

Grade 6 Math Workbook

22 lessons · printable · answer key at the back

Name _____

Date _____

Contents (1 of 2)

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

Contents (2 of 2)

Chapter 4 · Fractions and Decimals 12

4-2 Dividing Decimals 12

Chapter 5 · Equations 13

5-1 Solving Equations 13

5-2 Inequalities 14

Chapter 6 · Geometry and Measurement 15

6-1 Area of Composite Shapes 15

6-2 Area of Figures 16

6-3 Missing Sides 17

6-4 Volume of Prisms 18

6-5 Surface Area 19

Chapter 7 · Data 20

7-1 Finding the Mean 20

7-2 Median and Range 21

7-3 Statistics Word Problems 22

WORKED EXAMPLE

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

1. Simplifying a ratio

Write each ratio in its simplest form.

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

WORKED EXAMPLE

$$0.2 = \underline{20\%}$$

2. Decimals as percents

Write each decimal as a percent.

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

Positive and Negative Numbers

WORKED EXAMPLE

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

3. Add and subtract integers

Add or subtract the integers.

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

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

7 $-13 + 9 = \underline{\quad}$

10 $-16 + 11 = \underline{\quad}$

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

16 $-20 + 10 = \underline{\quad}$

19 $-1 + 9 = \underline{\quad}$

22 $9 - 16 = \underline{\quad}$

25 $-6 + 2 = \underline{\quad}$

28 $-8 + 7 = \underline{\quad}$

31 $-7 + 16 = \underline{\quad}$

34 $3 - 10 = \underline{\quad}$

37 $-9 + 5 = \underline{\quad}$

40 $-2 + 5 = \underline{\quad}$

43 $-3 + 20 = \underline{\quad}$

46 $-11 + 4 = \underline{\quad}$

49 $-16 + 9 = \underline{\quad}$

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

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

8 $7 - 13 = \underline{\quad}$

11 $-15 + 6 = \underline{\quad}$

14 $-16 + 1 = \underline{\quad}$

17 $-8 + 15 = \underline{\quad}$

20 $-18 + 11 = \underline{\quad}$

23 $-2 + 7 = \underline{\quad}$

26 $-7 + 4 = \underline{\quad}$

29 $4 - 13 = \underline{\quad}$

32 $-1 + 3 = \underline{\quad}$

35 $-4 + 10 = \underline{\quad}$

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

41 $-18 + 13 = \underline{\quad}$

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

47 $-6 + 14 = \underline{\quad}$

50 $3 - 15 = \underline{\quad}$

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

6 $-2 + 13 = \underline{\quad}$

9 $-19 + 10 = \underline{\quad}$

12 $1 - 2 = \underline{\quad}$

15 $8 - 17 = \underline{\quad}$

18 $-7 + 7 = \underline{\quad}$

21 $-3 + 3 = \underline{\quad}$

24 $2 - 7 = \underline{\quad}$

27 $-8 + 14 = \underline{\quad}$

30 $-11 + 9 = \underline{\quad}$

33 $-20 + 3 = \underline{\quad}$

36 $11 - 19 = \underline{\quad}$

39 $-12 + 9 = \underline{\quad}$

42 $3 - 4 = \underline{\quad}$

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

48 $-18 + 6 = \underline{\quad}$

Multiplying Integers

WORKED EXAMPLE

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

4. Multiplying integers

Multiply. Remember what two negative signs make.

1 $4 \times (-2) = \underline{\hspace{2cm}}$

4 $4 \times (-7) = \underline{\hspace{2cm}}$

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

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

13 $-9 \times 10 = \underline{\hspace{2cm}}$

16 $-6 \times 5 = \underline{\hspace{2cm}}$

19 $-7 \times 2 = \underline{\hspace{2cm}}$

22 $2 \times (-3) = \underline{\hspace{2cm}}$

25 $7 \times (-9) = \underline{\hspace{2cm}}$

28 $-12 \times 8 = \underline{\hspace{2cm}}$

31 $4 \times (-3) = \underline{\hspace{2cm}}$

34 $11 \times (-5) = \underline{\hspace{2cm}}$

37 $-7 \times 11 = \underline{\hspace{2cm}}$

40 $7 \times (-4) = \underline{\hspace{2cm}}$

2 $7 \times (-5) = \underline{\hspace{2cm}}$

5 $-8 \times 6 = \underline{\hspace{2cm}}$

8 $-12 \times (-9) = \underline{\hspace{2cm}}$

11 $6 \times (-9) = \underline{\hspace{2cm}}$

14 $7 \times (-7) = \underline{\hspace{2cm}}$

17 $9 \times (-3) = \underline{\hspace{2cm}}$

20 $9 \times (-6) = \underline{\hspace{2cm}}$

23 $4 \times (-9) = \underline{\hspace{2cm}}$

26 $-4 \times (-6) = \underline{\hspace{2cm}}$

29 $-3 \times (-2) = \underline{\hspace{2cm}}$

32 $-2 \times 6 = \underline{\hspace{2cm}}$

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

38 $2 \times (-12) = \underline{\hspace{2cm}}$

3 $11 \times (-3) = \underline{\hspace{2cm}}$

6 $12 \times (-3) = \underline{\hspace{2cm}}$

9 $-10 \times 5 = \underline{\hspace{2cm}}$

12 $-10 \times 4 = \underline{\hspace{2cm}}$

15 $-12 \times (-5) = \underline{\hspace{2cm}}$

18 $-12 \times 7 = \underline{\hspace{2cm}}$

21 $-3 \times (-7) = \underline{\hspace{2cm}}$

24 $-10 \times 8 = \underline{\hspace{2cm}}$

27 $5 \times (-7) = \underline{\hspace{2cm}}$

30 $-11 \times 8 = \underline{\hspace{2cm}}$

33 $-5 \times (-5) = \underline{\hspace{2cm}}$

36 $6 \times (-5) = \underline{\hspace{2cm}}$

39 $-4 \times (-10) = \underline{\hspace{2cm}}$

Order of Operations

WORKED EXAMPLE

$$49 \div 7 + 7 = \underline{14}$$

5. Order of operations

Follow the order of operations to solve each problem.

