4 \div 2 = 2$), and that is one factor too many. 4 is composite — no need to test any further.

Solutions (6 of 25)

Greatest Common Factor (continued)

Prime or composite (continued)

50. 28 Prime / Composite

$$\begin{array}{l} \text{tried: } 2 \\ 28 \div 2 = 14 \end{array}$$

A prime has exactly two factors: 1 and itself. So the question is whether anything ELSE divides into 28.

You do not have to try everything up to 28. Factors come in pairs, so if one were bigger than 5 its partner would be smaller — and you would have found that one first. Testing up to 5 is enough.

2 goes into 28 exactly ($28 \div 2 = 14$), and that is one factor too many. 28 is composite — no need to test any further.

Lowest Common Multiple

Least common multiple

1. 6, 8 → ____

$$\begin{array}{l} 6: \quad 6 \quad 12 \quad 18 \quad 24 \\ 8: \quad 8 \quad 16 \quad 24 \\ \text{LCM} = 24 \end{array}$$

Count up in 6s.

Now count up in 8s.

24 turns up in every list — it is the first number all of them reach.

Nothing smaller is in all of them, so 24 is the least common multiple.

2. 8, 12 → ____

$$\begin{array}{l} 8: \quad 8 \quad 16 \quad 24 \\ 12: \quad 12 \quad 24 \\ \text{LCM} = 24 \end{array}$$

Count up in 8s.

Now count up in 12s.

24 turns up in every list — it is the first number all of them reach.

Nothing smaller is in all of them, so 24 is the least common multiple.

Solutions (7 of 25)

Factors and Multiples

List the factors

1. 2 → _____

so far: 1 2

Factors come in PAIRS — every one you find hands you a second. So work in from both ends rather than trying every number in turn.

$1 \times 2 = 2$, so 1 and 2 are both factors.

The pair has met in the middle, so the list is finished: 1, 2. 2 factors.

2. 29 → _____

so far: 1 29

Factors come in PAIRS — every one you find hands you a second. So work in from both ends rather than trying every number in turn.

$1 \times 29 = 29$, so 1 and 29 are both factors.

The pair has met in the middle, so the list is finished: 1, 29. 2 factors.

Is it a multiple?

13. Is 16 a multiple of 4? Yes / No

$$16 \div 4 = 4$$

yes

Multiples of 4 are what you get COUNTING IN 4s — they start at 4 and only get bigger. (Factors are the other way: they go into 4 and are never bigger than it. The two words are swapped more often than either is misunderstood.)

$16 \div 4 = 4$ exactly — nothing left over. Counting in 4s lands on it, so yes.

14. Is 14 a multiple of 2? Yes / No

$$14 \div 2 = 7$$

yes

Multiples of 2 are what you get COUNTING IN 2s — they start at 2 and only get bigger. (Factors are the other way: they go into 2 and are never bigger than it. The two words are swapped more often than either is misunderstood.)

$14 \div 2 = 7$ exactly — nothing left over. Counting in 2s lands on it, so yes.

Solutions (8 of 25)

Dividing Fractions

Dividing fractions

1. $\frac{5}{6} \div \frac{2}{6} = \text{—}$



each piece is $\frac{2}{6}$

$$\frac{2}{6} \rightarrow \frac{6}{2}$$
$$\frac{5}{6} \div \frac{2}{6} = \frac{5}{2}$$
$$\frac{5}{6} \times \frac{6}{2} = \frac{5}{2}$$
$$\frac{30}{12} = \frac{5}{2}$$

$\frac{5}{6} \div \frac{2}{6}$ is asking a question: how many $\frac{2}{6}$ s fit inside $\frac{5}{6}$?

Lay $\frac{2}{6}$ against it and see how many times it goes.

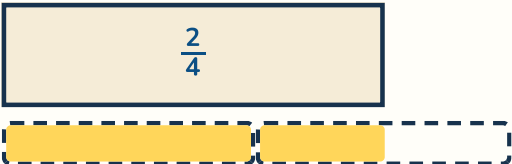
2 whole pieces and $\frac{1}{2}$ of another fits — so $\frac{5}{6} \div \frac{2}{6} = \frac{5}{2}$.

