

Grade 6 Advanced Workbook

27 lessons · printable · answer key at the back

Name _____

Date _____

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WORKED EXAMPLE

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

1. Simplifying a ratio

Write each ratio in its simplest form.

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

2. Unit rates

Find the unit rate for each.

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

Percents

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 $-19 + 14 = \underline{\hspace{1cm}}$ | 2 $7 - 13 = \underline{\hspace{1cm}}$ | 3 $-2 + 13 = \underline{\hspace{1cm}}$ | 4 $8 - 17 = \underline{\hspace{1cm}}$ |
| 5 $-16 + 11 = \underline{\hspace{1cm}}$ | 6 $9 - 16 = \underline{\hspace{1cm}}$ | 7 $4 - 13 = \underline{\hspace{1cm}}$ | 8 $-13 + 16 = \underline{\hspace{1cm}}$ |
| 9 $11 - 19 = \underline{\hspace{1cm}}$ | 10 $-3 + 20 = \underline{\hspace{1cm}}$ | 11 $-8 + 15 = \underline{\hspace{1cm}}$ | 12 $3 - 15 = \underline{\hspace{1cm}}$ |
| 13 $0 - 17 = \underline{\hspace{1cm}}$ | 14 $-18 + 11 = \underline{\hspace{1cm}}$ | 15 $4 - 20 = \underline{\hspace{1cm}}$ | 16 $7 - 20 = \underline{\hspace{1cm}}$ |
| 17 $2 - 7 = \underline{\hspace{1cm}}$ | 18 $1 - 16 = \underline{\hspace{1cm}}$ | 19 $-18 + 20 = \underline{\hspace{1cm}}$ | 20 $-8 + 14 = \underline{\hspace{1cm}}$ |
| 21 $5 - 20 = \underline{\hspace{1cm}}$ | 22 $14 - 20 = \underline{\hspace{1cm}}$ | 23 $-1 + 18 = \underline{\hspace{1cm}}$ | 24 $-7 + 16 = \underline{\hspace{1cm}}$ |
| 25 $-2 + 19 = \underline{\hspace{1cm}}$ | 26 $11 - 18 = \underline{\hspace{1cm}}$ | 27 $3 - 10 = \underline{\hspace{1cm}}$ | 28 $10 - 19 = \underline{\hspace{1cm}}$ |
| 29 $10 - 15 = \underline{\hspace{1cm}}$ | 30 $-17 + 17 = \underline{\hspace{1cm}}$ | 31 $13 - 19 = \underline{\hspace{1cm}}$ | 32 $11 - 17 = \underline{\hspace{1cm}}$ |
| 33 $-18 + 13 = \underline{\hspace{1cm}}$ | 34 $7 - 18 = \underline{\hspace{1cm}}$ | 35 $5 - 17 = \underline{\hspace{1cm}}$ | 36 $1 - 13 = \underline{\hspace{1cm}}$ |
| 37 $6 - 12 = \underline{\hspace{1cm}}$ | 38 $17 - 20 = \underline{\hspace{1cm}}$ | 39 $8 - 15 = \underline{\hspace{1cm}}$ | 40 $-6 + 14 = \underline{\hspace{1cm}}$ |
| 41 $3 - 14 = \underline{\hspace{1cm}}$ | 42 $9 - 20 = \underline{\hspace{1cm}}$ | 43 $6 - 9 = \underline{\hspace{1cm}}$ | 44 $-14 + 19 = \underline{\hspace{1cm}}$ |
| 45 $-11 + 18 = \underline{\hspace{1cm}}$ | 46 $5 - 7 = \underline{\hspace{1cm}}$ | 47 $-9 + 19 = \underline{\hspace{1cm}}$ | 48 $-9 + 18 = \underline{\hspace{1cm}}$ |
| 49 $5 - 14 = \underline{\hspace{1cm}}$ | 50 $-6 + 11 = \underline{\hspace{1cm}}$ | | |

Multiplying Integers

WORKED EXAMPLE

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

6. Multiplying integers

Multiply. Remember what two negative signs make.

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

7. Simplifying a ratio

Write each ratio in its simplest form.

- | | | | |
|--|---|--|---|
| 41 $4 : 10 = \underline{\hspace{2cm}}$ | 42 $15 : 35 = \underline{\hspace{2cm}}$ | 43 $2 : 6 = \underline{\hspace{2cm}}$ | 44 $18 : 30 = \underline{\hspace{2cm}}$ |
| 45 $5 : 20 = \underline{\hspace{2cm}}$ | 46 $9 : 12 = \underline{\hspace{2cm}}$ | 47 $5 : 30 = \underline{\hspace{2cm}}$ | 48 $12 : 32 = \underline{\hspace{2cm}}$ |
| 49 $3 : 6 = \underline{\hspace{2cm}}$ | 50 $10 : 25 = \underline{\hspace{2cm}}$ | | |

WORKED EXAMPLE

$$|2| + |-1| = \underline{3}$$

8. Absolute value

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

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

9. Decimals as percents

Write each decimal as a percent.

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

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 $88 \div 8 + 6 = \underline{\hspace{2cm}}$

4 $9 + 6 \times 4 = \underline{\hspace{2cm}}$

7 $5 \times 8 + 2 = \underline{\hspace{2cm}}$

10 $2 + 12 \times 8 = \underline{\hspace{2cm}}$

13 $2 + 11 \times 6 = \underline{\hspace{2cm}}$

16 $4 + 6 \times 12 = \underline{\hspace{2cm}}$

19 $12 \times 5 + 2 = \underline{\hspace{2cm}}$

22 $2 + 11 \times 8 = \underline{\hspace{2cm}}$

25 $12 \times 11 + 9 = \underline{\hspace{2cm}}$

28 $2 + 10 \times 11 = \underline{\hspace{2cm}}$

31 $2 + 11 \times 3 = \underline{\hspace{2cm}}$

34 $8 \times 7 + 8 = \underline{\hspace{2cm}}$

37 $20 \div 2 + 7 = \underline{\hspace{2cm}}$

2 $3 + 9 \times 6 = \underline{\hspace{2cm}}$

5 $7 + 64 \div 8 = \underline{\hspace{2cm}}$

8 $6 + 3 \times 6 = \underline{\hspace{2cm}}$

11 $4 + 2 \times 7 = \underline{\hspace{2cm}}$

14 $6 + 7 \times 3 = \underline{\hspace{2cm}}$

17 $6 \times 2 + 9 = \underline{\hspace{2cm}}$

20 $2 \times 9 + 2 = \underline{\hspace{2cm}}$

23 $8 + 6 \times 11 = \underline{\hspace{2cm}}$

26 $6 + 10 \times 11 = \underline{\hspace{2cm}}$

29 $4 \times 9 + 2 = \underline{\hspace{2cm}}$

32 $9 + 12 \times 9 = \underline{\hspace{2cm}}$

35 $4 + 9 \times 12 = \underline{\hspace{2cm}}$

38 $4 + 11 \times 7 = \underline{\hspace{2cm}}$

3 $25 \div 5 + 8 = \underline{\hspace{2cm}}$

6 $12 \times 12 + 9 = \underline{\hspace{2cm}}$

9 $3 + 3 \times 10 = \underline{\hspace{2cm}}$

12 $8 + 10 \times 3 = \underline{\hspace{2cm}}$

15 $7 + 12 \times 11 = \underline{\hspace{2cm}}$

18 $5 \times 9 + 2 = \underline{\hspace{2cm}}$

21 $2 + 10 \times 10 = \underline{\hspace{2cm}}$

24 $20 \div 4 + 9 = \underline{\hspace{2cm}}$

27 $4 + 36 \div 3 = \underline{\hspace{2cm}}$

30 $5 \times 2 + 7 = \underline{\hspace{2cm}}$

33 $44 \div 4 + 4 = \underline{\hspace{2cm}}$

36 $9 + 5 \times 8 = \underline{\hspace{2cm}}$

11. Add and subtract integers

Add or subtract the integers.

39 $-12 + 11 = \underline{\hspace{2cm}}$

40 $17 - 19 = \underline{\hspace{2cm}}$

41 $7 - 12 = \underline{\hspace{2cm}}$

42 $12 - 17 = \underline{\hspace{2cm}}$

43 $-6 + 16 = \underline{\hspace{2cm}}$

44 $5 - 16 = \underline{\hspace{2cm}}$

45 $7 - 18 = \underline{\hspace{2cm}}$

46 $-1 + 16 = \underline{\hspace{2cm}}$

47 $8 - 16 = \underline{\hspace{2cm}}$

48 $14 - 19 = \underline{\hspace{2cm}}$

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

Greatest Common Factor

WORKED EXAMPLE

10, 14 → 2

14. Greatest common factor

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

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

15. Prime or composite

Circle whether each number is prime or composite.

- | | |
|-------------------------|-------------------------|
| 49 17 Prime / Composite | 50 45 Prime / Composite |
| 51 44 Prime / Composite | 52 41 Prime / Composite |
| 53 5 Prime / Composite | 54 9 Prime / Composite |
| 55 21 Prime / Composite | 56 38 Prime / Composite |
| 57 35 Prime / Composite | 58 31 Prime / Composite |
| 59 3 Prime / Composite | 60 39 Prime / Composite |
| 61 27 Prime / Composite | 62 19 Prime / Composite |
| 63 49 Prime / Composite | 64 43 Prime / Composite |
| 65 50 Prime / Composite | 66 25 Prime / Composite |
| 67 29 Prime / Composite | 68 46 Prime / Composite |

Lowest Common Multiple

16. Least common multiple

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

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

17. Greatest common factor

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

- | | | | |
|------------------|------------------|------------------|------------------|
| 21 6, 21 → ____ | 22 30, 35 → ____ | 23 12, 21 → ____ | 24 20, 35 → ____ |
| 25 15, 21 → ____ | 26 10, 35 → ____ | 27 18, 30 → ____ | 28 10, 25 → ____ |
| 29 24, 30 → ____ | 30 20, 28 → ____ | 31 20, 24 → ____ | 32 16, 28 → ____ |
| 33 25, 30 → ____ | 34 12, 16 → ____ | 35 30, 36 → ____ | 36 25, 35 → ____ |
| 37 12, 18 → ____ | 38 8, 28 → ____ | 39 12, 30 → ____ | 40 18, 24 → ____ |

Factors and Multiples

WORKED EXAMPLE

31 → 1, 31

18. List the factors

List all the factors of each number.

- 1 6 → _____
- 2 28 → _____
- 3 38 → _____
- 4 32 → _____
- 5 26 → _____
- 6 40 → _____
- 7 12 → _____
- 8 10 → _____
- 9 24 → _____
- 10 36 → _____
- 11 35 → _____
- 12 30 → _____

19. Is it a multiple?

Circle Yes or No for each question.

- 13 Is 20 a multiple of 10? Yes / No
- 14 Is 32 a multiple of 8? Yes / No
- 15 Is 24 a multiple of 4? Yes / No
- 16 Is 36 a multiple of 9? Yes / No
- 17 Is 27 a multiple of 2? Yes / No
- 18 Is 36 a multiple of 6? Yes / No
- 19 Is 32 a multiple of 5? Yes / No
- 20 Is 22 a multiple of 4? Yes / No
- 21 Is 35 a multiple of 7? Yes / No
- 22 Is 30 a multiple of 2? Yes / No

Prime and Composite Numbers

WORKED EXAMPLE

18 Prime / Composite

20. Prime or composite

Circle whether each number is prime or composite.

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

21. Multiplying integers

Multiply. Remember what two negative signs make.

37	$-9 \times 11 = \underline{\hspace{2cm}}$	38	$-11 \times (-8) = \underline{\hspace{2cm}}$	39	$9 \times (-6) = \underline{\hspace{2cm}}$
40	$-4 \times (-8) = \underline{\hspace{2cm}}$	41	$12 \times (-5) = \underline{\hspace{2cm}}$	42	$-4 \times (-6) = \underline{\hspace{2cm}}$

21. Multiplying integers (continued)

Multiply. Remember what two negative signs make.