1 $2 + 54 \div 9 = \underline{\hspace{2cm}}$

4 $32 \div 4 + 2 = \underline{\hspace{2cm}}$

7 $28 \div 4 + 9 = \underline{\hspace{2cm}}$

10 $9 + 16 \div 4 = \underline{\hspace{2cm}}$

13 $32 \div 8 + 5 = \underline{\hspace{2cm}}$

16 $2 \times 10 + 5 = \underline{\hspace{2cm}}$

19 $24 \div 3 + 2 = \underline{\hspace{2cm}}$

22 $7 + 18 \div 6 = \underline{\hspace{2cm}}$

25 $9 - 15 \div 5 = \underline{\hspace{2cm}}$

28 $6 + 27 \div 9 = \underline{\hspace{2cm}}$

31 $8 - 10 \div 2 = \underline{\hspace{2cm}}$

34 $9 \times 11 + 8 = \underline{\hspace{2cm}}$

37 $88 \div 8 + 2 = \underline{\hspace{2cm}}$

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

5 $9 + 11 \times 3 = \underline{\hspace{2cm}}$

8 $4 + 18 \div 3 = \underline{\hspace{2cm}}$

11 $3 + 16 \div 8 = \underline{\hspace{2cm}}$

14 $3 \times 2 + 9 = \underline{\hspace{2cm}}$

17 $21 \div 7 + 6 = \underline{\hspace{2cm}}$

20 $96 \div 8 + 8 = \underline{\hspace{2cm}}$

23 $3 + 55 \div 5 = \underline{\hspace{2cm}}$

26 $6 + 18 \div 6 = \underline{\hspace{2cm}}$

29 $5 + 9 \times 8 = \underline{\hspace{2cm}}$

32 $7 - 36 \div 9 = \underline{\hspace{2cm}}$

35 $9 + 27 \div 9 = \underline{\hspace{2cm}}$

38 $5 + 36 \div 9 = \underline{\hspace{2cm}}$

3 $56 \div 7 + 4 = \underline{\hspace{2cm}}$

6 $14 \div 7 + 8 = \underline{\hspace{2cm}}$

9 $6 - 42 \div 7 = \underline{\hspace{2cm}}$

12 $2 + 6 \times 5 = \underline{\hspace{2cm}}$

15 $35 \div 5 + 5 = \underline{\hspace{2cm}}$

18 $6 \times 6 + 6 = \underline{\hspace{2cm}}$

21 $4 + 30 \div 5 = \underline{\hspace{2cm}}$

24 $8 + 12 \times 8 = \underline{\hspace{2cm}}$

27 $3 + 99 \div 9 = \underline{\hspace{2cm}}$

30 $2 \times 9 + 9 = \underline{\hspace{2cm}}$

33 $84 \div 7 + 9 = \underline{\hspace{2cm}}$

36 $14 \div 7 + 2 = \underline{\hspace{2cm}}$

WORKED EXAMPLE

$$20^2 = \underline{400}$$

6. 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 $13^2 = \underline{\hspace{1cm}}$ | | | |

Greatest Common Factor

WORKED EXAMPLE

$16, 28 \rightarrow \underline{4}$

7. Greatest common factor

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

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

Lowest Common Multiple

WORKED EXAMPLE

$12, 15 \rightarrow \underline{60}$

8. Least common multiple

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

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

Factors and Multiples

WORKED EXAMPLE

31 → 1, 31

9. List the factors

List all the factors of each number.

- 1 2 → _____
- 2 6 → _____
- 3 29 → _____
- 4 3 → _____
- 5 28 → _____
- 6 38 → _____
- 7 17 → _____
- 8 13 → _____
- 9 26 → _____
- 10 32 → _____

10. Is it a multiple?

Circle Yes or No for each question.

- 11 Is 16 a multiple of 4? Yes / No
- 12 Is 20 a multiple of 10? Yes / No
- 13 Is 14 a multiple of 2? Yes / No
- 14 Is 5 a multiple of 5? Yes / No
- 15 Is 32 a multiple of 8? Yes / No
- 16 Is 24 a multiple of 4? Yes / No
- 17 Is 16 a multiple of 2? Yes / No
- 18 Is 8 a multiple of 2? Yes / No
- 19 Is 27 a multiple of 2? Yes / No

Prime and Composite Numbers

WORKED EXAMPLE

29

Prime

/ Composite

11. Prime or composite

Circle whether each number is prime or composite.

1 24 Prime / Composite

3 20 Prime / Composite

5 6 Prime / Composite

7 34 Prime / Composite

9 4 Prime / Composite

11 32 Prime / Composite

13 47 Prime / Composite

15 7 Prime / Composite

17 21 Prime / Composite

19 40 Prime / Composite

21 12 Prime / Composite

23 30 Prime / Composite

25 14 Prime / Composite

27 33 Prime / Composite

29 17 Prime / Composite

31 16 Prime / Composite

33 28 Prime / Composite

35 22 Prime / Composite

2 50 Prime / Composite

4 49 Prime / Composite

6 44 Prime / Composite

8 9 Prime / Composite

10 5 Prime / Composite

12 46 Prime / Composite

14 26 Prime / Composite

16 18 Prime / Composite

18 10 Prime / Composite

20 37 Prime / Composite

22 3 Prime / Composite

24 25 Prime / Composite

26 23 Prime / Composite

28 36 Prime / Composite

30 39 Prime / Composite

32 13 Prime / Composite

34 45 Prime / Composite

36 11 Prime / Composite

Dividing Fractions

WORKED EXAMPLE

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

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

Dividing Decimals

WORKED EXAMPLE

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

13. Multiply and divide decimals

Divide. Each quotient is an exact decimal.

- | | | |
|-----------------------------|-----------------------------|----------------------------|
| 1 $72.0 \div 12 =$ _____ | 2 $6.54 \div 3 =$ _____ | 3 $23.1 \div 7 =$ _____ |
| 4 $102.60 \div 9 =$ _____ | 5 $11.4 \div 6 =$ _____ | 6 $57.5 \div 5 =$ _____ |
| 7 $49.5 \div 11 =$ _____ | 8 $48.40 \div 5 =$ _____ | 9 $44.4 \div 4 =$ _____ |
| 10 $2.8 \div 7 =$ _____ | 11 $48.42 \div 6 =$ _____ | 12 $42.5 \div 5 =$ _____ |
| 13 $58.5 \div 9 =$ _____ | 14 $127.20 \div 12 =$ _____ | 15 $28.5 \div 5 =$ _____ |
| 16 $50.5 \div 5 =$ _____ | 17 $65.76 \div 6 =$ _____ | 18 $37.8 \div 6 =$ _____ |
| 19 $17.80 \div 5 =$ _____ | 20 $21.76 \div 2 =$ _____ | 21 $28.0 \div 7 =$ _____ |
| 22 $82.6 \div 7 =$ _____ | 23 $67.00 \div 10 =$ _____ | 24 $7.6 \div 2 =$ _____ |
| 25 $30.0 \div 4 =$ _____ | 26 $74.96 \div 8 =$ _____ | 27 $9.8 \div 2 =$ _____ |
| 28 $40.4 \div 4 =$ _____ | 29 $72.24 \div 8 =$ _____ | 30 $13.2 \div 2 =$ _____ |
| 31 $18.74 \div 2 =$ _____ | 32 $12.2 \div 2 =$ _____ | 33 $19.68 \div 12 =$ _____ |
| 34 $24.45 \div 3 =$ _____ | 35 $74.8 \div 11 =$ _____ | 36 $48.5 \div 5 =$ _____ |
| 37 $129.58 \div 11 =$ _____ | 38 $2.8 \div 2 =$ _____ | 39 $103.4 \div 11 =$ _____ |
| 40 $45.09 \div 9 =$ _____ | 41 $18.0 \div 4 =$ _____ | 42 $11.52 \div 12 =$ _____ |
| 43 $17.58 \div 3 =$ _____ | 44 $9.1 \div 7 =$ _____ | 45 $14.04 \div 12 =$ _____ |
| 46 $81.30 \div 10 =$ _____ | 47 $13.2 \div 11 =$ _____ | 48 $15.8 \div 2 =$ _____ |
| 49 $35.63 \div 7 =$ _____ | 50 $4.2 \div 3 =$ _____ | |

Solving Equations

WORKED EXAMPLE

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

14. Solving equations

Solve each equation for x .