Now try multiplying by $\frac{6}{2}$ — $\frac{2}{6}$ turned over. It lands on the same number.

That is all turning it over does — the two questions are the same question, so either way of writing it will do. $\frac{5}{6} \div \frac{2}{6} = \frac{5}{2}$.

Worked out in full: 5×6 over 6×2 is $\frac{30}{12}$, which simplifies to $\frac{5}{2}$.

2. $\frac{2}{4} \div \frac{1}{3} = \text{—}$



each piece is $\frac{1}{3}$

$$\frac{1}{3} \rightarrow \frac{3}{1}$$
$$\frac{2}{4} \div \frac{1}{3} = \frac{3}{2}$$
$$\frac{2}{4} \times \frac{3}{1} = \frac{3}{2}$$
$$\frac{6}{4} = \frac{3}{2}$$

$\frac{2}{4} \div \frac{1}{3}$ is asking a question: how many $\frac{1}{3}$ s fit inside $\frac{2}{4}$?

Lay $\frac{1}{3}$ against it and see how many times it goes.

1 whole piece and $\frac{1}{2}$ of another fits — so $\frac{2}{4} \div \frac{1}{3} = \frac{3}{2}$.

Now try multiplying by $\frac{3}{1}$ — $\frac{1}{3}$ turned over. It lands on the same number.

That is all turning it over does — the two questions are the same question, so either way of writing it will do. $\frac{2}{4} \div \frac{1}{3} = \frac{3}{2}$.

Worked out in full: 2×3 over 4×1 is $\frac{6}{4}$, which simplifies to $\frac{3}{2}$.

Solutions (9 of 25)

Dividing Decimals

Multiply and divide decimals

1. $7.6 \div 2 = \underline{\quad}$

$$\begin{array}{rcl} 7.6 & \div & 2 \\ 7.6 & \div & 2 = 3.8 \\ 3.8 & \times & 2 = 7.6 \end{array}$$

The number you are dividing by is already whole, so there is nothing to move: divide as usual and the point in the answer comes straight down.

Now divide: $7.6 \div 2 = 3.8$.

Check it the other way round: 3.8×2 should give 7.6 back. A point in the wrong place fails this instantly — 7.6 and a tenth of it are not close.

2. $29.7 \div 9 = \underline{\quad}$

$$\begin{array}{rcl} 29.7 & \div & 9 \\ 29.7 & \div & 9 = 3.3 \\ 3.3 & \times & 9 = 29.7 \end{array}$$

The number you are dividing by is already whole, so there is nothing to move: divide as usual and the point in the answer comes straight down.

Now divide: $29.7 \div 9 = 3.3$.

Check it the other way round: 3.3×9 should give 29.7 back. A point in the wrong place fails this instantly — 29.7 and a tenth of it are not close.

Solutions (10 of 25)

Evaluating Expressions

Evaluate expressions

1. $x = 7$ $2x + 5 =$

$$2x + 5 \quad \text{with} \quad x = 7$$

$$2 \times 7 = 14$$

$$14 + 5 = 19$$

$$2x + 5 = 19$$

A letter is a number that has not been written down yet, and this question writes it down: $x = 7$. So put the value in where the letter is — in BRACKETS, which keeps whatever was being done to the letter being done to the number.

$2x$ means 2 TIMES x , and multiplying happens before adding or taking away however the line is written. So this multiplication comes first: $2 \times 7 = 14$.

Now the last bit: $14 + 5 = 19$. Doing it the other way round — adding first and multiplying after — gives 24, which is why the order is the whole of this question.

So $2x + 5$ is 19 when $x = 7$.

2. $x = 10$ $2x - 17 =$

$$2x - 17 \quad \text{with} \quad x = 10$$

$$2 \times 10 = 20$$

$$20 - 17 = 3$$

$$2x - 17 = 3$$

A letter is a number that has not been written down yet, and this question writes it down: $x = 10$. So put the value in where the letter is — in BRACKETS, which keeps whatever was being done to the letter being done to the number.

$2x$ means 2 TIMES x , and multiplying happens before adding or taking away however the line is written. So this multiplication comes first: $2 \times 10 = 20$.

Now the last bit: $20 - 17 = 3$. Doing it the other way round — taking away first and multiplying after — gives -14, which is why the order is the whole of this question.