43 $-6 \times (-3) = \underline{\hspace{2cm}}$

44 $-4 \times 12 = \underline{\hspace{2cm}}$

45 $-4 \times (-4) = \underline{\hspace{2cm}}$

46 $-6 \times (-9) = \underline{\hspace{2cm}}$

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

4 $\frac{1}{6} \div \frac{1}{5} = \text{—}$

7 $\frac{3}{4} \div \frac{2}{6} = \text{—}$

10 $\frac{3}{7} \div \frac{4}{5} = \text{—}$

13 $\frac{1}{7} \div \frac{2}{7} = \text{—}$

16 $\frac{1}{8} \div \frac{3}{5} = \text{—}$

19 $\frac{1}{7} \div \frac{1}{8} = \text{—}$

22 $\frac{6}{7} \div \frac{4}{6} = \text{—}$

25 $\frac{1}{4} \div \frac{2}{4} = \text{—}$

28 $\frac{3}{4} \div \frac{7}{8} = \text{—}$

31 $\frac{1}{6} \div \frac{4}{8} = \text{—}$

34 $\frac{5}{7} \div \frac{1}{3} = \text{—}$

37 $\frac{1}{4} \div \frac{2}{6} = \text{—}$

40 $\frac{2}{5} \div \frac{3}{8} = \text{—}$

43 $\frac{2}{6} \div \frac{3}{4} = \text{—}$

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

5 $\frac{4}{8} \div \frac{7}{8} = \text{—}$

8 $\frac{7}{8} \div \frac{2}{5} = \text{—}$

11 $\frac{3}{5} \div \frac{1}{4} = \text{—}$

14 $\frac{3}{8} \div \frac{1}{6} = \text{—}$

17 $\frac{5}{7} \div \frac{1}{7} = \text{—}$

20 $\frac{4}{8} \div \frac{2}{8} = \text{—}$

23 $\frac{4}{5} \div \frac{1}{3} = \text{—}$

26 $\frac{1}{2} \div \frac{4}{7} = \text{—}$

29 $\frac{3}{5} \div \frac{2}{7} = \text{—}$

32 $\frac{2}{4} \div \frac{1}{5} = \text{—}$

35 $\frac{3}{6} \div \frac{1}{5} = \text{—}$

38 $\frac{2}{3} \div \frac{3}{6} = \text{—}$

41 $\frac{3}{6} \div \frac{2}{8} = \text{—}$

3 $\frac{3}{5} \div \frac{6}{7} = \text{—}$

6 $\frac{6}{8} \div \frac{1}{7} = \text{—}$

9 $\frac{5}{7} \div \frac{5}{6} = \text{—}$

12 $\frac{3}{7} \div \frac{7}{8} = \text{—}$

15 $\frac{1}{6} \div \frac{5}{8} = \text{—}$

18 $\frac{1}{4} \div \frac{5}{7} = \text{—}$

21 $\frac{1}{8} \div \frac{2}{8} = \text{—}$

24 $\frac{5}{6} \div \frac{2}{8} = \text{—}$

27 $\frac{1}{8} \div \frac{1}{6} = \text{—}$

30 $\frac{2}{4} \div \frac{3}{7} = \text{—}$

33 $\frac{2}{3} \div \frac{4}{8} = \text{—}$

36 $\frac{5}{6} \div \frac{3}{7} = \text{—}$

39 $\frac{7}{8} \div \frac{1}{5} = \text{—}$

42 $\frac{1}{3} \div \frac{3}{7} = \text{—}$

23. Absolute value

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

44 $|-4| + |1| = \text{—}$

45 $|-7| + |9| = \text{—}$

23. Absolute value (continued)

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

46 $|8| + |-3| = \underline{\quad}$

47 $|-11| + |4| = \underline{\quad}$

48 $|-2| + |3| = \underline{\quad}$

49 How far apart are -4 and 6 on the number line? $\underline{\quad}$

50 How far apart are -10 and 3 on the number line? $\underline{\quad}$

51 $|-11| + |1| = \underline{\quad}$

52 How far apart are -9 and 4 on the number line? $\underline{\quad}$

53 How far apart are -1 and 9 on the number line? $\underline{\quad}$

Dividing Decimals

WORKED EXAMPLE

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

24. Multiply and divide decimals

Divide. Each quotient is an exact decimal.

- | | | |
|-----------------------------|-----------------------------|-----------------------------|
| 1 $57.5 \div 5 =$ _____ | 2 $65.76 \div 6 =$ _____ | 3 $8.30 \div 5 =$ _____ |
| 4 $119.79 \div 11 =$ _____ | 5 $106.0 \div 10 =$ _____ | 6 $99.36 \div 9 =$ _____ |
| 7 $53.55 \div 9 =$ _____ | 8 $27.80 \div 10 =$ _____ | 9 $61.38 \div 11 =$ _____ |
| 10 $68.88 \div 12 =$ _____ | 11 $35.90 \div 10 =$ _____ | 12 $45.09 \div 9 =$ _____ |
| 13 $97.68 \div 11 =$ _____ | 14 $30.0 \div 4 =$ _____ | 15 $52.36 \div 7 =$ _____ |
| 16 $116.70 \div 10 =$ _____ | 17 $38.8 \div 4 =$ _____ | 18 $77.88 \div 12 =$ _____ |
| 19 $59.43 \div 7 =$ _____ | 20 $16.00 \div 5 =$ _____ | 21 $116.76 \div 12 =$ _____ |
| 22 $102.60 \div 9 =$ _____ | 23 $141.00 \div 12 =$ _____ | 24 $42.0 \div 6 =$ _____ |
| 25 $63.40 \div 10 =$ _____ | 26 $98.20 \div 10 =$ _____ | 27 $18.6 \div 2 =$ _____ |
| 28 $69.42 \div 6 =$ _____ | 29 $117.04 \div 11 =$ _____ | 30 $9.80 \div 5 =$ _____ |
| 31 $120.23 \div 11 =$ _____ | 32 $19.58 \div 2 =$ _____ | 33 $40.4 \div 4 =$ _____ |
| 34 $30.78 \div 6 =$ _____ | 35 $82.11 \div 7 =$ _____ | 36 $50.16 \div 8 =$ _____ |
| 37 $92.0 \div 8 =$ _____ | 38 $114.18 \div 11 =$ _____ | 39 $48.40 \div 5 =$ _____ |
| 40 $78.0 \div 10 =$ _____ | 41 $50.85 \div 5 =$ _____ | 42 $94.00 \div 10 =$ _____ |
| 43 $19.8 \div 2 =$ _____ | 44 $34.44 \div 3 =$ _____ | 45 $24.57 \div 3 =$ _____ |
| 46 $99.6 \div 12 =$ _____ | 47 $11.56 \div 2 =$ _____ | 48 $52.86 \div 6 =$ _____ |
| 49 $16.65 \div 3 =$ _____ | 50 $15.51 \div 11 =$ _____ | |

25. Order of operations

Follow the order of operations to solve each problem.

- | | | |
|-----------------------------|------------------------------|------------------------------|
| 51 $8 + 56 \div 7 =$ _____ | 52 $4 + 12 \times 8 =$ _____ | 53 $88 \div 8 + 6 =$ _____ |
| 54 $9 \times 4 + 5 =$ _____ | 55 $6 + 72 \div 8 =$ _____ | 56 $2 + 11 \times 6 =$ _____ |
| 57 $3 + 9 \times 6 =$ _____ | 58 $9 + 25 \div 5 =$ _____ | 59 $6 + 10 \times 8 =$ _____ |
| 60 $8 \times 4 + 4 =$ _____ | | |

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 $a = 2, b = 7$ $6a + b =$ ____

2 $x = 6$ $x^2 + 2 =$ ____

3 $x = 8$ $2x + 12 =$ ____

4 $x = 8$ $6x - 8 =$ ____

5 $a = 4, b = 3$ $2a + b =$ ____

6 $x = 11$ $4x - 2 =$ ____

7 $a = 11, b = 3$ $2a + b =$ ____

8 $x = 7$ $2x + 14 =$ ____

9 $x = 12$ $2x + 19 =$ ____

10 $x = 3$ $x^2 + 10 =$ ____

11 $x = 2$ $9x + 16 =$ ____

12 $a = 8, b = 2$ $6a + b =$ ____

26. Evaluate expressions (continued)

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

13 $x = 5$ $6x + 8 =$ ____

14 $x = 8$ $3x + 3 =$ ____

15 $a = 6, b = 12$ $3a + b =$ ____

16 $x = 5$ $7x + 14 =$ ____

17 $x = 2$ $9x + 11 =$ ____

18 $x = 4$ $x^2 + 3 =$ ____

19 $x = 3$ $x^2 + 5 =$ ____

20 $x = 5$ $4x + 5 =$ ____

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 $5x + 18 - 2x$

2 $7x + 20 - 6x - 8$

3 $8x + 9 - 4x - 7$

4 $7x + 6 - x - 1$

5 $6x + 15 - 2x - 10$

6 $10x + 17 - 2x - 8$

7 $12x + 19 - 9x - 11$

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

9 $5x + 20 - 2x - 12$

10 $11x + 18 - 9x - 6$

11 $10 + 2x + 5 + 9x$

12 $12x + 14 - 8x - 6$

13 $9x + 15 - 3x - 3$

14 $7x + 17 - 4x - 11$

15 $9x + 14 - 4x - 6$

16 $10x + 20 - 3x - 10$

29. Multiply out brackets

Multiply out each bracket.

17 $6(4x + 7)$

18 $4(9x - 12)$

19 $2(6 + 9x)$

20 $7(5 + 6x)$

21 $5(6x + 4)$

22 $7(7x - 3)$

23 $8(3x - 4)$

24 $3(5x + 12)$

25 $4(10 + 9x)$

26 $6(5 + 4x)$

27 $6(5x + 5)$

28 $7(6x - 3)$

29 $4(6x - 11)$

30 $4(9x + 8)$

31 $6(7 + 7x)$

32 $6(6x - 8)$

Solving Equations

WORKED EXAMPLE

$$x - 5 = 6 \quad \underline{11}$$

30. Solving equations

Solve each equation for x .

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

31. Greatest common factor

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

- | | | | |
|-----------------|-----------------|-----------------|-----------------|
| 51 12, 20 → ___ | 52 25, 30 → ___ | 53 20, 25 → ___ | 54 30, 35 → ___ |
| 55 18, 21 → ___ | 56 18, 30 → ___ | 57 25, 35 → ___ | 58 15, 21 → ___ |
| 59 24, 28 → ___ | 60 20, 35 → ___ | | |

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 $3x \leq 42$ x 14

2 $-3x \geq -42$ x 14

3 $-5x < -5$ x 1

4 $-2x \leq -18$ x 9

5 $-4x \geq -16$ x 4

6 $-6x \leq 42$ x -7

7 $-4x \geq 32$ x -8

8 $2x \leq -36$ x -18

9 $-6x > 42$ x -7

10 $-7x \geq 49$ x -7

11 $4x > -40$ x -10

12 $-4x \geq -32$ x 8

13 $-2x > -36$ x 18

14 $2x \leq -44$ x -22

15 $-2x \leq 22$ x -11

16 $-5x \geq 35$ x -7

17 $-4x \geq -8$ x 2

18 $-2x \leq 36$ x -18

19 $-5x < 35$ x -7

20 $3x > -36$ x -12

21 $-3x \geq 30$ x -10

22 $-3x \leq 48$ x -16

23 $-2x \geq 46$ x -23

33. Least common multiple

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

24 12, 16 → _____

25 15, 25 → _____

26 8, 10 → _____

27 15, 20 → _____

28 10, 25 → _____

29 12, 15 → _____

30 12, 20 → _____

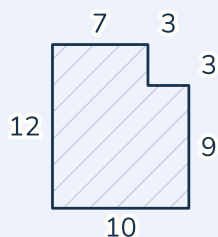
31 8, 20 → _____

32 20, 25 → _____

33 16, 20 → _____

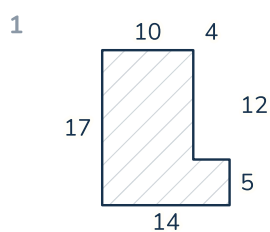
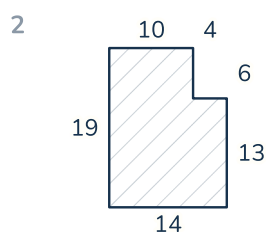
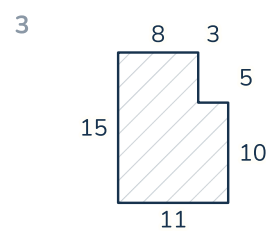
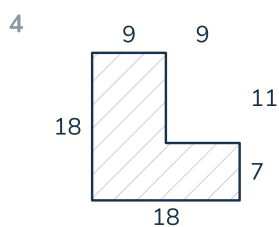
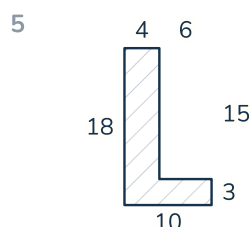
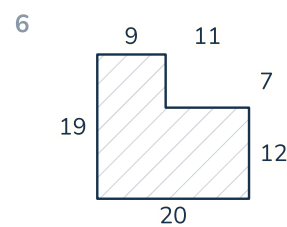
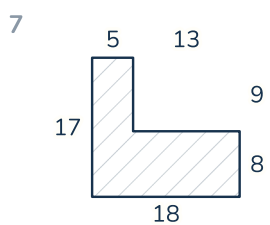
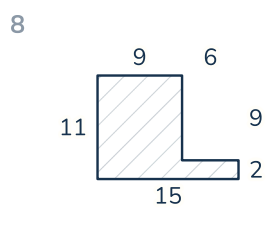
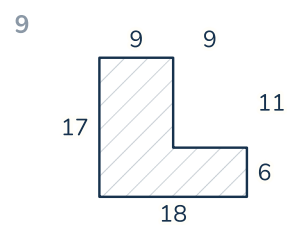
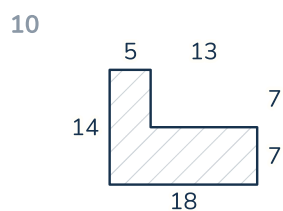
Area of Composite Shapes

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 20 a multiple of 3? Yes / No
- 12 Is 36 a multiple of 3? Yes / No
- 13 Is 20 a multiple of 10? Yes / No
- 14 Is 36 a multiple of 2? Yes / No
- 15 Is 26 a multiple of 3? Yes / No
- 16 Is 39 a multiple of 3? Yes / No
- 17 Is 34 a multiple of 3? Yes / No
- 18 Is 24 a multiple of 3? Yes / No
- 19 Is 32 a multiple of 5? Yes / No
- 20 Is 36 a multiple of 12? Yes / No

Area of Figures

WORKED EXAMPLE

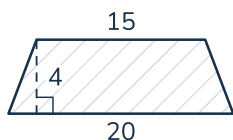


18 cm²

36. Area

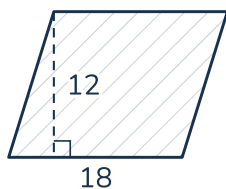
Find the area. Lengths are in cm; the dashed line is the height.

1



_____ cm²

2



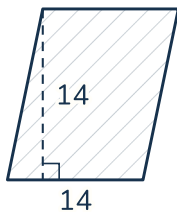
_____ cm²

3



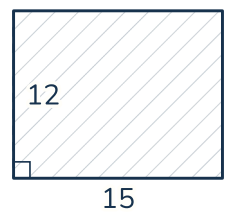
_____ cm²

4



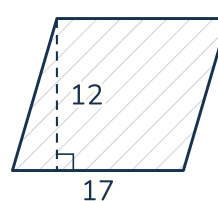
_____ cm²

5



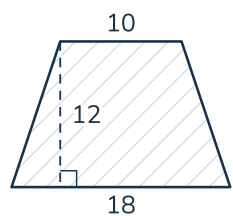
_____ cm²

6



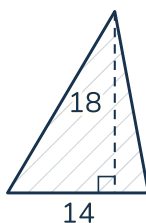
_____ cm²

7



_____ cm²

8



_____ cm²

9



_____ cm²

10



_____ cm²

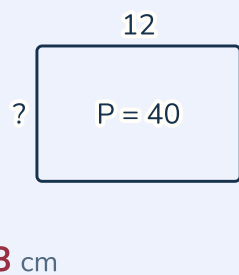
37. List the factors

List all the factors of each number.