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

Inequalities

WORKED EXAMPLE

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

15. Inequalities

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

1 $4x > 24$ x 6

2 $3x \leq 42$ x 14

3 $2x \geq 18$ x 9

4 $-3x \geq -42$ x 14

5 $-5x < -5$ x 1

6 $2x \leq 8$ x 4

7 $-2x \leq -18$ x 9

8 $-4x \geq -16$ x 4

9 $2x < 12$ x 6

10 $-6x \leq 42$ x -7

11 $6x \leq 42$ x 7

12 $2x \leq -36$ x -18

13 $-4x \geq 32$ x -8

14 $2x < -12$ x -6

15 $4x > -40$ x -10

16 $-6x > 42$ x -7

17 $3x < 24$ x 8

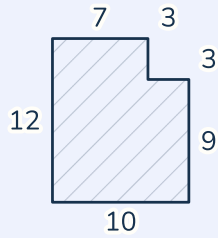
18 $-7x \geq 49$ x -7

19 $2x \leq -44$ x -22

20 $-4x \geq -32$ x 8

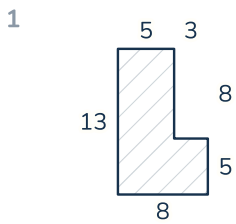
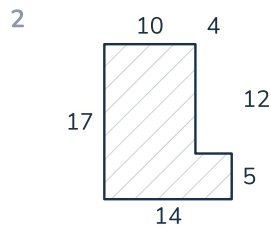
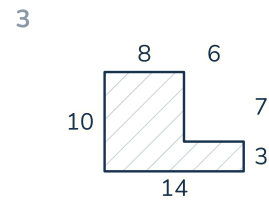
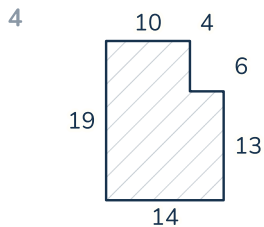
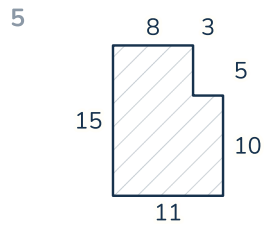
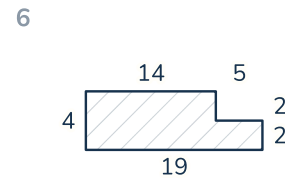
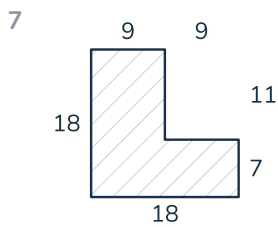
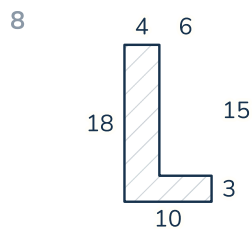
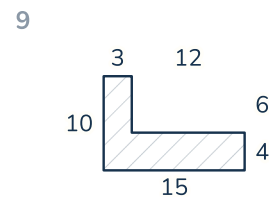
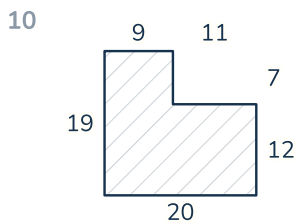
Area of Composite Shapes

WORKED EXAMPLE

**111** cm²

16. 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

Area of Figures

WORKED EXAMPLE

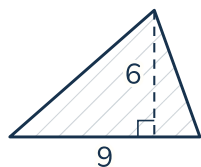


18 cm²

17. Area

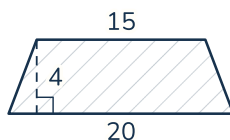
Find the area. Lengths are in cm; the dashed line is the height.

1



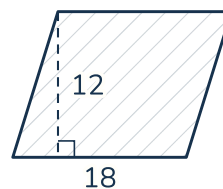
_____ cm²

2



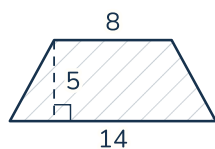
_____ cm²

3



_____ cm²

4



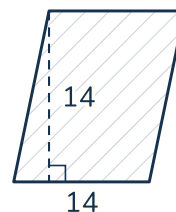
_____ cm²

5



_____ cm²

6



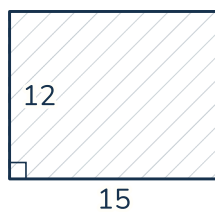
_____ cm²

7



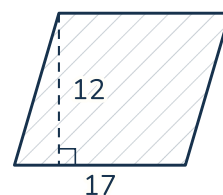
_____ cm²

8



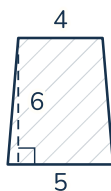
_____ cm²

9



_____ cm²

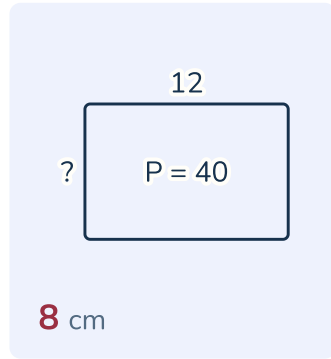
10



_____ cm²

Missing Sides

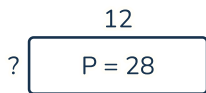
WORKED EXAMPLE



18. Find the missing side

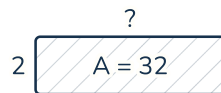
Find the missing side. All lengths are in centimeters.

1



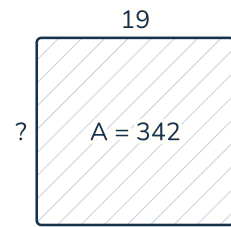
_____ cm

2



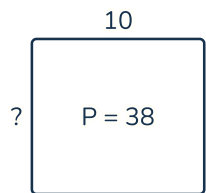
_____ cm

3



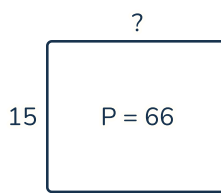
_____ cm

4



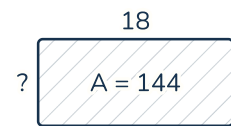
_____ cm

5



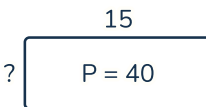
_____ cm

6



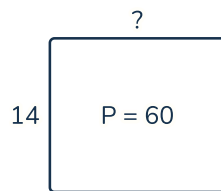
_____ cm

7



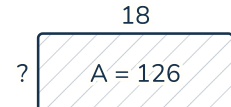
_____ cm

8



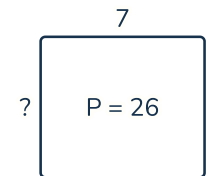
_____ cm

9



_____ cm

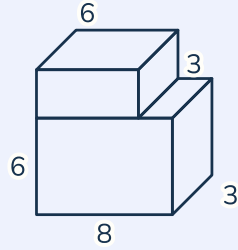
10



_____ cm

Volume of Prisms

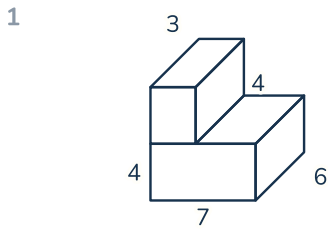
WORKED EXAMPLE



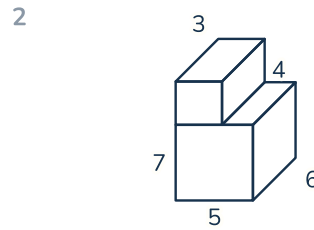
198 cm³

19. Volume of a rectangular prism

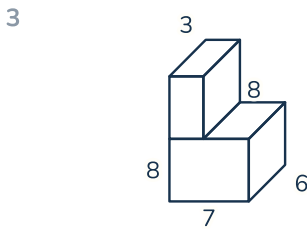
Find the volume of each box. All lengths are in centimeters.