So $2x - 17$ is 3 when $x = 10$.

Solutions (11 of 25)

Like Terms and the Distributive Property

Collect like terms

1. $8x + 2x + 13$

$$\begin{array}{rcl} 8x + 2x + 13 & & \\ 8 + 2 & = & 10 \\ 13 & = & 13 \\ 10x & + & 13 \end{array}$$

There are two kinds of thing on this line and they cannot mix: the x terms, and the plain numbers. Sort them into two piles before adding anything — the x terms are $8x$ and $2x$, and the numbers are 13.

Add up the x pile, keeping the signs: $8 + 2 = 10$, so $10x$.

There is only one plain number, so that pile is already done: 13.

So it is $10x + 13$ — and that is finished, even though it is still two things. Squashing them into $23x$ would be answering "10 whats and 13 whats?", and there is no answer to that until somebody says what x is.

2. $6x + 3x + 12$

$$\begin{array}{rcl} 6x + 3x + 12 & & \\ 6 + 3 & = & 9 \\ 12 & = & 12 \\ 9x & + & 12 \end{array}$$

There are two kinds of thing on this line and they cannot mix: the x terms, and the plain numbers. Sort them into two piles before adding anything — the x terms are $6x$ and $3x$, and the numbers are 12.

Add up the x pile, keeping the signs: $6 + 3 = 9$, so $9x$.

There is only one plain number, so that pile is already done: 12.

So it is $9x + 12$ — and that is finished, even though it is still two things. Squashing them into $21x$ would be answering "9 whats and 12 whats?", and there is no answer to that until somebody says what x is.

Solutions (12 of 25)

Like Terms and the Distributive Property (continued)

Multiply out brackets

17. $2(9x + 3)$

$$\begin{array}{rcl} & 2(9x + 3) & \\ 2 \times 9x & = & 18x \\ 2 \times 3 & = & 6 \\ 18x & + & 6 \end{array}$$

The 2 outside multiplies EVERYTHING inside the bracket, not just the thing next to it. Draw an arrow from the 2 to each of the two terms before working anything out — that is what stops one of them being left behind.

First arrow: $2 \times 9x = 18x$.

Second arrow: $2 \times 3 = 6$.

Put the two together: $18x + 6$. Check it by putting a small number in for x on both forms — they should agree, because they are the same amount written two ways.

18. $8(2x - 2)$

$$\begin{array}{rcl} & 8(2x - 2) & \\ 8 \times 2x & = & 16x \\ 8 \times 2 & = & 16 \\ 16x & - & 16 \end{array}$$

The 8 outside multiplies EVERYTHING inside the bracket, not just the thing next to it. Draw an arrow from the 8 to each of the two terms before working anything out — that is what stops one of them being left behind.

First arrow: $8 \times 2x = 16x$.

Second arrow: $8 \times 2 = 16$. The sign travels with the number it belongs to, so this one stays negative.

Put the two together: $16x - 16$. Check it by putting a small number in for x on both forms — they should agree, because they are the same amount written two ways.

Solutions (13 of 25)

Solving Equations

Solving equations

1. $x + 40 = 45$

$$x + 40 = 45$$

$$x = 5$$

$$x = 5$$

One thing was done to x : 40 added. So there is one thing to undo, and undoing it is the opposite operation.

The 40 went on last, so it comes off first — and off BOTH sides, or the two halves stop being equal. $45 - 40 = 5$.

Check by putting it back: $(5) + 40 = 45$. It holds, so $x = 5$.

2. $x + 12 = 13$

$$x + 12 = 13$$

$$x = 1$$

$$x = 1$$

One thing was done to x : 12 added. So there is one thing to undo, and undoing it is the opposite operation.

The 12 went on last, so it comes off first — and off BOTH sides, or the two halves stop being equal. $13 - 12 = 1$.

Check by putting it back: $(1) + 12 = 13$. It holds, so $x = 1$.

Inequalities

Inequalities

1. $4x > 24$ x 6

$$x > 6$$

An inequality comes apart exactly like an equation — the same moves, done to both sides. There is one extra rule and it arrives at the end, so start by ignoring the sign and solving for x .