- 11 39 → _____
- 12 12 → _____
- 13 35 → _____
- 14 36 → _____
- 15 38 → _____
- 16 24 → _____
- 17 32 → _____
- 18 21 → _____
- 19 18 → _____
- 20 40 → _____

Missing Sides

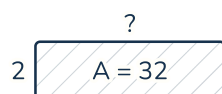
WORKED EXAMPLE



38. Find the missing side

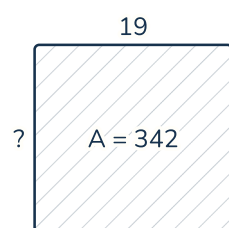
Find the missing side. All lengths are in centimeters.

1



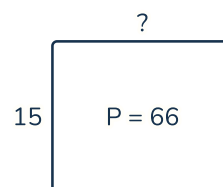
_____ cm

2



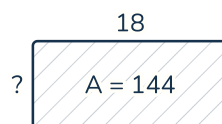
_____ cm

3



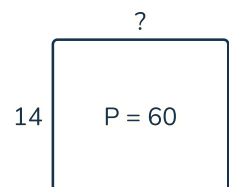
_____ cm

4



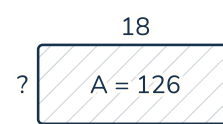
_____ cm

5



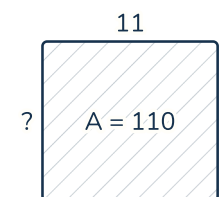
_____ cm

6



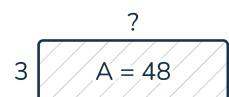
_____ cm

7



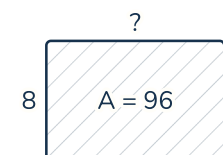
_____ cm

8



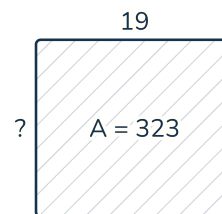
_____ cm

9



_____ cm

10



_____ cm

39. Prime or composite

Circle whether each number is prime or composite.

- 11

3

Prime / Composite
- 13

42

Prime / Composite
- 15

40

Prime / Composite
- 17

15

Prime / Composite
- 19

45

Prime / Composite
- 12

39

Prime / Composite
- 14

43

Prime / Composite
- 16

29

Prime / Composite
- 18

13

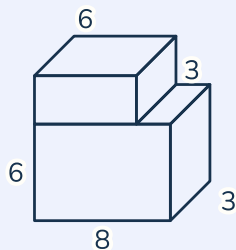
Prime / Composite
- 20

31

Prime / Composite

Volume of Prisms

WORKED EXAMPLE

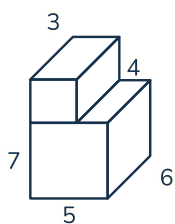


198 cm³

40. Volume of a rectangular prism

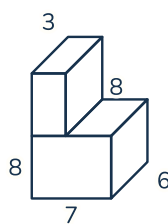
Find the volume of each box. All lengths are in centimeters.

1



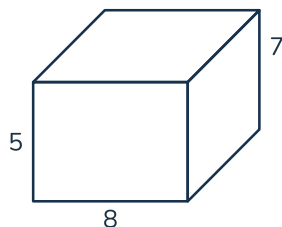
_____ cm³

2



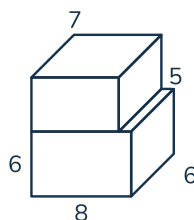
_____ cm³

3



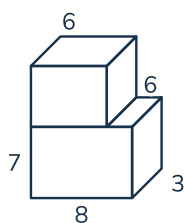
_____ cm³

4



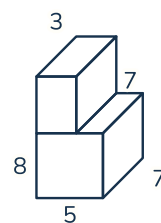
_____ cm³

5



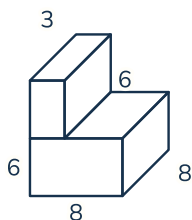
_____ cm³

6



_____ cm³

7



_____ cm³

41. Dividing fractions

Divide. Write each answer in simplest form.

$$8 \quad \frac{2}{5} \div \frac{3}{7} = \text{---}$$

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

$$10 \quad \frac{3}{4} \div \frac{4}{7} = \text{---}$$

$$11 \quad \frac{3}{4} \div \frac{3}{7} = \text{---}$$

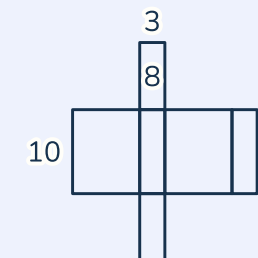
$$12 \quad \frac{3}{4} \div \frac{5}{6} = \text{---}$$

$$13 \quad \frac{2}{4} \div \frac{6}{8} = \text{---}$$

$$14 \quad \frac{4}{5} \div \frac{2}{6} = \text{---}$$

Surface Area

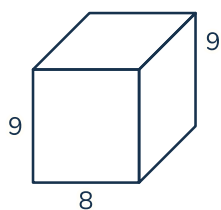
WORKED EXAMPLE

**268** cm²

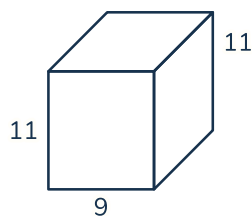
42. Surface area of a box

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

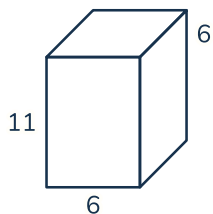
1

_____ cm²

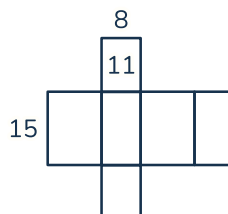
2

_____ cm²

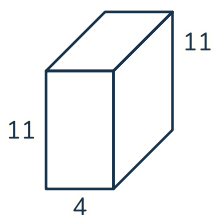
3

_____ cm²

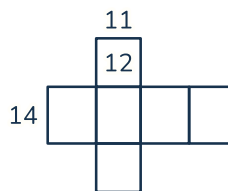
4

_____ cm²

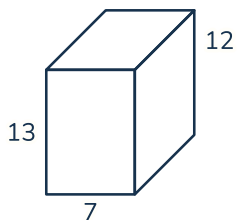
5

_____ cm²

6

_____ cm²

7

_____ cm²

43. Multiply and divide decimals

Divide. Each quotient is an exact decimal.

8 $8.30 \div 5 = \underline{\hspace{2cm}}$

9 $40.95 \div 7 = \underline{\hspace{2cm}}$

10 $8.01 \div 9 = \underline{\hspace{2cm}}$

11 $17.76 \div 2 = \underline{\hspace{2cm}}$

12 $35.2 \div 4 = \underline{\hspace{2cm}}$

13 $99.36 \div 9 = \underline{\hspace{2cm}}$

14 $136.20 \div 12 = \underline{\hspace{2cm}}$

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

42, 45, 30, 6, 42

2 Mean

16, 48, 1, 19, 1

3 Mean

37, 42, 45, 13, 13

4 Mean

42, 24, 20, 20, 49

5 Mean

15, 41, 34, 14, 41

6 Mean

49, 21, 44, 32, 49

7 Mean

50, 50, 5, 3, 7

8 Mean

30, 44, 46, 11, 44

9 Mean

47, 45, 12, 45, 16

10 Mean

48, 11, 42, 23, 11

11 Mean

28, 10, 45, 37, 10

12 Mean

27, 14, 47, 27, 50

44. The mean (continued)

Find the mean of each set of numbers.

13 Mean
48, 18, 41, 18, 40

15 Mean
46, 45, 15, 15, 49

17 Mean
31, 37, 41, 37, 34

19 Mean
49, 35, 17, 35, 14

21 Mean
49, 49, 17, 14, 11

23 Mean
21, 50, 50, 46, 3

25 Mean
27, 35, 27, 50, 21

27 Mean
10, 44, 40, 40, 11

14 Mean
17, 15, 45, 26, 17

16 Mean
49, 46, 43, 6, 6

18 Mean
3, 14, 7, 7, 49

20 Mean
35, 46, 35, 31, 13

22 Mean
35, 21, 49, 21, 39

24 Mean
24, 43, 17, 33, 43

26 Mean
38, 50, 38, 17, 22

28 Mean
22, 22, 14, 35, 47

44. The mean (continued)

Find the mean of each set of numbers.

29 Mean
50, 3, 19, 9, 19

31 Mean
49, 17, 6, 6, 27

33 Mean
10, 18, 10, 26, 41

30 Mean
35, 6, 16, 35, 43

32 Mean
50, 21, 8, 38, 8

34 Mean
26, 48, 26, 38, 42

45. Evaluate expressions

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

35 $x = 7$ $4x - 5 =$ _____

36 $a = 7, b = 11$ $4a + b =$ _____

37 $x = 6$ $6x + 1 =$ _____

38 $x = 12$ $2x + 15 =$ _____

39 $x = 12$ $4x - 17 =$ _____

40 $x = 8$ $5x + 3 =$ _____

41 $a = 10, b = 6$ $2a + b =$ _____

42 $x = 6$ $3x + 13 =$ _____

43 $x = 10$ $3x + 9 =$ _____

44 $a = 4, b = 11$ $4a + b =$ _____

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

14, 8, 42, 14, 37

- 2

Median

47, 6, 15, 31, 31

- 3

Median

5, 40, 2, 33, 40

- 4

Median

7, 31, 47, 5, 5

- 5

Median

40, 40, 14, 25, 6

- 6

Median

42, 50, 42, 20, 11

- 7

Median

7, 47, 20, 3, 3

- 8

Median

24, 2, 24, 21, 44

- 9

Median

13, 16, 11, 16, 49

- 10

Median

26, 34, 44, 44, 47

- 11

Median

45, 13, 45, 20, 27

- 12

Median

48, 6, 48, 38, 15

- 13

Median

46, 19, 43, 46, 16

- 14

Median

5, 4, 37, 42, 37

- 15

Median

21, 49, 14, 38, 38

- 16

Median

4, 37, 4, 47, 43

- 17

Median

9, 36, 44, 10, 36

- 18

Median

49, 26, 43, 49, 8

46. The median (continued)

Find the median of each set of numbers.

- 19

Median

40, 21, 46, 12, 46

- 20

Median

44, 31, 27, 27, 41

- 21

Median

38, 37, 42, 38, 50

- 22

Median

32, 47, 31, 47, 18

- 23

Median

14, 50, 35, 28, 28

- 24

Median

44, 44, 18, 3, 41

47. The range

Find the range of each set of numbers.

- 25

Range

44, 27, 16, 41, 27

- 26

Range

49, 35, 16, 49, 46

- 27

Range

38, 41, 1, 45, 45

- 28

Range

24, 48, 24, 45, 14

- 29

Range

24, 13, 24, 42, 37

- 30

Range

50, 47, 23, 40, 40

- 31

Range

22, 18, 48, 18, 4

- 32

Range

38, 15, 40, 38, 44

- 33

Range

3, 28, 3, 22, 49

- 34

Range

48, 50, 7, 17, 48

- 35

Range

24, 8, 45, 38, 45

- 36

Range

48, 45, 33, 33, 11

- 37

Range

25, 2, 25, 30, 48

- 38

Range

44, 14, 11, 12, 44

- 39

Range

49, 30, 4, 49, 13

- 40

Range

7, 7, 48, 2, 36

- 41

Range

42, 16, 16, 37, 4

- 42

Range

28, 30, 49, 28, 35

- 43

Range

29, 16, 16, 36, 48

- 44

Range

45, 20, 9, 20, 31

- 45

Range

6, 24, 14, 14, 47

- 46

Range

49, 27, 27, 21, 26

- 47

Range

20, 23, 37, 47, 23

- 48

Range

2, 2, 10, 43, 18

48. Multiply out brackets

Multiply out each bracket.

49 $4(4 + 6x)$

50 $7(4x + 7)$

51 $7(4x + 3)$

52 $5(7x + 9)$

53 $4(4x + 11)$

54 $6(6 + 4x)$

55 $6(5 + 4x)$

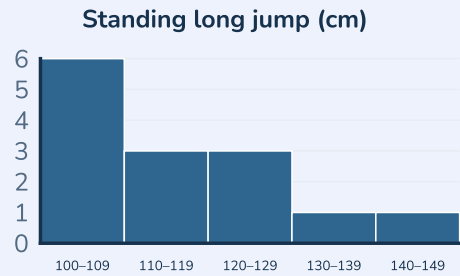
56 $2(9x - 11)$

57 $3(9x - 11)$

58 $4(9 + 8x)$

Histograms

WORKED EXAMPLE

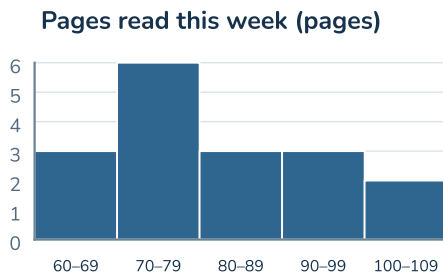


Which interval holds the most?

100-109

49. Histograms

Read each histogram and answer the question.

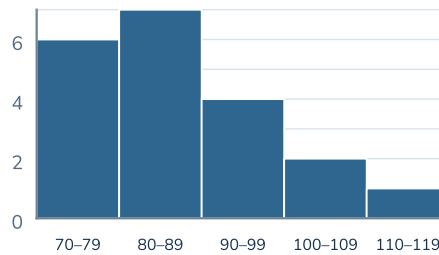


- 1 How many readers are in the 60-69 interval?

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

6 $12x + 12 - 11x - 1$

7 $6x + 12 - 2x - 10$

8 $7x + 18 - x - 8$

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

What is the median number of books?