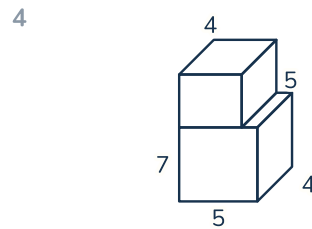
_____ cm³



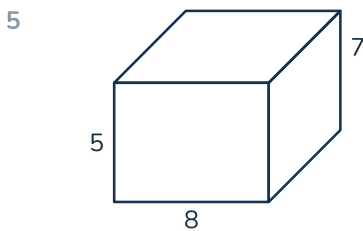
_____ cm³



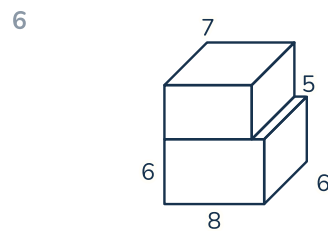
_____ cm³



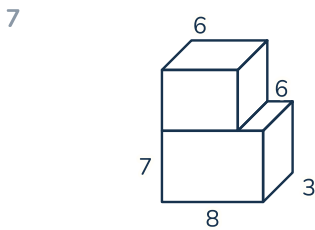
_____ cm³



_____ cm³



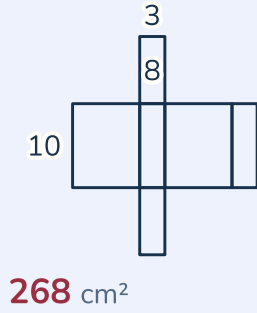
_____ cm³



_____ cm³

Surface Area

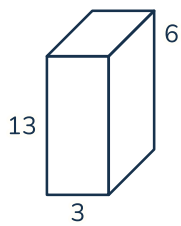
WORKED EXAMPLE



20. Surface area of a box

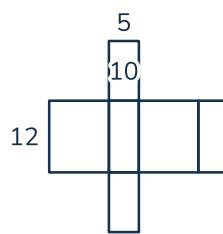
Find the surface area of each box. All lengths are in centimeters.

1



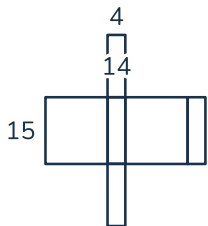
_____ cm²

2



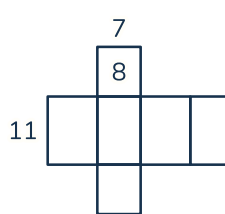
_____ cm²

3



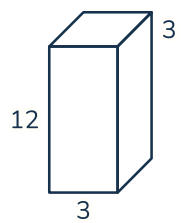
_____ cm²

4



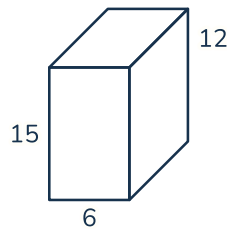
_____ cm²

5



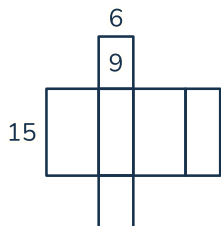
_____ cm²

6



_____ cm²

7



_____ cm²

Finding the Mean

WORKED EXAMPLE

Mean

38, 30, 22, 38, 12

28

21. The mean

Find the mean of each set of numbers.

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

Median and Range

WORKED EXAMPLE

Median

17, 21, 9, 17, 16

17

22. The median

Find the median of each set of numbers.

1 Median

14, 8, 42, 14, 37

2 Median

16, 1, 30, 29, 29

3 Median

47, 6, 15, 31, 31

4 Median

5, 40, 2, 33, 40

5 Median

7, 31, 47, 5, 5

6 Median

31, 38, 22, 7, 7

7 Median

40, 40, 14, 25, 6

8 Median

42, 50, 42, 20, 11

9 Median

7, 47, 20, 3, 3

10 Median

24, 2, 24, 21, 44

11 Median

13, 16, 11, 16, 49

12 Median

24, 33, 26, 24, 28

23. The range

Find the range of each set of numbers.

13 Range

44, 27, 16, 41, 27

14 Range

15, 19, 33, 15, 3

15 Range

49, 35, 16, 49, 46

16 Range

38, 41, 1, 45, 45

17 Range

24, 48, 24, 45, 14

18 Range

2, 19, 11, 17, 11

19 Range

24, 13, 24, 42, 37

20 Range

50, 47, 23, 40, 40

21 Range

22, 18, 48, 18, 4

22 Range

38, 15, 40, 38, 44

23 Range

3, 28, 3, 22, 49

24 Range

29, 29, 37, 18, 32

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.

24. Word problems

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 of the books?

- 2 In five weeks one summer, a garden grew 19, 20, 21, 18 and 19 tomatoes.

Find the range.

- 3 In five mornings one spring, a farm collected 19, 5, 23, 21 and 23 eggs.

Find the median.

- 4 Over five days at the market, a bakery sold 13, 14, 15, 19 and 14 cakes.

What was the median number of cakes?

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

What is the median of the cakes?

- 6 Across five days at the market, a bakery sold 20, 5, 15, 15 and 7 cakes.

What is the median of the cakes?

24. Word problems (continued)

Read each problem. Write the answer.

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

Find the median.

- 8 In five days one holiday, a shop sold 12, 10, 9, 21 and 9 kites.

Find the median.

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

What was the median number of cakes?

- 10 In five days one holiday, a shop sold 10, 19, 10, 15 and 23 kites.

Find the median.

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

What was the median number of tomatoes?

- 12 Across five days one holiday, a shop sold 15, 24, 25, 23 and 15 kites.

What is the median of the kites?

Answer Key (1 of 8)

Ratio

Simplifying a ratio

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

Ratio (continued)

Simplifying a ratio (continued)

46. $8:12 = 2:3$
47. $8:10 = 4:5$
48. $20:24 = 5:6$
49. $15:24 = 5:8$
50. $15:35 = 3:7$

Percents

Decimals as percents

1. $0.85 = 85\%$
2. $0.61 = 61\%$
3. $0.97 = 97\%$
4. $0.10 = 10\%$
5. $0.19 = 19\%$
6. $0.44 = 44\%$
7. $0.30 = 30\%$
8. $0.86 = 86\%$
9. $0.52 = 52\%$
10. $0.21 = 21\%$
11. $0.4 = 40\%$
12. $0.6 = 60\%$
13. $0.09 = 9\%$
14. $0.98 = 98\%$
15. $0.81 = 81\%$
16. $0.54 = 54\%$
17. $0.68 = 68\%$
18. $0.76 = 76\%$
19. $0.94 = 94\%$
20. $0.42 = 42\%$
21. $0.75 = 75\%$
22. $0.63 = 63\%$
23. $0.47 = 47\%$
24. $0.88 = 88\%$
25. $0.80 = 80\%$
26. $0.65 = 65\%$
27. $0.13 = 13\%$
28. $0.66 = 66\%$
29. $0.69 = 69\%$
30. $0.07 = 7\%$
31. $0.82 = 82\%$
32. $0.46 = 46\%$
33. $0.87 = 87\%$
34. $0.92 = 92\%$
35. $0.17 = 17\%$
36. $0.36 = 36\%$
37. $0.11 = 11\%$

Answer Key (2 of 8)

Percents (continued)

Decimals as percents (continued)

38. $0.06 = 6\%$
39. $0.08 = 8\%$
40. $0.70 = 70\%$
41. $0.59 = 59\%$
42. $0.72 = 72\%$
43. $0.31 = 31\%$
44. $0.73 = 73\%$
45. $0.43 = 43\%$
46. $0.27 = 27\%$
47. $0.77 = 77\%$
48. $0.95 = 95\%$
49. $0.24 = 24\%$
50. $0.48 = 48\%$

Positive and Negative Numbers

Add and subtract integers

1. $-1 + 1 = 0$
2. $-13 + 7 = -6$
3. $-19 + 14 = -5$
4. $-2 + 10 = 8$
5. $-19 + 2 = -17$
6. $-2 + 13 = 11$
7. $-13 + 9 = -4$
8. $7 - 13 = -6$
9. $-19 + 10 = -9$
10. $-16 + 11 = -5$
11. $-15 + 6 = -9$
12. $1 - 2 = -1$
13. $-13 + 16 = 3$
14. $-16 + 1 = -15$
15. $8 - 17 = -9$
16. $-20 + 10 = -10$
17. $-8 + 15 = 7$
18. $-7 + 7 = 0$
19. $-1 + 9 = 8$
20. $-18 + 11 = -7$
21. $-3 + 3 = 0$
22. $9 - 16 = -7$
23. $-2 + 7 = 5$
24. $2 - 7 = -5$
25. $-6 + 2 = -4$
26. $-7 + 4 = -3$
27. $-8 + 14 = 6$
28. $-8 + 7 = -1$
29. $4 - 13 = -9$