Now divide both sides by 4: $24 \div 4 = 6$.

Nothing was divided by a negative here, so the sign has not moved: it is still $>$. That is the one thing to check on every one of these before writing the answer down.

So $x > 6$. That is a whole RANGE of numbers rather than one, which is what makes this different from an equation — and why the sign is half the answer.

Solutions (14 of 25)

Inequalities (continued)

Inequalities (continued)

2. $2x \geq 18$ $x \boxed{} 9$

$$x \geq 9$$

An inequality comes apart exactly like an equation — the same moves, done to both sides. There is one extra rule and it arrives at the end, so start by ignoring the sign and solving for x .

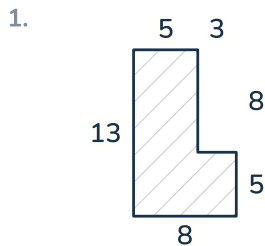
Now divide both sides by 2: $18 \div 2 = 9$.

Nothing was divided by a negative here, so the sign has not moved: it is still $\geq$. That is the one thing to check on every one of these before writing the answer down.

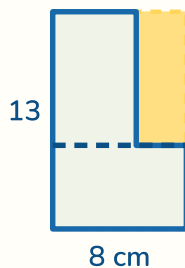
So $x \geq 9$. That is a whole RANGE of numbers rather than one, which is what makes this different from an equation — and why the sign is half the answer.

Area of Composite Shapes

Area of composite figures



— cm²



First way: pretend the bite was never taken. The whole rectangle would be $8 \times 13 = 104$.

Then take the bite off. It is $3 \times 8 = 24$, so the L is $104 - 24 = 80$ square cm.

Second way, and it works on any of these: cut the L into two rectangles.

The bottom strip is $8 \times 5 = 40$, and the piece standing on it is $5 \times 8 = 40$.

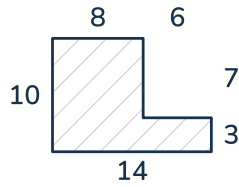
$40 + 40 = 80$ square cm — the same answer as the first way. Two methods that agree is how you know the answer is right.

Solutions (15 of 25)

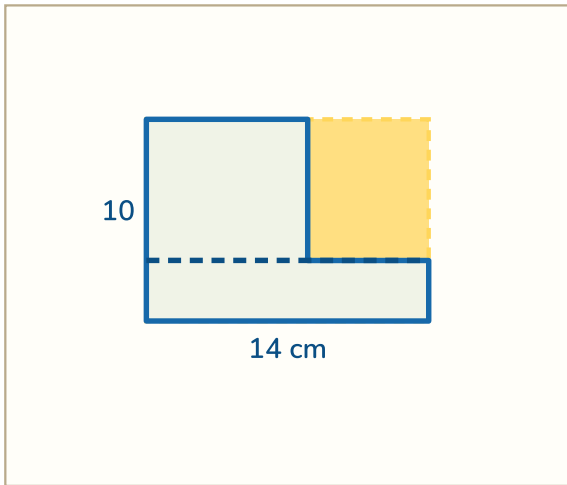
Area of Composite Shapes (continued)

Area of composite figures (continued)

2.



— cm²



First way: pretend the bite was never taken. The whole rectangle would be $14 \times 10 = 140$.

Then take the bite off. It is $6 \times 7 = 42$, so the L is $140 - 42 = 98$ square cm.

Second way, and it works on any of these: cut the L into two rectangles.

The bottom strip is $14 \times 3 = 42$, and the piece standing on it is $8 \times 7 = 56$.

$42 + 56 = 98$ square cm — the same answer as the first way. Two methods that agree is how you know the answer is right.

Solutions (16 of 25)

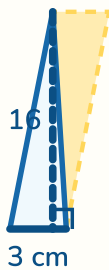
Area of Figures

Area

1.



— cm²



A triangle. Two of its numbers matter and they are not the two longest lines — find them before working anything out.

The base is the side it stands on: 3 cm.

The height is the DASHED line — straight up from the base, at a right angle to it: 16 cm. It is not the sloping side, even though the sloping side is longer and is written right next to it.

Now the halving. Turn a second copy of the triangle upside down against this one and the two together make a parallelogram — $3 \times 16 = 48$. The triangle is exactly half of it.