- ² The eggs a farm collected over five mornings one spring were 19, 5, 23, 21 and 23.

Find the median.

- ³ A bakery sold 13, 14, 15, 19 and 14 cakes over five days at the market.

What was the median number of cakes?

- ⁴ Across five days at the market, a bakery sold 22, 19, 25, 22 and 7 cakes.

What is the median number of cakes?

- ⁵ 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?

- ⁶ In five weeks during a school drive, a class recycled 16, 21, 28, 13 and 21 bottles.

Find the median.

51. Word problems: statistics (continued)

Read each problem. Write the answer.

- 7 Over five days at the market, a bakery sold 16, 4, 20, 20 and 27 cakes.

What was the median number of cakes?

- 8 In five days one vacation week, a store sold 10, 19, 10, 15 and 23 kites.

Find the median.

- 9 Over five weeks one summer, a garden grew 18, 25, 18, 14 and 6 tomatoes.

What was the median number of tomatoes?

- 10 Across five days one vacation week, a store sold 15, 24, 25, 23 and 15 kites.

What is the median number of kites?

- 11 Over five days at the market, a bakery sold 15, 16, 7, 7 and 24 cakes.

What was the median number of cakes?

- 12 Across five weeks one summer, a garden grew 26, 24, 24, 9 and 30 tomatoes.

What is the median number of tomatoes?

- 13 The books a library lent out over five days one week were 23, 23, 15, 18 and 27.

Find the median.

- 14 Over five weeks during a school drive, a class recycled 26, 28, 10, 16 and 10 bottles.

What was the median number of bottles?

52. Solving equations

Solve each equation for x .

15 $x + 1 = 26$

16 $x - 10 = 36$

17 $45 - x = 29$

18 $x - 15 = 33$

19 $x + 20 = 45$

20 $49 - x = 3$

21 $33 - x = 2$

22 $44 - x = 24$

23 $x - 21 = 13$

24 $x - 42 = 3$

Look for the Structure

53. Look for the structure

Read each question and write what you work out.

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

☐ always

☐ sometimes

☐ never

Why?

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

☐ always

☐ sometimes

☐ never

Why?

- 3 Add up some numbers in a row and the total is a multiple of how many you took.

☐ always

☐ sometimes

☐ never

Why?

- 4 A multiple of 4 added to a multiple of 6 gives a multiple of 12.

☐ always

☐ sometimes

☐ never

Why?

- 5 A number that is a multiple of both 4 and 6 is a multiple of 24.

☐ always

☐ sometimes

☐ never

Why?

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

☐ always

☐ sometimes

☐ never

Why?

- 7 The product of two consecutive numbers is even.

☐ always

☐ sometimes

☐ never

Why?

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

☐ 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. $-19 + 14 = -5$
2. $7 - 13 = -6$
3. $-2 + 13 = 11$

Positive and Negative Numbers (continued)

Add and subtract integers (continued)

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

Answer Key (3 of 13)

Positive and Negative Numbers (continued)

Add and subtract integers (continued)

49. $5 - 14 = -9$

50. $-6 + 11 = 5$

Multiplying Integers

Multiplying integers

1. $-5 \times 8 = -40$

2. $-5 \times -5 = 25$

3. $12 \times -8 = -96$

4. $-5 \times -12 = 60$

5. $12 \times -4 = -48$

6. $-7 \times -4 = 28$

7. $-7 \times -11 = 77$

8. $10 \times -4 = -40$

9. $-12 \times -4 = 48$

10. $-7 \times -8 = 56$

11. $-5 \times 9 = -45$

12. $-9 \times -10 = 90$

13. $-12 \times -9 = 108$

14. $-9 \times 12 = -108$

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

16. $-4 \times -6 = 24$

17. $-11 \times 12 = -132$

18. $-8 \times -4 = 32$

19. $-10 \times -11 = 110$

20. $-5 \times 12 = -60$

21. $-9 \times -6 = 54$

22. $-8 \times -11 = 88$

23. $-6 \times -6 = 36$

24. $-8 \times 11 = -88$

25. $-2 \times -8 = 16$

26. $-5 \times -8 = 40$

27. $10 \times -9 = -90$

28. $-6 \times -9 = 54$

29. $-4 \times -10 = 40$

30. $-3 \times -4 = 12$

31. $-11 \times -3 = 33$

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

33. $-10 \times 11 = -110$

34. $-6 \times -12 = 72$

35. $-3 \times -10 = 30$

36. $-7 \times -9 = 63$

37. $9 \times -7 = -63$

38. $-5 \times -4 = 20$

39. $-9 \times -9 = 81$

40. $-4 \times -2 = 8$

Multiplying Integers (continued)

Simplifying a ratio

41. $4 : 10 = 2 : 5$

42. $15 : 35 = 3 : 7$

43. $2 : 6 = 1 : 3$

44. $18 : 30 = 3 : 5$

45. $5 : 20 = 1 : 4$

46. $9 : 12 = 3 : 4$

47. $5 : 30 = 1 : 6$

48. $12 : 32 = 3 : 8$

49. $3 : 6 = 1 : 2$

50. $10 : 25 = 2 : 5$

Absolute Value

Absolute value

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

2. How far apart are -8 and 5 on the number line? $\rightarrow 13$

3. $|-2| + |12| \rightarrow 14$

4. How far apart are -11 and 4 on the number line? $\rightarrow 15$

5. $|3| + |-7| \rightarrow 10$

6. How far apart are -12 and 8 on the number line? $\rightarrow 20$

7. $|-12| + |5| \rightarrow 17$

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

9. How far apart are -7 and 10 on the number line? $\rightarrow 17$

10. $|-9| + |7| \rightarrow 16$

11. $|-4| + |5| \rightarrow 9$

12. How far apart are -5 and 7 on the number line? $\rightarrow 12$

13. How far apart are -7 and 12 on the number line? $\rightarrow 19$

14. $|11| + |-2| \rightarrow 13$

15. How far apart are -7 and 8 on the number line? $\rightarrow 15$

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

17. $|-6| + |6| \rightarrow 12$

18. $|-10| + |8| \rightarrow 18$

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

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

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. $88 \div 8 + 6 = 17$
2. $3 + 9 \times 6 = 57$
3. $25 \div 5 + 8 = 13$
4. $9 + 6 \times 4 = 33$
5. $7 + 64 \div 8 = 15$
6. $12 \times 12 + 9 = 153$
7. $5 \times 8 + 2 = 42$
8. $6 + 3 \times 6 = 24$
9. $3 + 3 \times 10 = 33$
10. $2 + 12 \times 8 = 98$
11. $4 + 2 \times 7 = 18$
12. $8 + 10 \times 3 = 38$
13. $2 + 11 \times 6 = 68$
14. $6 + 7 \times 3 = 27$
15. $7 + 12 \times 11 = 139$
16. $4 + 6 \times 12 = 76$
17. $6 \times 2 + 9 = 21$
18. $5 \times 9 + 2 = 47$
19. $12 \times 5 + 2 = 62$
20. $2 \times 9 + 2 = 20$
21. $2 + 10 \times 10 = 102$
22. $2 + 11 \times 8 = 90$
23. $8 + 6 \times 11 = 74$
24. $20 \div 4 + 9 = 14$
25. $12 \times 11 + 9 = 141$
26. $6 + 10 \times 11 = 116$
27. $4 + 36 \div 3 = 16$
28. $2 + 10 \times 11 = 112$
29. $4 \times 9 + 2 = 38$
30. $5 \times 2 + 7 = 17$
31. $2 + 11 \times 3 = 35$
32. $9 + 12 \times 9 = 117$
33. $44 \div 4 + 4 = 15$
34. $8 \times 7 + 8 = 64$
35. $4 + 9 \times 12 = 112$
36. $9 + 5 \times 8 = 49$
37. $20 \div 2 + 7 = 17$
38. $4 + 11 \times 7 = 81$

Add and subtract integers

39. $-12 + 11 = -1$
40. $17 - 19 = -2$
41. $7 - 12 = -5$
42. $12 - 17 = -5$
43. $-6 + 16 = 10$
44. $5 - 16 = -11$

Order of Operations (continued)

Add and subtract integers (continued)

45. $7 - 18 = -11$
46. $-1 + 16 = 15$
47. $8 - 16 = -8$
48. $14 - 19 = -5$

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

Answer Key (5 of 13)

Exponents (continued)

Add and subtract integers (continued)

38. $10 - 14 = -4$

39. $-13 + 13 = 0$

Greatest Common Factor

Greatest common factor

1. 20, 24 $\rightarrow$ 4
2. 25, 30 $\rightarrow$ 5
3. 15, 21 $\rightarrow$ 3
4. 10, 35 $\rightarrow$ 5
5. 9, 21 $\rightarrow$ 3
6. 20, 28 $\rightarrow$ 4
7. 12, 30 $\rightarrow$ 6
8. 8, 20 $\rightarrow$ 4
9. 30, 35 $\rightarrow$ 5
10. 24, 28 $\rightarrow$ 4
11. 10, 25 $\rightarrow$ 5
12. 25, 35 $\rightarrow$ 5
13. 30, 36 $\rightarrow$ 6
14. 16, 20 $\rightarrow$ 4
15. 8, 28 $\rightarrow$ 4
16. 15, 35 $\rightarrow$ 5
17. 15, 25 $\rightarrow$ 5
18. 12, 28 $\rightarrow$ 4
19. 18, 30 $\rightarrow$ 6
20. 12, 21 $\rightarrow$ 3
21. 24, 30 $\rightarrow$ 6
22. 16, 28 $\rightarrow$ 4
23. 20, 35 $\rightarrow$ 5
24. 20, 25 $\rightarrow$ 5
25. 12, 18 $\rightarrow$ 6
26. 6, 15 $\rightarrow$ 3
27. 12, 16 $\rightarrow$ 4
28. 15, 18 $\rightarrow$ 3
29. 12, 15 $\rightarrow$ 3
30. 6, 21 $\rightarrow$ 3
31. 8, 12 $\rightarrow$ 4
32. 18, 21 $\rightarrow$ 3
33. 12, 20 $\rightarrow$ 4
34. 4, 6 $\rightarrow$ 2
35. 18, 24 $\rightarrow$ 6
36. 15, 20 $\rightarrow$ 5
37. 8, 10 $\rightarrow$ 2
38. 8, 14 $\rightarrow$ 2
39. 4, 14 $\rightarrow$ 2
40. 6, 8 $\rightarrow$ 2

Greatest Common Factor (continued)

Greatest common factor (continued)

41. 6, 14 $\rightarrow$ 2
42. 12, 14 $\rightarrow$ 2
43. 10, 12 $\rightarrow$ 2
44. 9, 15 $\rightarrow$ 3
45. 6, 9 $\rightarrow$ 3
46. 9, 12 $\rightarrow$ 3
47. 10, 15 $\rightarrow$ 5
48. 6, 10 $\rightarrow$ 2

Prime or composite

49. 17 $\rightarrow$ Prime
50. 45 $\rightarrow$ Composite (3×15)
51. 44 $\rightarrow$ Composite (2×22)
52. 41 $\rightarrow$ Prime
53. 5 $\rightarrow$ Prime
54. 9 $\rightarrow$ Composite (3×3)
55. 21 $\rightarrow$ Composite (3×7)
56. 38 $\rightarrow$ Composite (2×19)
57. 35 $\rightarrow$ Composite (5×7)
58. 31 $\rightarrow$ Prime
59. 3 $\rightarrow$ Prime
60. 39 $\rightarrow$ Composite (3×13)
61. 27 $\rightarrow$ Composite (3×9)
62. 19 $\rightarrow$ Prime
63. 49 $\rightarrow$ Composite (7×7)
64. 43 $\rightarrow$ Prime
65. 50 $\rightarrow$ Composite (2×25)
66. 25 $\rightarrow$ Composite (5×5)
67. 29 $\rightarrow$ Prime
68. 46 $\rightarrow$ Composite (2×23)

Lowest Common Multiple

Least common multiple

1. 9, 15 $\rightarrow$ 45
2. 12, 20 $\rightarrow$ 60
3. 10, 25 $\rightarrow$ 50
4. 15, 20 $\rightarrow$ 60
5. 9, 12 $\rightarrow$ 36
6. 15, 25 $\rightarrow$ 75
7. 16, 20 $\rightarrow$ 80
8. 8, 20 $\rightarrow$ 40
9. 12, 15 $\rightarrow$ 60
10. 20, 25 $\rightarrow$ 100
11. 12, 16 $\rightarrow$ 48
12. 8, 10 $\rightarrow$ 40
13. 6, 8 $\rightarrow$ 24

Answer Key (6 of 13)

Lowest Common Multiple (continued)

Least common multiple (continued)

14. 8, 12 → 24
15. 4, 6 → 12
16. 4, 10 → 20
17. 6, 9 → 18
18. 6, 10 → 30
19. 6, 15 → 30
20. 10, 15 → 30

Greatest common factor

21. 6, 21 → 3
22. 30, 35 → 5
23. 12, 21 → 3
24. 20, 35 → 5
25. 15, 21 → 3
26. 10, 35 → 5
27. 18, 30 → 6
28. 10, 25 → 5
29. 24, 30 → 6
30. 20, 28 → 4
31. 20, 24 → 4
32. 16, 28 → 4
33. 25, 30 → 5
34. 12, 16 → 4
35. 30, 36 → 6
36. 25, 35 → 5
37. 12, 18 → 6
38. 8, 28 → 4
39. 12, 30 → 6
40. 18, 24 → 6

Factors and Multiples

List the factors

1. 6 → 1, 2, 3, 6
2. 28 → 1, 2, 4, 7, 14, 28
3. 38 → 1, 2, 19, 38
4. 32 → 1, 2, 4, 8, 16, 32
5. 26 → 1, 2, 13, 26
6. 40 → 1, 2, 4, 5, 8, 10, 20, 40
7. 12 → 1, 2, 3, 4, 6, 12
8. 10 → 1, 2, 5, 10
9. 24 → 1, 2, 3, 4, 6, 8, 12, 24
10. 36 → 1, 2, 3, 4, 6, 9, 12, 18, 36
11. 35 → 1, 5, 7, 35
12. 30 → 1, 2, 3, 5, 6, 10, 15, 30

Is it a multiple?