Positive and Negative Numbers (continued)

Add and subtract integers (continued)

30. $-11 + 9 = -2$
31. $-7 + 16 = 9$
32. $-1 + 3 = 2$
33. $-20 + 3 = -17$
34. $3 - 10 = -7$
35. $-4 + 10 = 6$
36. $11 - 19 = -8$
37. $-9 + 5 = -4$
38. $-17 + 17 = 0$
39. $-12 + 9 = -3$
40. $-2 + 5 = 3$
41. $-18 + 13 = -5$
42. $3 - 4 = -1$
43. $-3 + 20 = 17$
44. $-9 + 8 = -1$
45. $6 - 12 = -6$
46. $-11 + 4 = -7$
47. $-6 + 14 = 8$
48. $-18 + 6 = -12$
49. $-16 + 9 = -7$
50. $3 - 15 = -12$

Multiplying Integers

Multiplying integers

1. $4 \times -2 = -8$
2. $7 \times -5 = -35$
3. $11 \times -3 = -33$
4. $4 \times -7 = -28$
5. $-8 \times 6 = -48$
6. $12 \times -3 = -36$
7. $-5 \times 2 = -10$
8. $-12 \times -9 = 108$
9. $-10 \times 5 = -50$
10. $-11 \times 11 = -121$
11. $6 \times -9 = -54$
12. $-10 \times 4 = -40$
13. $-9 \times 10 = -90$
14. $7 \times -7 = -49$
15. $-12 \times -5 = 60$
16. $-6 \times 5 = -30$
17. $9 \times -3 = -27$
18. $-12 \times 7 = -84$
19. $-7 \times 2 = -14$
20. $9 \times -6 = -54$
21. $-3 \times -7 = 21$

Answer Key (3 of 8)

Multiplying Integers (continued)

Multiplying integers (continued)

22. $2 \times -3 = -6$
23. $4 \times -9 = -36$
24. $-10 \times 8 = -80$
25. $7 \times -9 = -63$
26. $-4 \times -6 = 24$
27. $5 \times -7 = -35$
28. $-12 \times 8 = -96$
29. $-3 \times -2 = 6$
30. $-11 \times 8 = -88$
31. $4 \times -3 = -12$
32. $-2 \times 6 = -12$
33. $-5 \times -5 = 25$
34. $11 \times -5 = -55$
35. $-12 \times 4 = -48$
36. $6 \times -5 = -30$
37. $-7 \times 11 = -77$
38. $2 \times -12 = -24$
39. $-4 \times -10 = 40$
40. $7 \times -4 = -28$

Order of Operations

Order of operations

1. $2 + 54 \div 9 = 8$
2. $6 \times 3 + 9 = 27$
3. $56 \div 7 + 4 = 12$
4. $32 \div 4 + 2 = 10$
5. $9 + 11 \times 3 = 42$
6. $14 \div 7 + 8 = 10$
7. $28 \div 4 + 9 = 16$
8. $4 + 18 \div 3 = 10$
9. $6 - 42 \div 7 = 0$
10. $9 + 16 \div 4 = 13$
11. $3 + 16 \div 8 = 5$
12. $2 + 6 \times 5 = 32$
13. $32 \div 8 + 5 = 9$
14. $3 \times 2 + 9 = 15$
15. $35 \div 5 + 5 = 12$
16. $2 \times 10 + 5 = 25$
17. $21 \div 7 + 6 = 9$
18. $6 \times 6 + 6 = 42$
19. $24 \div 3 + 2 = 10$
20. $96 \div 8 + 8 = 20$
21. $4 + 30 \div 5 = 10$
22. $7 + 18 \div 6 = 10$
23. $3 + 55 \div 5 = 14$

Order of Operations (continued)

Order of operations (continued)

24. $8 + 12 \times 8 = 104$
25. $9 - 15 \div 5 = 6$
26. $6 + 18 \div 6 = 9$
27. $3 + 99 \div 9 = 14$
28. $6 + 27 \div 9 = 9$
29. $5 + 9 \times 8 = 77$
30. $2 \times 9 + 9 = 27$
31. $8 - 10 \div 2 = 3$
32. $7 - 36 \div 9 = 3$
33. $84 \div 7 + 9 = 21$
34. $9 \times 11 + 8 = 107$
35. $9 + 27 \div 9 = 12$
36. $14 \div 7 + 2 = 4$
37. $88 \div 8 + 2 = 13$
38. $5 + 36 \div 9 = 9$

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. $13^2 = 169$

Greatest Common Factor

Greatest common factor

1. $6, 15 \rightarrow 3$
2. $20, 24 \rightarrow 4$
3. $12, 15 \rightarrow 3$
4. $8, 12 \rightarrow 4$
5. $25, 30 \rightarrow 5$
6. $4, 6 \rightarrow 2$
7. $15, 21 \rightarrow 3$

Answer Key (4 of 8)

Greatest Common Factor (continued)

Greatest common factor (continued)

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

Lowest Common Multiple

Least common multiple

1. 6, 8 → 24

Lowest Common Multiple (continued)

Least common multiple (continued)

2. 9, 15 → 45
3. 8, 12 → 24
4. 4, 6 → 12
5. 12, 20 → 60
6. 10, 25 → 50
7. 4, 10 → 20
8. 6, 9 → 18
9. 9, 12 → 36
10. 15, 20 → 60
11. 6, 10 → 30
12. 6, 15 → 30
13. 8, 20 → 40
14. 15, 25 → 75
15. 10, 15 → 30
16. 12, 16 → 48
17. 16, 20 → 80
18. 8, 10 → 40

Factors and Multiples

List the factors

1. 2 → 1, 2
2. 6 → 1, 2, 3, 6
3. 29 → 1, 29
4. 3 → 1, 3
5. 28 → 1, 2, 4, 7, 14, 28
6. 38 → 1, 2, 19, 38
7. 17 → 1, 17
8. 13 → 1, 13
9. 26 → 1, 2, 13, 26
10. 32 → 1, 2, 4, 8, 16, 32

Is it a multiple?

11. Is 16 a multiple of 4? → Yes
12. Is 20 a multiple of 10? → Yes
13. Is 14 a multiple of 2? → Yes
14. Is 5 a multiple of 5? → Yes
15. Is 32 a multiple of 8? → Yes
16. Is 24 a multiple of 4? → Yes
17. Is 16 a multiple of 2? → Yes
18. Is 8 a multiple of 2? → Yes
19. Is 27 a multiple of 2? → No

Prime and Composite Numbers

Prime or composite

1. 24 → Composite (2×12)
2. 50 → Composite (2×25)

Answer Key (5 of 8)

Prime and Composite Numbers (continued)

Prime or composite (continued)

3. 20 → Composite (2×10)
4. 49 → Composite (7×7)
5. 6 → Composite (2×3)
6. 44 → Composite (2×22)
7. 34 → Composite (2×17)
8. 9 → Composite (3×3)
9. 4 → Composite (2×2)
10. 5 → Prime
11. 32 → Composite (2×16)
12. 46 → Composite (2×23)
13. 47 → Prime
14. 26 → Composite (2×13)
15. 7 → Prime
16. 18 → Composite (2×9)
17. 21 → Composite (3×7)
18. 10 → Composite (2×5)
19. 40 → Composite (2×20)
20. 37 → Prime
21. 12 → Composite (2×6)
22. 3 → Prime
23. 30 → Composite (2×15)
24. 25 → Composite (5×5)
25. 14 → Composite (2×7)
26. 23 → Prime
27. 33 → Composite (3×11)
28. 36 → Composite (2×18)
29. 17 → Prime
30. 39 → Composite (3×13)
31. 16 → Composite (2×8)
32. 13 → Prime
33. 28 → Composite (2×14)
34. 45 → Composite (3×15)
35. 22 → Composite (2×11)
36. 11 → Prime