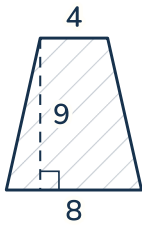
So half of 48 is 24 square cm.

Solutions (17 of 25)

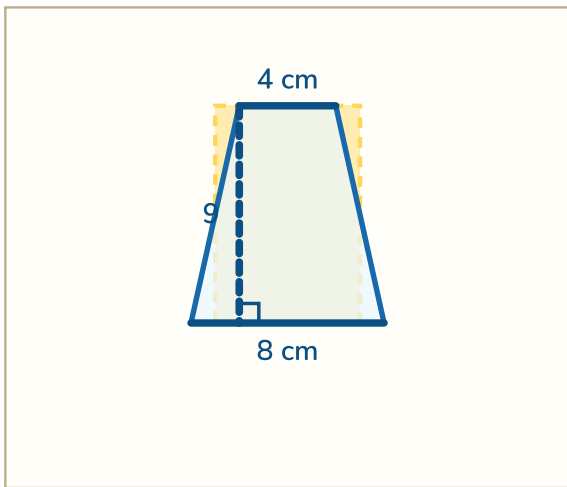
Area of Figures (continued)

Area (continued)

2.



— cm²



A trapezium. Two of its numbers matter and they are not the two longest lines — find them before working anything out.

The two PARALLEL sides are 4 cm and 8 cm. They are the pair that counts.

The height is the DASHED line — straight up from the base, at a right angle to it: 9 cm. It is not the sloping side, even though the sloping side is longer and is written right next to it.

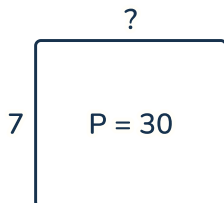
Average the two parallel sides: $(4 + 8) \div 2 = 6$. That is the width of the rectangle this trapezium is worth.

Then it is that width times the height: $6 \times 9 = 54$ square cm.

Missing Sides

Find the missing side

1.



— cm

$$30 \div 2 = 15$$

$$15 - 7 = 8 \text{ cm}$$

Forwards, the perimeter goes round twice: 30 is $7 + ? + 7 + ?$ — each side counted two times.

So undo the doubling FIRST: half of 30 is 15, and that is one long side plus one short one. Taking 7 off the whole 30 is the natural wrong move — it forgets that 7 is in there twice.

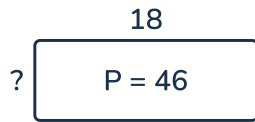
Now take the side you know off that half: $15 - 7 = 8$ cm.

Solutions (18 of 25)

Missing Sides (continued)

Find the missing side (continued)

2.



— cm

$$\begin{aligned} 46 \div 2 &= 23 \\ 23 - 18 &= 5 \text{ cm} \end{aligned}$$

Forwards, the perimeter goes round twice: 46 is $18 + ? + 18 + ?$ — each side counted two times.

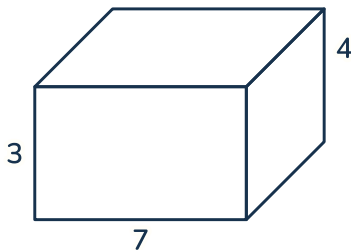
So undo the doubling FIRST: half of 46 is 23, and that is one long side plus one short one. Taking 18 off the whole 46 is the natural wrong move — it forgets that 18 is in there twice.

Now take the side you know off that half: $23 - 18 = 5$ cm.

Volume of Prisms

Volume of a rectangular prism

1.



— cm³

$$\begin{aligned} \text{base: } 7 \times 4 &= 28 \\ 28 \times 3 &= 84 \text{ cubic cm} \end{aligned}$$

Volume is always the same idea: work out the area of the BASE, then see how many of those stack up to the top. Three numbers multiplied is what that comes to, not a rule of its own.

The base is a 7 by 4 rectangle, so its area is 28 square cm — that is one layer.

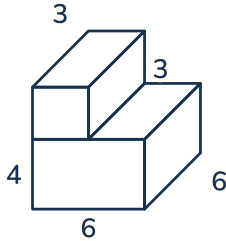
Stack 3 of those layers: $28 \times 3 = 84$ cubic cm. Cubic, not square — a volume is three lengths multiplied, so the unit is cubed.