13. Is 20 a multiple of 10? → Yes

Factors and Multiples (continued)

Is it a multiple? (continued)

14. Is 32 a multiple of 8? → Yes
15. Is 24 a multiple of 4? → Yes
16. Is 36 a multiple of 9? → Yes
17. Is 27 a multiple of 2? → No
18. Is 36 a multiple of 6? → Yes
19. Is 32 a multiple of 5? → No
20. Is 22 a multiple of 4? → No
21. Is 35 a multiple of 7? → Yes
22. Is 30 a multiple of 2? → Yes

Prime and Composite Numbers

Prime or composite

1. 46 → Composite (2×23)
2. 41 → Prime
3. 23 → Prime
4. 37 → Prime
5. 48 → Composite (2×24)
6. 39 → Composite (3×13)
7. 29 → Prime
8. 11 → Prime
9. 45 → Composite (3×15)
10. 15 → Composite (3×5)
11. 13 → Prime
12. 9 → Composite (3×3)
13. 49 → Composite (7×7)
14. 2 → Prime
15. 27 → Composite (3×9)
16. 21 → Composite (3×7)
17. 17 → Prime
18. 33 → Composite (3×11)
19. 35 → Composite (5×7)
20. 50 → Composite (2×25)
21. 43 → Prime
22. 47 → Prime
23. 31 → Prime
24. 38 → Composite (2×19)
25. 25 → Composite (5×5)
26. 42 → Composite (2×21)
27. 10 → Composite (2×5)
28. 44 → Composite (2×22)
29. 7 → Prime
30. 16 → Composite (2×8)
31. 19 → Prime
32. 3 → Prime
33. 32 → Composite (2×16)

Answer Key (7 of 13)

Prime and Composite Numbers (continued)

Prime or composite (continued)

- 34. $5 \rightarrow$ Prime
- 35. $40 \rightarrow$ Composite (2×20)
- 36. $36 \rightarrow$ Composite (2×18)

Multiplying integers

- 37. $-9 \times 11 = -99$
- 38. $-11 \times -8 = 88$
- 39. $9 \times -6 = -54$
- 40. $-4 \times -8 = 32$
- 41. $12 \times -5 = -60$
- 42. $-4 \times -6 = 24$
- 43. $-6 \times -3 = 18$
- 44. $-4 \times 12 = -48$
- 45. $-4 \times -4 = 16$
- 46. $-6 \times -9 = 54$

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. $|-4| + |1| \rightarrow 5$
- 45. $|-7| + |9| \rightarrow 16$
- 46. $|8| + |-3| \rightarrow 11$
- 47. $|-11| + |4| \rightarrow 15$
- 48. $|-2| + |3| \rightarrow 5$
- 49. How far apart are -4 and 6 on the number line? $\rightarrow 10$
- 50. How far apart are -10 and 3 on the number line? $\rightarrow 13$
- 51. $|-11| + |1| \rightarrow 12$
- 52. How far apart are -9 and 4 on the number line? $\rightarrow 13$
- 53. How far apart are -1 and 9 on the number line? $\rightarrow 10$

Dividing Decimals

Multiply and divide decimals

- 1. $57.5 \div 5 = 11.5$
- 2. $65.76 \div 6 = 10.96$
- 3. $8.30 \div 5 = 1.66$
- 4. $119.79 \div 11 = 10.89$
- 5. $106.0 \div 10 = 10.6$
- 6. $99.36 \div 9 = 11.04$
- 7. $53.55 \div 9 = 5.95$
- 8. $27.80 \div 10 = 2.78$
- 9. $61.38 \div 11 = 5.58$
- 10. $68.88 \div 12 = 5.74$
- 11. $35.90 \div 10 = 3.59$
- 12. $45.09 \div 9 = 5.01$
- 13. $97.68 \div 11 = 8.88$
- 14. $30.0 \div 4 = 7.5$
- 15. $52.36 \div 7 = 7.48$
- 16. $116.70 \div 10 = 11.67$

Answer Key (8 of 13)

Dividing Decimals (continued)

Multiply and divide decimals (continued)

17. $38.8 \div 4 = 9.7$
18. $77.88 \div 12 = 6.49$
19. $59.43 \div 7 = 8.49$
20. $16.00 \div 5 = 3.20$
21. $116.76 \div 12 = 9.73$
22. $102.60 \div 9 = 11.40$
23. $141.00 \div 12 = 11.75$
24. $42.0 \div 6 = 7.0$
25. $63.40 \div 10 = 6.34$
26. $98.20 \div 10 = 9.82$
27. $18.6 \div 2 = 9.3$
28. $69.42 \div 6 = 11.57$
29. $117.04 \div 11 = 10.64$
30. $9.80 \div 5 = 1.96$
31. $120.23 \div 11 = 10.93$
32. $19.58 \div 2 = 9.79$
33. $40.4 \div 4 = 10.1$
34. $30.78 \div 6 = 5.13$
35. $82.11 \div 7 = 11.73$
36. $50.16 \div 8 = 6.27$
37. $92.0 \div 8 = 11.5$
38. $114.18 \div 11 = 10.38$
39. $48.40 \div 5 = 9.68$
40. $78.0 \div 10 = 7.8$
41. $50.85 \div 5 = 10.17$
42. $94.00 \div 10 = 9.40$
43. $19.8 \div 2 = 9.9$
44. $34.44 \div 3 = 11.48$
45. $24.57 \div 3 = 8.19$
46. $99.6 \div 12 = 8.3$
47. $11.56 \div 2 = 5.78$
48. $52.86 \div 6 = 8.81$
49. $16.65 \div 3 = 5.55$
50. $15.51 \div 11 = 1.41$

Order of operations

51. $8 + 56 \div 7 = 16$
52. $4 + 12 \times 8 = 100$
53. $88 \div 8 + 6 = 17$
54. $9 \times 4 + 5 = 41$
55. $6 + 72 \div 8 = 15$
56. $2 + 11 \times 6 = 68$
57. $3 + 9 \times 6 = 57$
58. $9 + 25 \div 5 = 14$
59. $6 + 10 \times 8 = 86$
60. $8 \times 4 + 4 = 36$

Evaluating Expressions

Evaluate expressions

1. $6a + b$ ($a = 2, b = 7$) $\rightarrow 19$
2. $x^2 + 2$ ($x = 6$) $\rightarrow 38$
3. $2x + 12$ ($x = 8$) $\rightarrow 28$
4. $6x - 8$ ($x = 8$) $\rightarrow 40$
5. $2a + b$ ($a = 4, b = 3$) $\rightarrow 11$
6. $4x - 2$ ($x = 11$) $\rightarrow 42$
7. $2a + b$ ($a = 11, b = 3$) $\rightarrow 25$
8. $2x + 14$ ($x = 7$) $\rightarrow 28$
9. $2x + 19$ ($x = 12$) $\rightarrow 43$
10. $x^2 + 10$ ($x = 3$) $\rightarrow 19$
11. $9x + 16$ ($x = 2$) $\rightarrow 34$
12. $6a + b$ ($a = 8, b = 2$) $\rightarrow 50$
13. $6x + 8$ ($x = 5$) $\rightarrow 38$
14. $3x + 3$ ($x = 8$) $\rightarrow 27$
15. $3a + b$ ($a = 6, b = 12$) $\rightarrow 30$
16. $7x + 14$ ($x = 5$) $\rightarrow 49$
17. $9x + 11$ ($x = 2$) $\rightarrow 29$
18. $x^2 + 3$ ($x = 4$) $\rightarrow 19$
19. $x^2 + 5$ ($x = 3$) $\rightarrow 14$
20. $4x + 5$ ($x = 5$) $\rightarrow 25$

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. $5x + 18 - 2x \rightarrow 3x + 18$
2. $7x + 20 - 6x - 8 \rightarrow 1x + 12$
3. $8x + 9 - 4x - 7 \rightarrow 4x + 2$
4. $7x + 6 - x - 1 \rightarrow 6x + 5$
5. $6x + 15 - 2x - 10 \rightarrow 4x + 5$
6. $10x + 17 - 2x - 8 \rightarrow 8x + 9$
7. $12x + 19 - 9x - 11 \rightarrow 3x + 8$
8. $10x + 4 - 8x - 2 \rightarrow 2x + 2$
9. $5x + 20 - 2x - 12 \rightarrow 3x + 8$
10. $11x + 18 - 9x - 6 \rightarrow 2x + 12$
11. $10 + 2x + 5 + 9x \rightarrow 11x + 15$

Answer Key (9 of 13)

Like Terms and the Distributive Property (continued)

Collect like terms (continued)

12. $12x + 14 - 8x - 6 \rightarrow 4x + 8$
13. $9x + 15 - 3x - 3 \rightarrow 6x + 12$
14. $7x + 17 - 4x - 11 \rightarrow 3x + 6$
15. $9x + 14 - 4x - 6 \rightarrow 5x + 8$
16. $10x + 20 - 3x - 10 \rightarrow 7x + 10$

Multiply out brackets

17. $6(4x + 7) \rightarrow 24x + 42$
18. $4(9x - 12) \rightarrow 36x - 48$
19. $2(6 + 9x) \rightarrow 18x + 12$
20. $7(5 + 6x) \rightarrow 42x + 35$
21. $5(6x + 4) \rightarrow 30x + 20$
22. $7(7x - 3) \rightarrow 49x - 21$
23. $8(3x - 4) \rightarrow 24x - 32$
24. $3(5x + 12) \rightarrow 15x + 36$
25. $4(10 + 9x) \rightarrow 36x + 40$
26. $6(5 + 4x) \rightarrow 24x + 30$
27. $6(5x + 5) \rightarrow 30x + 30$
28. $7(6x - 3) \rightarrow 42x - 21$
29. $4(6x - 11) \rightarrow 24x - 44$
30. $4(9x + 8) \rightarrow 36x + 32$
31. $6(7 + 7x) \rightarrow 42x + 42$
32. $6(6x - 8) \rightarrow 36x - 48$

Solving Equations

Solving equations

1. $x + 17 = 32 \rightarrow x = 15$
2. $x - 20 = 28 \rightarrow x = 48$
3. $x - 18 = 9 \rightarrow x = 27$
4. $x - 10 = 31 \rightarrow x = 41$
5. $25 - x = 6 \rightarrow x = 19$
6. $x - 28 = 15 \rightarrow x = 43$
7. $48 - x = 7 \rightarrow x = 41$
8. $x + 4 = 18 \rightarrow x = 14$
9. $x + 16 = 48 \rightarrow x = 32$
10. $x - 29 = 16 \rightarrow x = 45$
11. $x + 1 = 15 \rightarrow x = 14$
12. $x - 14 = 23 \rightarrow x = 37$
13. $x - 16 = 31 \rightarrow x = 47$
14. $29 - x = 8 \rightarrow x = 21$
15. $x - 37 = 7 \rightarrow x = 44$
16. $x - 19 = 18 \rightarrow x = 37$
17. $x + 5 = 34 \rightarrow x = 29$
18. $x - 30 = 10 \rightarrow x = 40$
19. $x - 40 = 5 \rightarrow x = 45$
20. $x + 15 = 43 \rightarrow x = 28$

Solving Equations (continued)

Solving equations (continued)

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

Greatest common factor

51. $12, 20 \rightarrow 4$
52. $25, 30 \rightarrow 5$
53. $20, 25 \rightarrow 5$
54. $30, 35 \rightarrow 5$
55. $18, 21 \rightarrow 3$
56. $18, 30 \rightarrow 6$
57. $25, 35 \rightarrow 5$
58. $15, 21 \rightarrow 3$
59. $24, 28 \rightarrow 4$
60. $20, 35 \rightarrow 5$

Inequalities

Inequalities

1. $3x \leq 42 \rightarrow x \leq 14$

Answer Key (10 of 13)

Inequalities (continued)

Inequalities (continued)

2. $-3x \geq -42 \rightarrow x \leq 14$
3. $-5x < -5 \rightarrow x > 1$
4. $-2x \leq -18 \rightarrow x \geq 9$
5. $-4x \geq -16 \rightarrow x \leq 4$
6. $-6x \leq 42 \rightarrow x \geq -7$
7. $-4x \geq 32 \rightarrow x \leq -8$
8. $2x \leq -36 \rightarrow x \leq -18$
9. $-6x > 42 \rightarrow x < -7$
10. $-7x \geq 49 \rightarrow x \leq -7$
11. $4x > -40 \rightarrow x > -10$
12. $-4x \geq -32 \rightarrow x \leq 8$
13. $-2x > -36 \rightarrow x < 18$
14. $2x \leq -44 \rightarrow x \leq -22$
15. $-2x \leq 22 \rightarrow x \geq -11$
16. $-5x \geq 35 \rightarrow x \leq -7$
17. $-4x \geq -8 \rightarrow x \leq 2$
18. $-2x \leq 36 \rightarrow x \geq -18$
19. $-5x < 35 \rightarrow x > -7$
20. $3x > -36 \rightarrow x > -12$
21. $-3x \geq 30 \rightarrow x \leq -10$
22. $-3x \leq 48 \rightarrow x \geq -16$
23. $-2x \geq 46 \rightarrow x \leq -23$

Least common multiple

24. 12, 16 $\rightarrow$ 48
25. 15, 25 $\rightarrow$ 75
26. 8, 10 $\rightarrow$ 40
27. 15, 20 $\rightarrow$ 60
28. 10, 25 $\rightarrow$ 50
29. 12, 15 $\rightarrow$ 60
30. 12, 20 $\rightarrow$ 60
31. 8, 20 $\rightarrow$ 40
32. 20, 25 $\rightarrow$ 100
33. 16, 20 $\rightarrow$ 80

Area of Composite Shapes

Area of composite figures

1. 14×17 less 4×12 : 190 cm^2
2. 14×19 less 4×6 : 242 cm^2
3. 11×15 less 3×5 : 150 cm^2
4. 18×18 less 9×11 : 225 cm^2
5. 10×18 less 6×15 : 90 cm^2
6. 20×19 less 11×7 : 303 cm^2
7. 18×17 less 13×9 : 189 cm^2
8. 15×11 less 6×9 : 111 cm^2
9. 18×17 less 9×11 : 207 cm^2

Area of Composite Shapes (continued)

Area of composite figures (continued)

10. 18×14 less 13×7 : 161 cm^2

Is it a multiple?