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. $7/8 \div 2/5 = 35/16$

Dividing Fractions (continued)

Dividing fractions (continued)

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. $3/4 \div 7/8 = 6/7$
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. $2/6 \div 3/4 = 4/9$

Dividing Decimals

Multiply and divide decimals

1. $72.0 \div 12 = 6.0$
2. $6.54 \div 3 = 2.18$
3. $23.1 \div 7 = 3.3$
4. $102.60 \div 9 = 11.40$
5. $11.4 \div 6 = 1.9$
6. $57.5 \div 5 = 11.5$
7. $49.5 \div 11 = 4.5$

Answer Key (6 of 8)

Dividing Decimals (continued)

Multiply and divide decimals (continued)

8. $48.40 \div 5 = 9.68$
9. $44.4 \div 4 = 11.1$
10. $2.8 \div 7 = 0.4$
11. $48.42 \div 6 = 8.07$
12. $42.5 \div 5 = 8.5$
13. $58.5 \div 9 = 6.5$
14. $127.20 \div 12 = 10.60$
15. $28.5 \div 5 = 5.7$
16. $50.5 \div 5 = 10.1$
17. $65.76 \div 6 = 10.96$
18. $37.8 \div 6 = 6.3$
19. $17.80 \div 5 = 3.56$
20. $21.76 \div 2 = 10.88$
21. $28.0 \div 7 = 4.0$
22. $82.6 \div 7 = 11.8$
23. $67.00 \div 10 = 6.70$
24. $7.6 \div 2 = 3.8$
25. $30.0 \div 4 = 7.5$
26. $74.96 \div 8 = 9.37$
27. $9.8 \div 2 = 4.9$
28. $40.4 \div 4 = 10.1$
29. $72.24 \div 8 = 9.03$
30. $13.2 \div 2 = 6.6$
31. $18.74 \div 2 = 9.37$
32. $12.2 \div 2 = 6.1$
33. $19.68 \div 12 = 1.64$
34. $24.45 \div 3 = 8.15$
35. $74.8 \div 11 = 6.8$
36. $48.5 \div 5 = 9.7$
37. $129.58 \div 11 = 11.78$
38. $2.8 \div 2 = 1.4$
39. $103.4 \div 11 = 9.4$
40. $45.09 \div 9 = 5.01$
41. $18.0 \div 4 = 4.5$
42. $11.52 \div 12 = 0.96$
43. $17.58 \div 3 = 5.86$
44. $9.1 \div 7 = 1.3$
45. $14.04 \div 12 = 1.17$
46. $81.30 \div 10 = 8.13$
47. $13.2 \div 11 = 1.2$
48. $15.8 \div 2 = 7.9$
49. $35.63 \div 7 = 5.09$
50. $4.2 \div 3 = 1.4$

Solving Equations

Solving equations

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

Answer Key (7 of 8)

Solving Equations (continued)

Solving equations (continued)

46. $x - 47 = 3 \rightarrow x = 50$
47. $x + 18 = 29 \rightarrow x = 11$
48. $x - 23 = 22 \rightarrow x = 45$
49. $25 - x = 1 \rightarrow x = 24$
50. $x - 22 = 15 \rightarrow x = 37$

Inequalities

Inequalities

1. $4x > 24 \rightarrow x > 6$
2. $3x \leq 42 \rightarrow x \leq 14$
3. $2x \geq 18 \rightarrow x \geq 9$
4. $-3x \geq -42 \rightarrow x \leq 14$
5. $-5x < -5 \rightarrow x > 1$
6. $2x \leq 8 \rightarrow x \leq 4$
7. $-2x \leq -18 \rightarrow x \geq 9$
8. $-4x \geq -16 \rightarrow x \leq 4$
9. $2x < 12 \rightarrow x < 6$
10. $-6x \leq 42 \rightarrow x \geq -7$
11. $6x \leq 42 \rightarrow x \leq 7$
12. $2x \leq -36 \rightarrow x \leq -18$
13. $-4x \geq 32 \rightarrow x \leq -8$
14. $2x < -12 \rightarrow x < -6$
15. $4x > -40 \rightarrow x > -10$
16. $-6x > 42 \rightarrow x < -7$
17. $3x < 24 \rightarrow x < 8$
18. $-7x \geq 49 \rightarrow x \leq -7$
19. $2x \leq -44 \rightarrow x \leq -22$
20. $-4x \geq -32 \rightarrow x \leq 8$

Area of Composite Shapes

Area of composite figures

1. 8×13 less 3×8 : 80 cm^2
2. 14×17 less 4×12 : 190 cm^2
3. 14×10 less 6×7 : 98 cm^2
4. 14×19 less 4×6 : 242 cm^2
5. 11×15 less 3×5 : 150 cm^2
6. 19×4 less 5×2 : 66 cm^2
7. 18×18 less 9×11 : 225 cm^2
8. 10×18 less 6×15 : 90 cm^2
9. 15×10 less 12×6 : 78 cm^2
10. 20×19 less 11×7 : 303 cm^2

Area of Figures

Area

1. triangle $9 \times 6 \div 2 = 27 \text{ cm}^2$

Area of Figures (continued)

Area (continued)

2. trapezoid $(15 + 20) \div 2 \times 4 = 70 \text{ cm}^2$
3. parallelogram $18 \times 12 = 216 \text{ cm}^2$
4. trapezoid $(8 + 14) \div 2 \times 5 = 55 \text{ cm}^2$
5. trapezoid $(6 + 10) \div 2 \times 10 = 80 \text{ cm}^2$
6. parallelogram $14 \times 14 = 196 \text{ cm}^2$
7. parallelogram $5 \times 17 = 85 \text{ cm}^2$
8. rectangle $15 \times 12 = 180 \text{ cm}^2$
9. parallelogram $17 \times 12 = 204 \text{ cm}^2$
10. trapezoid $(4 + 5) \div 2 \times 6 = 27 \text{ cm}^2$

Missing Sides

Find the missing side

1. $P = 28$, side 12: 2 cm
2. $A = 32$, side 2: 16 cm
3. $A = 342$, side 19: 18 cm
4. $P = 38$, side 10: 9 cm
5. $P = 66$, side 15: 18 cm
6. $A = 144$, side 18: 8 cm
7. $P = 40$, side 15: 5 cm
8. $P = 60$, side 14: 16 cm
9. $A = 126$, side 18: 7 cm
10. $P = 26$, side 7: 6 cm

Volume of Prisms

Volume of a rectangular prism

1. $7 \times 6 \times 4 + 3 \times 6 \times 4$: 240 cm^3
2. $5 \times 6 \times 7 + 3 \times 6 \times 4$: 282 cm^3
3. $7 \times 6 \times 8 + 3 \times 6 \times 8$: 480 cm^3
4. $5 \times 4 \times 7 + 4 \times 4 \times 5$: 220 cm^3
5. $8 \times 7 \times 5$: 280 cm^3
6. $8 \times 6 \times 6 + 7 \times 6 \times 5$: 498 cm^3
7. $8 \times 3 \times 7 + 6 \times 3 \times 6$: 276 cm^3