Solutions (19 of 25)

Volume of Prisms (continued)

Volume of a rectangular prism (continued)

2.



_____ cm³

filled box: 252

notch: 54

$$252 - 54 = \mathbf{198 \text{ cubic cm}}$$

A block standing on a slab. There is no formula for this shape — the job is to turn it into boxes, which do have one, and there is more than one way.

First way: cut it into the two boxes it already is. The slab underneath is $6 \times 6 \times 4 = 144$, and the block standing on it is $3 \times 6 \times 3 = 54$.

$$144 + 54 = 198 \text{ cubic cm.}$$

Second way: fill the notch in to make one big box. That box is $6 \times 6 \times 7 = 252$, and the notch taken back off is $3 \times 6 \times 3 = 54$.

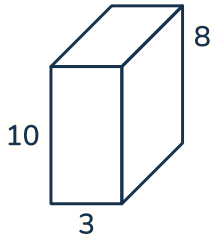
$252 - 54 = 198$ cubic cm. Two methods agreeing is how you know.

Solutions (20 of 25)

Surface Area

Surface area of a box

1.



_____ cm²

front and back: $2 \times 3 \times 10 = 60$

the two sides: $2 \times 8 \times 10 = 160$

top and bottom: $2 \times 3 \times 8 = 48$

total: **268**

Six faces, and the drawing can only show you three of them. The three you cannot see are the reason the usual wrong answer here is five faces added perfectly.

Front and back are 3 by 10, and they are identical — so that pair is $2 \times 3 \times 10 = 60$.

The two sides are 8 by 10, and they are identical — so that pair is $2 \times 8 \times 10 = 160$.

Top and bottom are 3 by 8, and they are identical — so that pair is $2 \times 3 \times 8 = 48$.

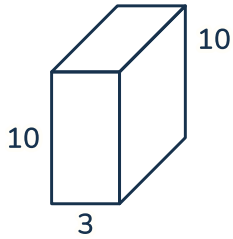
Three pairs, six faces, none missed: $60 + 160 + 48 = 268$ square cm.

Solutions (21 of 25)

Surface Area (continued)

Surface area of a box (continued)

2.



_____ cm²

$$\text{front and back: } 2 \times 3 \times 10 = 60$$

$$\text{the two sides: } 2 \times 10 \times 10 = 200$$

$$\text{top and bottom: } 2 \times 3 \times 10 = 60$$

$$\text{total: } \mathbf{320}$$

Six faces, and the drawing can only show you three of them. The three you cannot see are the reason the usual wrong answer here is five faces added perfectly.

Front and back are 3 by 10, and they are identical — so that pair is $2 \times 3 \times 10 = 60$.

The two sides are 10 by 10, and they are identical — so that pair is $2 \times 10 \times 10 = 200$.

Top and bottom are 3 by 10, and they are identical — so that pair is $2 \times 3 \times 10 = 60$.

Three pairs, six faces, none missed: $60 + 200 + 60 = 320$ square cm.

Finding the Mean

The mean

1. **Mean**
4, 35, 4, 30, 32

$$4 \quad 35 \quad 4 \quad 30 \quad 32$$

$$4 + 35 + 4 + 30 + 32 = 105$$

$$105 \div 5 = \mathbf{21}$$

The mean is what every number **WOULD** be if the total were shared out evenly. So first find the total.

$$4 + 35 + 4 + 30 + 32 = 105.$$

Now share it between all 5 of them: $105 \div 5 = 21$.

Solutions (22 of 25)

Finding the Mean (continued)

The mean (continued)

2. Mean

36, 33, 23, 4, 4

$$\begin{array}{r} 36 \quad 33 \quad 23 \quad 4 \quad 4 \\ 36 + 33 + 23 + 4 + 4 = 100 \\ 100 \div 5 = 20 \end{array}$$

The mean is what every number **WOULD** be if the total were shared out evenly. So first find the total.