11. Is 20 a multiple of 3? $\rightarrow$ No
12. Is 36 a multiple of 3? $\rightarrow$ Yes
13. Is 20 a multiple of 10? $\rightarrow$ Yes
14. Is 36 a multiple of 2? $\rightarrow$ Yes
15. Is 26 a multiple of 3? $\rightarrow$ No
16. Is 39 a multiple of 3? $\rightarrow$ Yes
17. Is 34 a multiple of 3? $\rightarrow$ No
18. Is 24 a multiple of 3? $\rightarrow$ Yes
19. Is 32 a multiple of 5? $\rightarrow$ No
20. Is 36 a multiple of 12? $\rightarrow$ Yes

Area of Figures

Area

1. trapezoid $(15 + 20) \div 2 \times 4 = 70 \text{ cm}^2$
2. parallelogram $18 \times 12 = 216 \text{ cm}^2$
3. trapezoid $(6 + 10) \div 2 \times 10 = 80 \text{ cm}^2$
4. parallelogram $14 \times 14 = 196 \text{ cm}^2$
5. rectangle $15 \times 12 = 180 \text{ cm}^2$
6. parallelogram $17 \times 12 = 204 \text{ cm}^2$
7. trapezoid $(10 + 18) \div 2 \times 12 = 168 \text{ cm}^2$
8. triangle $14 \times 18 \div 2 = 126 \text{ cm}^2$
9. trapezoid $(5 + 14) \div 2 \times 18 = 171 \text{ cm}^2$
10. trapezoid $(9 + 11) \div 2 \times 18 = 180 \text{ cm}^2$

List the factors

11. 39 $\rightarrow$ 1, 3, 13, 39
12. 12 $\rightarrow$ 1, 2, 3, 4, 6, 12
13. 35 $\rightarrow$ 1, 5, 7, 35
14. 36 $\rightarrow$ 1, 2, 3, 4, 6, 9, 12, 18, 36
15. 38 $\rightarrow$ 1, 2, 19, 38
16. 24 $\rightarrow$ 1, 2, 3, 4, 6, 8, 12, 24
17. 32 $\rightarrow$ 1, 2, 4, 8, 16, 32
18. 21 $\rightarrow$ 1, 3, 7, 21
19. 18 $\rightarrow$ 1, 2, 3, 6, 9, 18
20. 40 $\rightarrow$ 1, 2, 4, 5, 8, 10, 20, 40

Missing Sides

Find the missing side

1. A = 32, side 2: 16 cm
2. A = 342, side 19: 18 cm
3. P = 66, side 15: 18 cm
4. A = 144, side 18: 8 cm
5. P = 60, side 14: 16 cm
6. A = 126, side 18: 7 cm

Answer Key (11 of 13)

Missing Sides (continued)

Find the missing side (continued)

7. $A = 110$, side 11: 10 cm
8. $A = 48$, side 3: 16 cm
9. $A = 96$, side 8: 12 cm
10. $A = 323$, side 19: 17 cm

Prime or composite

11. $3 \rightarrow$ Prime
12. $39 \rightarrow$ Composite (3×13)
13. $42 \rightarrow$ Composite (2×21)
14. $43 \rightarrow$ Prime
15. $40 \rightarrow$ Composite (2×20)
16. $29 \rightarrow$ Prime
17. $15 \rightarrow$ Composite (3×5)
18. $13 \rightarrow$ Prime
19. $45 \rightarrow$ Composite (3×15)
20. $31 \rightarrow$ Prime

Volume of Prisms

Volume of a rectangular prism

1. $5 \times 6 \times 7 + 3 \times 6 \times 4$: 282 cm^3
2. $7 \times 6 \times 8 + 3 \times 6 \times 8$: 480 cm^3
3. $8 \times 7 \times 5$: 280 cm^3
4. $8 \times 6 \times 6 + 7 \times 6 \times 5$: 498 cm^3
5. $8 \times 3 \times 7 + 6 \times 3 \times 6$: 276 cm^3
6. $5 \times 7 \times 8 + 3 \times 7 \times 7$: 427 cm^3
7. $8 \times 8 \times 6 + 3 \times 8 \times 6$: 528 cm^3

Dividing fractions

8. $2/5 \div 3/7 = 14/15$
9. $1/8 \div 4/6 = 3/16$
10. $3/4 \div 4/7 = 21/16$
11. $3/4 \div 3/7 = 7/4$
12. $3/4 \div 5/6 = 9/10$
13. $2/4 \div 6/8 = 2/3$
14. $4/5 \div 2/6 = 12/5$

Surface Area

Surface area of a box

1. $8 \times 9 \times 9 \rightarrow 2(72 + 72 + 81)$: 450 cm^2
2. $9 \times 11 \times 11 \rightarrow 2(99 + 99 + 121)$: 638 cm^2
3. $6 \times 6 \times 11 \rightarrow 2(36 + 66 + 66)$: 336 cm^2
4. $8 \times 11 \times 15 \rightarrow 2(88 + 120 + 165)$: 746 cm^2
5. $4 \times 11 \times 11 \rightarrow 2(44 + 44 + 121)$: 418 cm^2
6. $11 \times 12 \times 14 \rightarrow 2(132 + 154 + 168)$: 908 cm^2
7. $7 \times 12 \times 13 \rightarrow 2(84 + 91 + 156)$: 662 cm^2

Multiply and divide decimals

8. $8.30 \div 5 = 1.66$

Surface Area (continued)

Multiply and divide decimals (continued)

9. $40.95 \div 7 = 5.85$
10. $8.01 \div 9 = 0.89$
11. $17.76 \div 2 = 8.88$
12. $35.2 \div 4 = 8.8$
13. $99.36 \div 9 = 11.04$
14. $136.20 \div 12 = 11.35$

Finding the Mean

The mean

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

Evaluate expressions

35. $4x - 5$ ($x = 7$) $\rightarrow 23$

Answer Key (12 of 13)

Finding the Mean (continued)

Evaluate expressions (continued)

36. $4a + b$ ($a = 7$, $b = 11$) $\rightarrow 39$
37. $6x + 1$ ($x = 6$) $\rightarrow 37$
38. $2x + 15$ ($x = 12$) $\rightarrow 39$
39. $4x - 17$ ($x = 12$) $\rightarrow 31$
40. $5x + 3$ ($x = 8$) $\rightarrow 43$
41. $2a + b$ ($a = 10$, $b = 6$) $\rightarrow 26$
42. $3x + 13$ ($x = 6$) $\rightarrow 31$
43. $3x + 9$ ($x = 10$) $\rightarrow 39$
44. $4a + b$ ($a = 4$, $b = 11$) $\rightarrow 27$

Median and Range

The median

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

The range

25. Range of 44, 27, 16, 41, 27 = 28
26. Range of 49, 35, 16, 49, 46 = 33
27. Range of 38, 41, 1, 45, 45 = 44
28. Range of 24, 48, 24, 45, 14 = 34
29. Range of 24, 13, 24, 42, 37 = 29
30. Range of 50, 47, 23, 40, 40 = 27
31. Range of 22, 18, 48, 18, 4 = 44
32. Range of 38, 15, 40, 38, 44 = 29

Median and Range (continued)

The range (continued)

33. Range of 3, 28, 3, 22, 49 = 46
34. Range of 48, 50, 7, 17, 48 = 43
35. Range of 24, 8, 45, 38, 45 = 37
36. Range of 48, 45, 33, 33, 11 = 37
37. Range of 25, 2, 25, 30, 48 = 46
38. Range of 44, 14, 11, 12, 44 = 33
39. Range of 49, 30, 4, 49, 13 = 45
40. Range of 7, 7, 48, 2, 36 = 46
41. Range of 42, 16, 16, 37, 4 = 38
42. Range of 28, 30, 49, 28, 35 = 21
43. Range of 29, 16, 16, 36, 48 = 32
44. Range of 45, 20, 9, 20, 31 = 36
45. Range of 6, 24, 14, 14, 47 = 41
46. Range of 49, 27, 27, 21, 26 = 28
47. Range of 20, 23, 37, 47, 23 = 27
48. Range of 2, 2, 10, 43, 18 = 41

Multiply out brackets

49. $4(4 + 6x) \rightarrow 24x + 16$
50. $7(4x + 7) \rightarrow 28x + 49$
51. $7(4x + 3) \rightarrow 28x + 21$
52. $5(7x + 9) \rightarrow 35x + 45$
53. $4(4x + 11) \rightarrow 16x + 44$
54. $6(6 + 4x) \rightarrow 24x + 36$
55. $6(5 + 4x) \rightarrow 24x + 30$
56. $2(9x - 11) \rightarrow 18x - 22$
57. $3(9x - 11) \rightarrow 27x - 33$
58. $4(9 + 8x) \rightarrow 32x + 36$

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. $9x + 14 - 8x - 8 \rightarrow 1x + 6$
6. $12x + 12 - 11x - 1 \rightarrow 1x + 11$
7. $6x + 12 - 2x - 10 \rightarrow 4x + 2$
8. $7x + 18 - x - 8 \rightarrow 6x + 10$

Statistics Word Problems

Word problems: statistics

1. Ordered: 9, 11, 16, 16, 26; the middle value is 16.
2. Ordered: 5, 19, 21, 23, 23; the middle value is 21.
3. Ordered: 13, 14, 14, 15, 19; the middle value is 14.

Answer Key (13 of 13)

Statistics Word Problems (continued)

Word problems: statistics (continued)

4. Ordered: 7, 19, 22, 22, 25; the middle value is 22.
5. Ordered: 5, 7, 15, 15, 20; the middle value is 15.
6. Ordered: 13, 16, 21, 21, 28; the middle value is 21.
7. Ordered: 4, 16, 20, 20, 27; the middle value is 20.
8. Ordered: 10, 10, 15, 19, 23; the middle value is 15.
9. Ordered: 6, 14, 18, 18, 25; the middle value is 18.
10. Ordered: 15, 15, 23, 24, 25; the middle value is 23.
11. Ordered: 7, 7, 15, 16, 24; the middle value is 15.
12. Ordered: 9, 24, 24, 26, 30; the middle value is 24.
13. Ordered: 15, 18, 23, 23, 27; the middle value is 23.
14. Ordered: 10, 10, 16, 26, 28; the middle value is 16.

Solving equations

15. $x + 1 = 26 \rightarrow x = 25$
16. $x - 10 = 36 \rightarrow x = 46$
17. $45 - x = 29 \rightarrow x = 16$
18. $x - 15 = 33 \rightarrow x = 48$
19. $x + 20 = 45 \rightarrow x = 25$
20. $49 - x = 3 \rightarrow x = 46$
21. $33 - x = 2 \rightarrow x = 31$
22. $44 - x = 24 \rightarrow x = 20$
23. $x - 21 = 13 \rightarrow x = 34$
24. $x - 42 = 3 \rightarrow x = 45$

Look for the Structure

Look for the structure

1. The sum of four consecutive numbers is a multiple of 4.
→ never
2. A number that is a multiple of both 2 and 3 is a multiple of 6. → always
3. Add up some numbers in a row and the total is a multiple of how many you took. → sometimes
4. A multiple of 4 added to a multiple of 6 gives a multiple of 12. → sometimes
5. A number that is a multiple of both 4 and 6 is a multiple of 24. → sometimes
6. The difference between two multiples of 3 is a multiple of 3. → always
7. The product of two consecutive numbers is even. → always
8. Adding up the odd numbers starting from 1 gives a square number. → always

Solutions (1 of 24)

Ratio

Simplifying a ratio

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

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

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

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

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

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

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

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

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

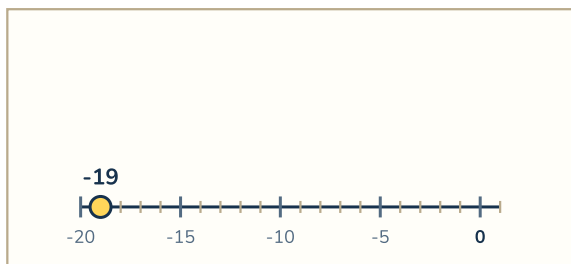
95 out of a hundred is written 95%.

Solutions (2 of 24)

Positive and Negative Numbers

Add and subtract integers

1. $-19 + 14 = \underline{\hspace{2cm}}$

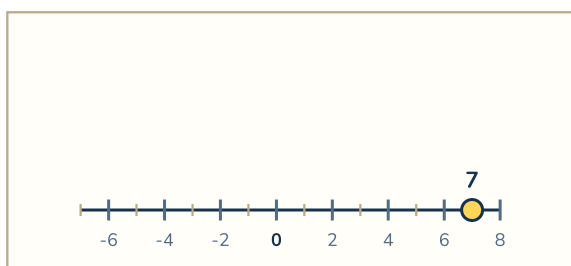


Put a counter on -19. Everything else is which way it slides and how far.

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

So slide 14 to the right, from -19 to -5. $(-19) + 14 = -5$.

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



Put a counter on 7. Everything else is which way it slides and how far.

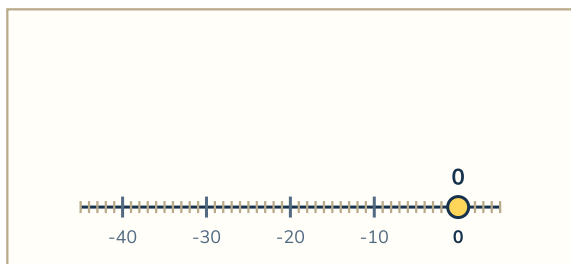
Taking away a positive moves left, the way it always has.