Surface Area

Surface area of a box

1. $3 \times 6 \times 13 \rightarrow 2(18 + 39 + 78)$: 270 cm^2
2. $5 \times 10 \times 12 \rightarrow 2(50 + 60 + 120)$: 460 cm^2
3. $4 \times 14 \times 15 \rightarrow 2(56 + 60 + 210)$: 652 cm^2
4. $7 \times 8 \times 11 \rightarrow 2(56 + 77 + 88)$: 442 cm^2
5. $3 \times 3 \times 12 \rightarrow 2(9 + 36 + 36)$: 162 cm^2
6. $6 \times 12 \times 15 \rightarrow 2(72 + 90 + 180)$: 684 cm^2
7. $6 \times 9 \times 15 \rightarrow 2(54 + 90 + 135)$: 558 cm^2

Finding the Mean

The mean

1. Mean of 42, 45, 30, 6, 42 = 33

Answer Key (8 of 8)

Finding the Mean (continued)

The mean (continued)

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

Median and Range

The median

1. Median of 14, 8, 42, 14, 37 = 14
2. Median of 16, 1, 30, 29, 29 = 29
3. Median of 47, 6, 15, 31, 31 = 31
4. Median of 5, 40, 2, 33, 40 = 33
5. Median of 7, 31, 47, 5, 5 = 7
6. Median of 31, 38, 22, 7, 7 = 22
7. Median of 40, 40, 14, 25, 6 = 25

Median and Range (continued)

The median (continued)

8. Median of 42, 50, 42, 20, 11 = 42
9. Median of 7, 47, 20, 3, 3 = 7
10. Median of 24, 2, 24, 21, 44 = 24
11. Median of 13, 16, 11, 16, 49 = 16
12. Median of 24, 33, 26, 24, 28 = 26

The range

13. Range of 44, 27, 16, 41, 27 = 28
14. Range of 15, 19, 33, 15, 3 = 30
15. Range of 49, 35, 16, 49, 46 = 33
16. Range of 38, 41, 1, 45, 45 = 44
17. Range of 24, 48, 24, 45, 14 = 34
18. Range of 2, 19, 11, 17, 11 = 17
19. Range of 24, 13, 24, 42, 37 = 29
20. Range of 50, 47, 23, 40, 40 = 27
21. Range of 22, 18, 48, 18, 4 = 44
22. Range of 38, 15, 40, 38, 44 = 29
23. Range of 3, 28, 3, 22, 49 = 46
24. Range of 29, 29, 37, 18, 32 = 19

Statistics Word Problems

Word problems

1. Ordered: 9, 11, 16, 16, 26; the middle value is 16.
2. $21 - 18 = 3$.
3. Ordered: 5, 19, 21, 23, 23; the middle value is 21.
4. Ordered: 13, 14, 14, 15, 19; the middle value is 14.
5. Ordered: 7, 19, 22, 22, 25; the middle value is 22.
6. Ordered: 5, 7, 15, 15, 20; the middle value is 15.
7. Ordered: 13, 16, 21, 21, 28; the middle value is 21.
8. Ordered: 9, 9, 10, 12, 21; the middle value is 10.
9. Ordered: 4, 16, 20, 20, 27; the middle value is 20.
10. Ordered: 10, 10, 15, 19, 23; the middle value is 15.
11. Ordered: 6, 14, 18, 18, 25; the middle value is 18.
12. Ordered: 15, 15, 23, 24, 25; the middle value is 23.

Solutions (1 of 18)

Ratio

Simplifying a ratio

1. $6 : 36 = \underline{\hspace{2cm}}$

$$\begin{array}{l} 6 : 36 \\ 6 : 36 \quad \text{both} \div 6 \\ 6 : 36 = 1 : 6 \end{array}$$

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 6 and 36 is 6.

$6 \div 6 = 1$ and $36 \div 6 = 6$, so $6 : 36$ is $1 : 6$. Same ratio, smaller numbers — nothing has changed except how it is written.

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

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

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

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

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

Percents

Decimals as percents

1. $0.85 = \underline{\hspace{2cm}}$

$$\begin{array}{l} 0.85 = 85/100 \\ 85\% \end{array}$$

Percent means "out of a hundred", so the question is really: how many hundredths is 0.85? It is 85 of them.

85 out of a hundred is written 85%.

2. $0.61 = \underline{\hspace{2cm}}$

$$\begin{array}{l} 0.61 = 61/100 \\ 61\% \end{array}$$

Percent means "out of a hundred", so the question is really: how many hundredths is 0.61? It is 61 of them.

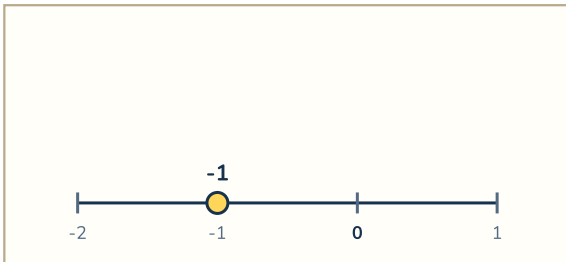
61 out of a hundred is written 61%.

Solutions (2 of 18)

Positive and Negative Numbers

Add and subtract integers

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

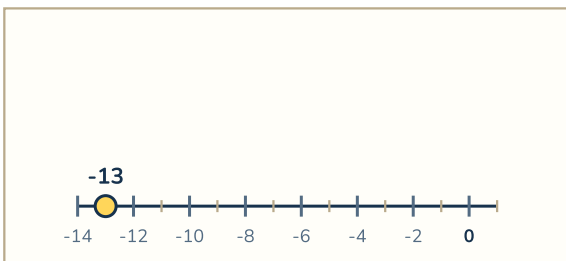


Put a counter on -1. Everything else is which way it slides and how far.

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

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

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



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

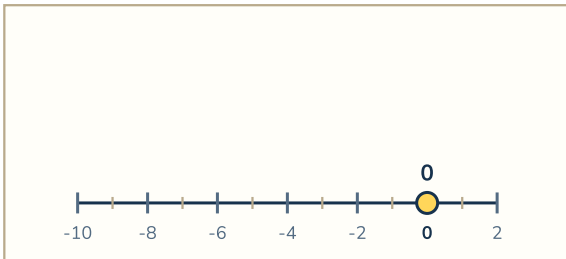
Adding a positive moves right, the way it always has.

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

Multiplying Integers

Multiplying integers

1. $4 \times (-2) = \underline{\quad}$



$4 \times (-2)$ is 4 lots of -2. 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 -2 goes LEFT, landing on -2.

All 4 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.

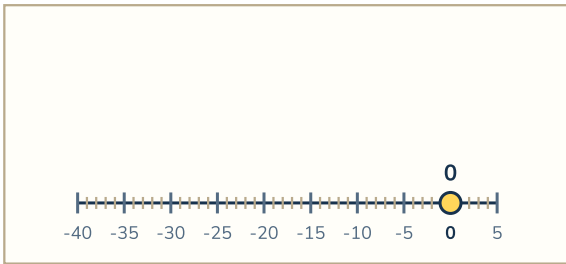
4 hops of 2 is 8 of distance, all of it on the low side. So $4 \times (-2) = -8$.

Solutions (3 of 18)

Multiplying Integers (continued)

Multiplying integers (continued)

2. $7 \times (-5) = \underline{\hspace{2cm}}$



$7 \times (-5)$ is 7 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 .

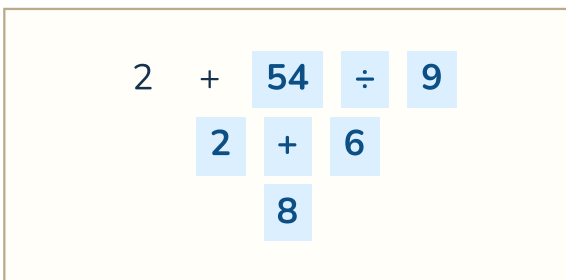
All 7 hops go the same way — not one of them turns round — so it can only get further from 0, never back towards it. That is the whole of why the answer is below zero.