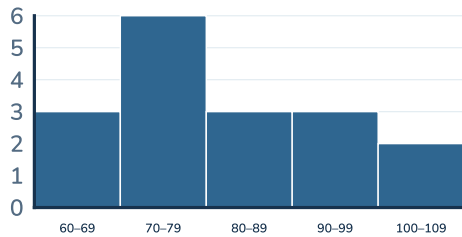
$$36 + 33 + 23 + 4 + 4 = 100.$$

Now share it between all 5 of them: $100 \div 5 = 20$.

Histograms

Histograms

1. Pages read this week (pages)



How many readers are in the 60–69 interval?

60–69: 3 readers
70–79: 6 readers
80–89: 3 readers
90–99: 3 readers
100–109: 2 readers

3

The bars touch, and that is the clue: this is not a bar graph of separate things, it is a number line cut into stretches of 10 pages. Each bar is a **BAND**, not a value.

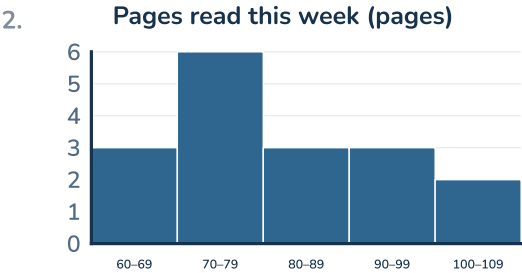
So a bar's height counts how many fell **ANYWHERE** inside its band — the 60–69 bar says 3 readers, but not what any single one of them was.

60–69 — 3 — so the answer is 3.

Solutions (23 of 25)

Histograms (continued)

Histograms (continued)



Which interval holds the most?

60-69: 3 readers
70-79: 6 readers
80-89: 3 readers
90-99: 3 readers
100-109: 2 readers

70-79

The bars touch, and that is the clue: this is not a bar graph of separate things, it is a number line cut into stretches of 10 pages. Each bar is a BAND, not a value.

So a bar's height counts how many fell ANYWHERE inside its band — the 60-69 bar says 3 readers, but not what any single one of them was.

70-79 — 6, the tallest bar — so the answer is 70-79.

Statistics Word Problems

Word problems: statistics

4. A record from five days one week shows that a library lent out 15, 21, 26, 14 and 14 books.

What is the mode? _____

14 appears more often than any other value

the mode is 14.

14 books

Read it through once. The deliverable here is an EQUATION written with x, not just a number — so turn the story into one before solving it.

Let x stand for the unknown the story is about. Writing what the story says as an equation: 14 appears more often than any other value.

Now solve it: the mode is 14.. The equation was what the question asked you to write; the number then answers it, in books.

Solutions (24 of 25)

Statistics Word Problems (continued)

Word problems: statistics (continued)

5. Over five mornings one spring, a farm collected 15, 15, 8, 7 and 12 eggs.

Which number of eggs was the mode? ____

15 appears more often than any other value

the mode is 15.

15 eggs

Read it through once. The deliverable here is an EQUATION written with x, not just a number — so turn the story into one before solving it.

Let x stand for the unknown the story is about. Writing what the story says as an equation: 15 appears more often than any other value.

Now solve it: the mode is 15.. The equation was what the question asked you to write; the number then answers it, in eggs.

Look for the Structure

Look for the structure

1. A number that is a multiple of both 2 and 3 is a multiple of 6.

always

sometimes

never

Why?

always

sometimes

never

always

Before trying anything, notice what each answer would COST. One example that works proves nothing at all. One that fails rules out "always" on its own. They are not the same size of evidence.

So hunt for a counter-example — a case where the claim breaks. That is the cheapest question to ask, and its answer decides between all three.

There is no counter-example, and here is why: a number with a 2 in it and a 3 in it has a 6 in it, because 2 and 3 share no factor to double up on. So the answer is always.

Solutions (25 of 25)

Look for the Structure (continued)

Look for the structure (continued)

2. The difference between two multiples of 3 is a multiple of 3.

always

sometimes

never

Why?

always

sometimes

never

always

Before trying anything, notice what each answer would COST. One example that works proves nothing at all. One that fails rules out "always" on its own. They are not the same size of evidence.

So hunt for a counter-example — a case where the claim breaks. That is the cheapest question to ask, and its answer decides between all three.

There is no counter-example, and here is why: take a whole number of threes away from a whole number of threes and threes are what is left. So the answer is always.