So slide 13 to the left, from 7 to -6. $7 - 13 = -6$.

Multiplying Integers

Multiplying integers

1. $-5 \times 8 = \underline{\hspace{2cm}}$



$(-5) \times 8$ is 8 lots of -5. 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 -5 goes LEFT, landing on -5.

All 8 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.

8 hops of 5 is 40 of distance, all of it on the low side. So $(-5) \times 8 = -40$.

Solutions (3 of 24)

Multiplying Integers (continued)

Multiplying integers (continued)

2. $-5 \times (-5) = \underline{\hspace{1cm}}$

$$(-5) \times (-5) = ?$$

$$5 \times 5 = 25$$

$$\text{signs: } (-5) \quad (-5) \rightarrow$$

plus

$$(-5) \times (-5) = 25$$

Two easy jobs, kept apart: how BIG the answer is, then which side of zero it is on. Do the size first, with the minus signs set aside.

Signs off: $5 \times 5 = 25$. Ordinary times-tables — the negatives play no part in the size.

Now the sign. Both numbers are negative, and two minus signs cancel each other — the way "not unhappy" just means happy. Same signs give a PLUS.

Size 25, sign plus — so $(-5) \times (-5) = 25$.

Absolute Value

Absolute value

1. How far apart are -1 and 5 on the number line? $\underline{\hspace{1cm}}$

How far apart are -1 and 5
on the number line?

$$1 + 5 = 6$$

6

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.

These two are on opposite sides of zero, so count to zero and then on: -1 is 1 from zero, and 5 is 5 more.

So they are 6 apart. Written with bars that is $|-1 - 5|$, and the reason it is not 4 is that the gap crosses zero.

2. How far apart are -8 and 5 on the number line? $\underline{\hspace{1cm}}$

How far apart are -8 and 5
on the number line?

$$8 + 5 = 13$$

13

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.

These two are on opposite sides of zero, so count to zero and then on: -8 is 8 from zero, and 5 is 5 more.

So they are 13 apart. Written with bars that is $|-8 - 5|$, and the reason it is not 3 is that the gap crosses zero.

Solutions (4 of 24)

Order of Operations

Order of operations

1. $88 \div 8 + 6 = \underline{\quad}$

$$\begin{array}{ccccccc} 88 & \div & 8 & + & 6 \\ & 11 & + & 6 \\ & & 17 \end{array}$$

$\times$ and $\div$ come before $+$ and $-$, so this goes first. $88 \div 8 = 11$.

Only $+$ and $-$ are left, so work from left to right. $11 + 6 = 17$.

Nothing is left to work out, so the answer is 17.

2. $3 + 9 \times 6 = \underline{\quad}$

$$\begin{array}{ccccccc} 3 & + & 9 & \times & 6 \\ & 3 & + & 54 \\ & & 57 \end{array}$$

$\times$ and $\div$ come before $+$ and $-$, so this goes first. $9 \times 6 = 54$.

Only $+$ and $-$ are left, so work from left to right. $3 + 54 = 57$.

Nothing is left to work out, so the answer is 57.

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 24)

Greatest Common Factor

Greatest common factor

1. 20, 24 → ____

20: 1 2 4 5 10 20
24: 1 2 3 4 6 8 12
24
GCF = 4

A factor is a number that divides in exactly. List every factor of 20.

Now every factor of 24.

Some appear in BOTH lists — 1, 2, 4. Those are the common factors.

The greatest of them is 4, so the GCF of 20 and 24 is 4.

2. 25, 30 → ____

25: 1 5 25
30: 1 2 3 5 6 10 15
30
GCF = 5

A factor is a number that divides in exactly. List every factor of 25.

Now every factor of 30.

Some appear in BOTH lists — 1, 5. Those are the common factors.

The greatest of them is 5, so the GCF of 25 and 30 is 5.

Prime or composite

49. 17 Prime / Composite

tried: 2 3 4
17: 1 17

A prime has exactly two factors: 1 and itself. So the question is whether anything ELSE divides into 17.

You do not have to try everything up to 17. Factors come in pairs, so if one were bigger than 4 its partner would be smaller — and you would have found that one first. Testing up to 4 is enough.

Try each in turn — 2, 3, 4 — and none of them goes in exactly.

Nothing under 5 divides in, so nothing above it can either. 17 has only 1 and 17 — it is prime.

Solutions (6 of 24)

Greatest Common Factor (continued)

Prime or composite (continued)

50. **45** **Prime** / **Composite**

$$\begin{array}{l} \text{tried: } 2 \quad \mathbf{3} \\ 45 \div 3 = \mathbf{15} \end{array}$$

A prime has exactly two factors: 1 and itself. So the question is whether anything ELSE divides into 45.

You do not have to try everything up to 45. Factors come in pairs, so if one were bigger than 6 its partner would be smaller — and you would have found that one first. Testing up to 6 is enough.

3 goes into 45 exactly ($45 \div 3 = 15$), and that is one factor too many. 45 is composite — no need to test any further.

Lowest Common Multiple

Least common multiple

1. **9, 15** → ____

$$\begin{array}{l} 9: \quad 9 \quad 18 \quad 27 \quad 36 \quad \mathbf{45} \\ 15: \quad 15 \quad 30 \quad \mathbf{45} \\ \text{LCM} = \mathbf{45} \end{array}$$

Count up in 9s.

Now count up in 15s.

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

Nothing smaller is in all of them, so 45 is the least common multiple.

2. **12, 20** → ____

$$\begin{array}{l} 12: \quad 12 \quad 24 \quad 36 \quad 48 \quad \mathbf{60} \\ 20: \quad 20 \quad 40 \quad \mathbf{60} \\ \text{LCM} = \mathbf{60} \end{array}$$

Count up in 12s.

Now count up in 20s.

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

Nothing smaller is in all of them, so 60 is the least common multiple.

Solutions (7 of 24)

Factors and Multiples

List the factors

1. 6 → _____

so far: 1 2 3 6

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.

$1 \times 6 = 6$, so 1 and 6 are both factors.

$2 \times 3 = 6$, so 2 and 3 are both factors.

The pair has met in the middle, so the list is finished: 1, 2, 3, 6. 4 factors.

2. 28 → _____

so far: 1 2 4 7 14 28

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.

$1 \times 28 = 28$, so 1 and 28 are both factors.

$2 \times 14 = 28$, so 2 and 14 are both factors.

$4 \times 7 = 28$, so 4 and 7 are both factors.

The pair has met in the middle, so the list is finished: 1, 2, 4, 7, 14, 28. 6 factors.

Is it a multiple?

13. Is 20 a multiple of 10? Yes / No

$$20 \div 10 = 2$$

yes

Multiples of 10 are what you get COUNTING IN 10s — they start at 10 and only get bigger. (Factors are the other way: they go into 10 and are never bigger than it. The two words are swapped more often than either is misunderstood.)

$20 \div 10 = 2$ exactly — nothing left over. Counting in 10s lands on it, so yes.

Solutions (8 of 24)

Factors and Multiples (continued)

Is it a multiple? (continued)

14. Is 32 a multiple of 8? Yes / No

$$32 \div 8 = 4$$

yes

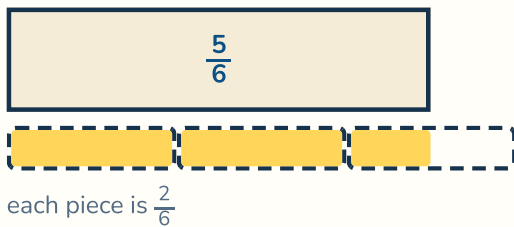
Multiples of 8 are what you get COUNTING IN 8s — they start at 8 and only get bigger. (Factors are the other way: they go into 8 and are never bigger than it. The two words are swapped more often than either is misunderstood.)

$32 \div 8 = 4$ exactly — nothing left over. Counting in 8s lands on it, so yes.

Dividing Fractions

Dividing fractions

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



$$\frac{2}{6} \rightarrow \frac{6}{2}$$

$$\frac{5}{6} \div \frac{2}{6} = \frac{5}{2}$$

$$\frac{5}{6} \times \frac{6}{2} = \frac{5}{2}$$

$$\frac{30}{12} = \frac{5}{2}$$

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

Lay $2/6$ against it and see how many times it goes.

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

Now try multiplying by $6/2$ — $2/6$ 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. $5/6 \div 2/6 = 5/2$.

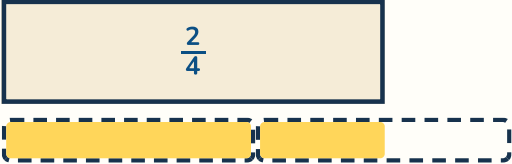
Worked out in full: 5×6 over 6×2 is $30/12$, which simplifies to $5/2$.

Solutions (9 of 24)

Dividing Fractions (continued)

Dividing fractions (continued)

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



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

$$\frac{1}{3} \rightarrow \frac{3}{1}$$

$$\frac{2}{4} \div \frac{1}{3} = \frac{3}{2}$$

$$\frac{2}{4} \times \frac{3}{1} = \frac{3}{2}$$

$$\frac{6}{4} = \frac{3}{2}$$

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

Lay $1/3$ against it and see how many times it goes.

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

Now try multiplying by $3/1$ — $1/3$ 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. $2/4 \div 1/3 = 3/2$.

Worked out in full: 2×3 over 4×1 is $6/4$, which simplifies to $3/2$.

Dividing Decimals

Multiply and divide decimals

1. $57.5 \div 5 = \text{—}$

$$57.5 \div 5 = 11.5$$

$$11.5 \times 5 = 57.5$$

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: $57.5 \div 5 = 11.5$.

Check it the other way round: 11.5×5 should give 57.5 back. A point in the wrong place fails this instantly — 57.5 and a tenth of it are not close.

2. $65.76 \div 6 = \text{—}$

$$65.76 \div 6 = 10.96$$

$$10.96 \times 6 = 65.76$$

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: $65.76 \div 6 = 10.96$.

Check it the other way round: 10.96×6 should give 65.76 back. A point in the wrong place fails this instantly — 65.76 and a tenth of it are not close.

Solutions (10 of 24)

Evaluating Expressions

Evaluate expressions

1. $a = 2, b = 7$ $6a + b =$ ____

$$6a + b \quad \text{with} \quad a = 2, b = 7$$

$$6 \times 2 = 12$$

$$12 + 7 = 19$$

$$6a + b = 19$$

A letter is a number that has not been written down yet, and this question writes it down: $a = 2, b = 7$. 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.

Two letters, two values, and they do not swap: $a = 2$ and $b = 7$. Take the multiplication first — $6 \times 2 = 12$.

Then add b : $12 + 7 = 19$.

So $6a + b$ is 19 when $a = 2, b = 7$.

2. $x = 6$ $x^2 + 2 =$ ____

$$x^2 + 2 \quad \text{with} \quad x = 6$$

$$6 \times 6 = 36$$

$$36 + 2 = 38$$

$$x^2 + 2 = 38$$

A letter is a number that has not been written down yet, and this question writes it down: $x = 6$. 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.

x^2 means x times ITSELF, not x times 2 — that is the mistake this shape is here to catch. $6 \times 6 = 36$.

Then add the 2: $36 + 2 = 38$.

So $x^2 + 2$ is 38 when $x = 6$.

Solutions (11 of 24)

Like Terms and the Distributive Property

Collect like terms

1. $5x + 18 - 2x$

$$5x + 18 - 2x$$

$$5 - 2 = 3$$

$$18 = 18$$

$$3x + 18$$

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 $5x$ and $-2x$, and the numbers are 18.

Add up the x pile, keeping the signs: $5 - 2 = 3$, so $3x$.

There is only one plain number, so that pile is already done: 18.

So it is $3x + 18$ — and that is finished, even though it is still two things. Squashing them into $21x$ would be answering "3 whats and 18 whats?", and there is no answer to that until somebody says what x is.

2. $7x + 20 - 6x - 8$

$$7x + 20 - 6x - 8$$

$$7 - 6 = 1$$

$$20 - 8 = 12$$

$$x + 12$$

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 $7x$ and $-6x$, and the numbers are 20 and -8 .

Add up the x pile, keeping the signs: $7 - 6 = 1$, so x .

Then the number pile, on its own: $20 - 8 = 12$.

So it is $x + 12$ — and that is finished, even though it is still two things. Squashing them into $13x$ would be answering "1 whats and 12 whats?", and there is no answer to that until somebody says what x is.

Solutions (12 of 24)

Like Terms and the Distributive Property (continued)

Multiply out brackets

17. $6(4x + 7)$

$$\begin{array}{rcl} & 6(4x + 7) & \\ 6 \times 4x & = & 24x \\ 6 \times 7 & = & 42 \\ 24x & + & 42 \end{array}$$

The 6 outside multiplies EVERYTHING inside the bracket, not just the thing next to it. Draw an arrow from the 6 to each of the two terms before working anything out — that is what stops one of them being left behind.

First arrow: $6 \times 4x = 24x$.

Second arrow: $6 \times 7 = 42$.

Put the two together: $24x + 42$. 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. $4(9x - 12)$

$$\begin{array}{rcl} & 4(9x - 12) & \\ 4 \times 9x & = & 36x \\ 4 \times 12 & = & 48 \\ 36x & - & 48 \end{array}$$

The 4 outside multiplies EVERYTHING inside the bracket, not just the thing next to it. Draw an arrow from the 4 to each of the two terms before working anything out — that is what stops one of them being left behind.

First arrow: $4 \times 9x = 36x$.

Second arrow: $4 \times 12 = 48$. The sign travels with the number it belongs to, so this one stays negative.

Put the two together: $36x - 48$. 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 24)

Solving Equations

Solving equations

1. $x + 17 = 32$

$$x + 17 = 32$$

$$x = 15$$

$$x = 15$$

One thing was done to x : 17 added. So there is one thing to undo, and undoing it is the opposite operation.

The 17 went on last, so it comes off first — and off BOTH sides, or the two halves stop being equal. $32 - 17 = 15$.

Check by putting it back: $(15) + 17 = 32$. It holds, so $x = 15$.

2. $x - 20 = 28$

$$x - 20 = 28$$

$$x = 48$$

$$x = 48$$

One thing was done to x : 20 taken away. So there is one thing to undo, and undoing it is the opposite operation.

The 20 went on last, so it comes off first — and off BOTH sides, or the two halves stop being equal. $28 + 20 = 48$.

Check by putting it back: $(48) - 20 = 28$. It holds, so $x = 48$.

Inequalities

Inequalities

1. $3x \leq 42$ x 14

$$x \leq 14$$

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 3: $42 \div 3 = 14$.

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

So $x \leq 14$. 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 24)

Inequalities (continued)

Inequalities (continued)

2. $-3x \geq -42$ x 14

$$x \leq 14$$

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 -3 : $-42 \div -3 = 14$.

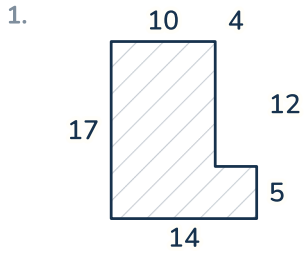
Here is the extra rule, and it is the only one: dividing both sides by a **NEGATIVE** turns the sign round, so $\geq$ becomes $\leq$. Do not take that on trust — put a number from the answer back into the question and see which way it has to face.

So $x \leq 14$. 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.

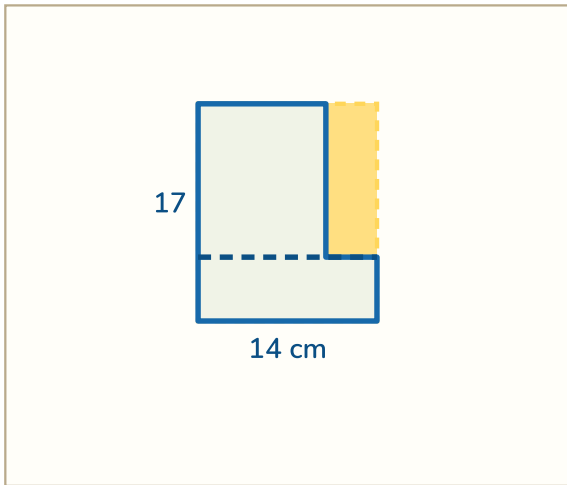
Solutions (15 of 24)

Area of Composite Shapes

Area of composite figures



_____ cm²



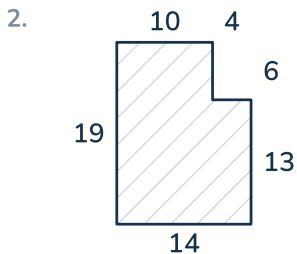
First way: pretend the bite was never taken. The whole rectangle would be $14 \times 17 = 238$.

Then take the bite off. It is $4 \times 12 = 48$, so the L is $238 - 48 = 190$ square cm.

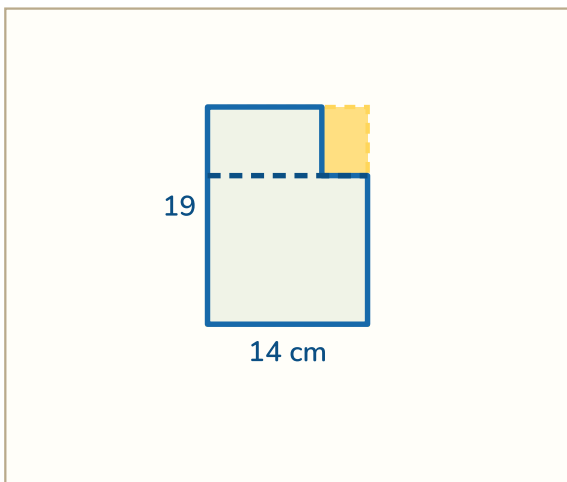
Second way, and it works on any of these: cut the L into two rectangles.

The bottom strip is $14 \times 5 = 70$, and the piece standing on it is $10 \times 12 = 120$.

$70 + 120 = 190$ square cm — the same answer as the first way. Two methods that agree is how you know the answer is right.



_____ cm²



First way: pretend the bite was never taken. The whole rectangle would be $14 \times 19 = 266$.

Then take the bite off. It is $4 \times 6 = 24$, so the L is $266 - 24 = 242$ square cm.

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

The bottom strip is $14 \times 13 = 182$, and the piece standing on it is $10 \times 6 = 60$.

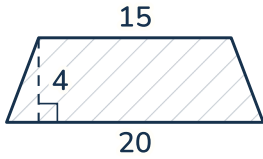
$182 + 60 = 242$ square cm — the same answer as the first way. Two methods that agree is how you know the answer is right.

Solutions (16 of 24)

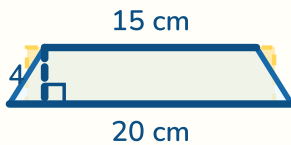
Area of Figures

Area

1.



— 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 15 cm and 20 cm. They are the pair that counts.

The height is the DASHED line — straight up from the base, at a right angle to it: 4 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: $(15 + 20) \div 2 = 17.5$. That is the width of the rectangle this trapezium is worth.

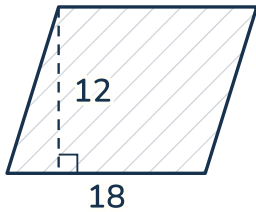
Then it is that width times the height: $17.5 \times 4 = 70$ square cm.

Solutions (17 of 24)

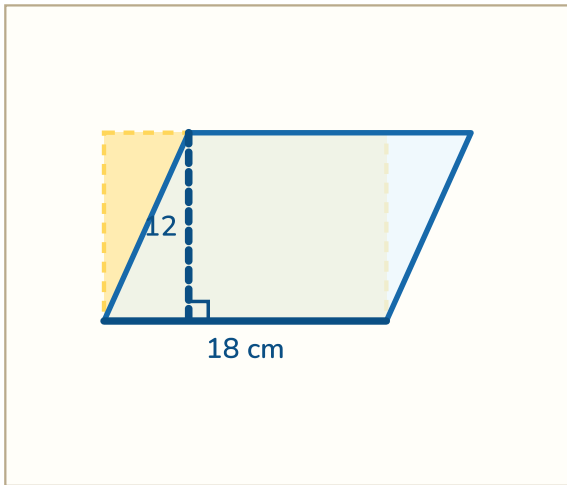
Area of Figures (continued)

Area (continued)

2.



— cm²



A parallelogram. 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: 18 cm.

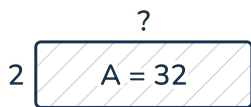
The height is the DASHED line — straight up from the base, at a right angle to it: 12 cm. It is not the sloping side, even though the sloping side is longer and is written right next to it.

Slide the triangle off one end round to the other and it is a rectangle — same base, same height. So there is no halving here: $18 \times 12 = 216$ square cm.

Missing Sides

Find the missing side

1.



— cm

$$32 \div 2 = 16 \text{ cm}$$

$$\text{check: } 2 \times 16 = 32$$

Forwards, area is one side times the other: $2 \times ? = 32$. Every number you need is here, which is exactly why the usual mistake is to multiply them.

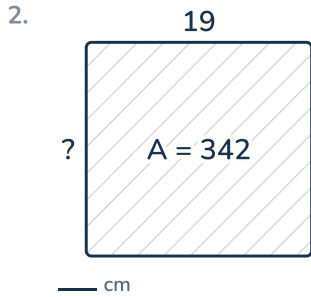
But the 32 is the ANSWER to that multiplication, not another side. To get back to the missing one, undo the multiply — and the undo of multiplying is dividing.

$32 \div 2 = 16$ cm. Check it forwards: $2 \times 16 = 32$, which is what the question said.

Solutions (18 of 24)

Missing Sides (continued)

Find the missing side (continued)



$$342 \div 19 = 18 \text{ cm}$$

$$\text{check: } 19 \times 18 = 342$$

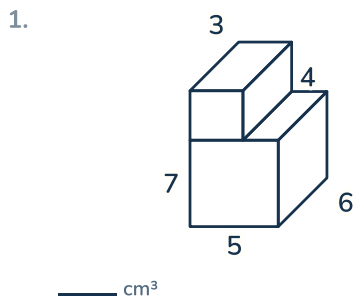
Forwards, area is one side times the other: $19 \times ? = 342$. Every number you need is here, which is exactly why the usual mistake is to multiply them.

But the 342 is the ANSWER to that multiplication, not another side. To get back to the missing one, undo the multiply — and the undo of multiplying is dividing.

$342 \div 19 = 18 \text{ cm}$. Check it forwards: $19 \times 18 = 342$, which is what the question said.

Volume of Prisms

Volume of a rectangular prism



$$\text{filled box: } 330$$

$$\text{notch: } 48$$

$$330 - 48 = 282 \text{ cubic cm}$$

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 $5 \times 6 \times 7 = 210$, and the block standing on it is $3 \times 6 \times 4 = 72$.

$$210 + 72 = 282 \text{ cubic cm.}$$

Second way: fill the notch in to make one big box. That box is $5 \times 6 \times 11 = 330$, and the notch taken back off is $2 \times 6 \times 4 = 48$.

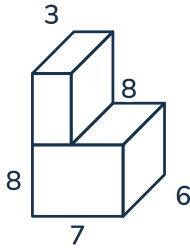
$330 - 48 = 282 \text{ cubic cm}$. Two methods agreeing is how you know.

Solutions (19 of 24)

Volume of Prisms (continued)

Volume of a rectangular prism (continued)

2.



_____ cm³

filled box: 672

notch: 192

$$672 - 192 = \mathbf{480 \text{ cubic cm}}$$

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 $7 \times 6 \times 8 = 336$, and the block standing on it is $3 \times 6 \times 8 = 144$.

$$336 + 144 = 480 \text{ cubic cm.}$$

Second way: fill the notch in to make one big box. That box is $7 \times 6 \times 16 = 672$, and the notch taken back off is $4 \times 6 \times 8 = 192$.

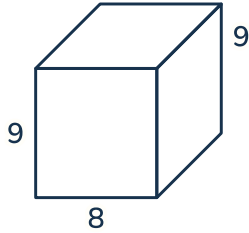
$672 - 192 = 480$ cubic cm. Two methods agreeing is how you know.

Solutions (20 of 24)

Surface Area

Surface area of a box

1.



_____ cm²

front and back: $2 \times 8 \times 9 = 144$

the two sides: $2 \times 9 \times 9 = 162$

top and bottom: $2 \times 8 \times 9 = 144$

total: **450**

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 8 by 9, and they are identical — so that pair is $2 \times 8 \times 9 = 144$.

The two sides are 9 by 9, and they are identical — so that pair is $2 \times 9 \times 9 = 162$.

Top and bottom are 8 by 9, and they are identical — so that pair is $2 \times 8 \times 9 = 144$.

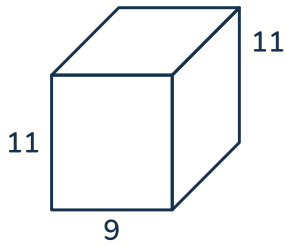
Three pairs, six faces, none missed: $144 + 162 + 144 = 450$ square cm.

Solutions (21 of 24)

Surface Area (continued)

Surface area of a box (continued)

2.



_____ cm²

front and back: $2 \times 9 \times 11 = 198$

the two sides: $2 \times 11 \times 11 = 242$

top and bottom: $2 \times 9 \times 11 = 198$

total: **638**

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 9 by 11, and they are identical — so that pair is $2 \times 9 \times 11 = 198$.

The two sides are 11 by 11, and they are identical — so that pair is $2 \times 11 \times 11 = 242$.

Top and bottom are 9 by 11, and they are identical — so that pair is $2 \times 9 \times 11 = 198$.

Three pairs, six faces, none missed: $198 + 242 + 198 = 638$ square cm.

Finding the Mean

The mean

1. **Mean**
42, 45, 30, 6, 42

42 45 30 6 42

$42 + 45 + 30 + 6 + 42 = 165$

$165 \div 5 = \mathbf{33}$

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

$42 + 45 + 30 + 6 + 42 = 165$.

Now share it between all 5 of them: $165 \div 5 = 33$.

Solutions (22 of 24)

Finding the Mean (continued)

The mean (continued)

2. Mean
16, 48, 1, 19, 1

16481191

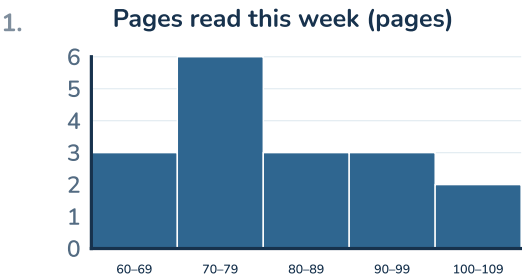
16 + 48 + 1 + 19 + 1 = 85

85 ÷ 5 = 17

The mean is what every number **WOULD** be if the total were shared out evenly. So first find the total.
 $16 + 48 + 1 + 19 + 1 = 85$.
Now share it between all 5 of them: $85 \div 5 = 17$.

Histograms

Histograms



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

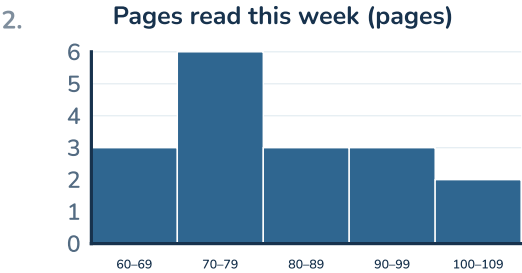
3

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 24)

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.

Look for the Structure

Look for the structure

1. The sum of four consecutive numbers is a multiple of 4.

always

sometimes

never

Why?

always

sometimes

never

never

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.

Try 14 and 15 and 16 and 17 — it fails, and so does every other case. So the answer is never.

Solutions (24 of 24)

Look for the Structure (continued)

Look for the structure (continued)

2. 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.