7 hops of 5 is 35 of distance, all of it on the low side. So $7 \times (-5) = -35$.

Order of Operations

Order of operations

1. $2 + 54 \div 9 = \underline{\hspace{2cm}}$

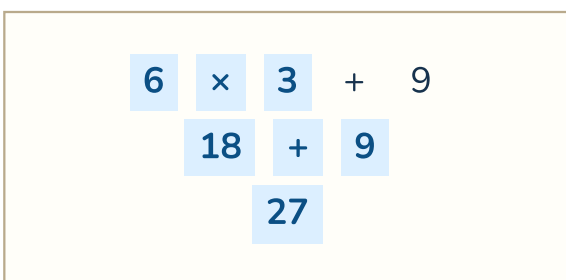


$\times$ and $\div$ come before $+$ and $-$, so this goes first. $54 \div 9 = 6$.

Only $+$ and $-$ are left, so work from left to right. $2 + 6 = 8$.

Nothing is left to work out, so the answer is 8.

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



$\times$ and $\div$ come before $+$ and $-$, so this goes first. $6 \times 3 = 18$.

Only $+$ and $-$ are left, so work from left to right. $18 + 9 = 27$.

Nothing is left to work out, so the answer is 27.

Solutions (4 of 18)

Exponents

Exponents

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

$$3^2 = 3 \times 3$$

$$3 \times 3 = \mathbf{9}$$

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

$$17^2 = 17 \times 17$$

$$17 \times 17 = \mathbf{289}$$

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: $17 \times 17 = 289$.

Greatest Common Factor

Greatest common factor

1. $6, 15 \rightarrow \underline{\quad}$

$$\begin{array}{l} 6: \quad 1 \quad 2 \quad \mathbf{3} \quad 6 \\ 15: \quad 1 \quad \mathbf{3} \quad 5 \quad 15 \\ \text{GCF} = \mathbf{3} \end{array}$$

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

Now every factor of 15.

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

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

2. $20, 24 \rightarrow \underline{\quad}$

$$\begin{array}{l} 20: \quad 1 \quad 2 \quad \mathbf{4} \quad 5 \quad 10 \quad 20 \\ 24: \quad 1 \quad 2 \quad 3 \quad \mathbf{4} \quad 6 \quad 8 \quad 12 \\ \quad \quad \quad 24 \\ \text{GCF} = \mathbf{4} \end{array}$$

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.

Solutions (5 of 18)

Lowest Common Multiple

Least common multiple

1. 6, 8 → ____

6:	6	12	18	24
8:	8	16	24	
LCM	=	24		

Count up in 6s.

Now count up in 8s.

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

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

2. 9, 15 → ____

9:	9	18	27	36	45
15:	15	30	45		
LCM	=	45			

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.

Factors and Multiples

List the factors

1. 2 → _____

so far: 1 2

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

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

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

2. 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.

Solutions (6 of 18)

Factors and Multiples (continued)

Is it a multiple?

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

$$16 \div 4 = 4$$

yes

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

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

12. 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.

Prime and Composite Numbers

Prime or composite

1. 24 Prime / Composite

tried: 2

$$24 \div 2 = 12$$

A prime has exactly two factors: 1 and itself. So the question is whether anything ELSE divides into 24.

You do not have to try everything up to 24. 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.

2 goes into 24 exactly ($24 \div 2 = 12$), and that is one factor too many. 24 is composite — no need to test any further.

Solutions (7 of 18)

Prime and Composite Numbers (continued)

Prime or composite (continued)

2. 50 Prime / Composite

$$\begin{array}{l} \text{tried: } 2 \\ 50 \div 2 = 25 \end{array}$$

A prime has exactly two factors: 1 and itself. So the question is whether anything ELSE divides into 50.

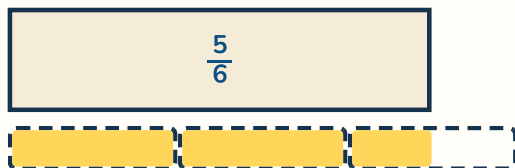
You do not have to try everything up to 50. Factors come in pairs, so if one were bigger than 7 its partner would be smaller — and you would have found that one first. Testing up to 7 is enough.

2 goes into 50 exactly ($50 \div 2 = 25$), and that is one factor too many. 50 is composite — no need to test any further.

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. $5/6 \div 2/6 = 5/2$.

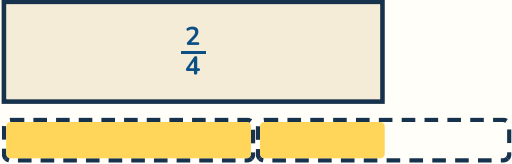
Worked out in full: 5×6 over 6×2 is $30/12$, which simplifies to $5/2$.

Solutions (8 of 18)

Dividing Fractions (continued)

Dividing fractions (continued)

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



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. $72.0 \div 12 = \underline{\hspace{1cm}}$

$$\begin{array}{r} 72.0 \div 12 \\ 6.0 \times 12 \end{array} = 72.0$$

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: $72.0 \div 12 = 6.0$.

Check it the other way round: 6.0×12 should give 72.0 back. A point in the wrong place fails this instantly — 72.0 and a tenth of it are not close.

2. $6.54 \div 3 = \underline{\hspace{1cm}}$

$$\begin{array}{r} 6.54 \div 3 \\ 2.18 \times 3 \end{array} = 6.54$$

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: $6.54 \div 3 = 2.18$.

Check it the other way round: 2.18×3 should give 6.54 back. A point in the wrong place fails this instantly — 6.54 and a tenth of it are not close.

Solutions (9 of 18)

Solving Equations

Solving equations

1. $x + 40 = 45$

$$x + 40 = 45$$

$$x = 5$$

$$x = 5$$

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

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

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

2. $x + 17 = 32$

$$x + 17 = 32$$

$$x = 15$$

$$x = 15$$

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 $x = 15$.

Inequalities

Inequalities

1. $4x > 24$ x 6

$$x > 6$$

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

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

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

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

Solutions (10 of 18)

Inequalities (continued)

Inequalities (continued)

2. $3x \leq 42$ $x \leq 14$

$$x \leq 14$$

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: $42 \div 3 = 14$.

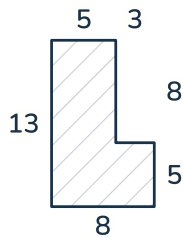
Nothing was divided by a negative here, so the sign has not moved: it is still $\leq$. That is the one thing to check on every one of these before writing the answer down.

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.

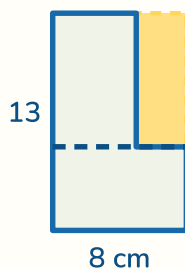
Area of Composite Shapes

Area of composite figures

1.



— cm²



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

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

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

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

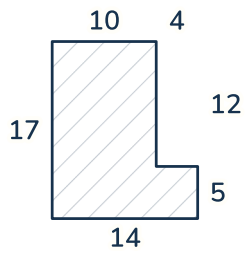
$40 + 40 = 80$ square cm — the same answer as the first way. Two methods that agree is how you know the answer is right.

Solutions (11 of 18)

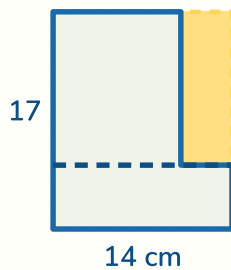
Area of Composite Shapes (continued)

Area of composite figures (continued)

2.



_____ cm²



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

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 $10 \times 12 = 120$.

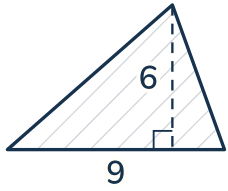
$70 + 120 = 190$ square cm — the same answer as the first way. Two methods that agree is how you know the answer is right.

Solutions (12 of 18)

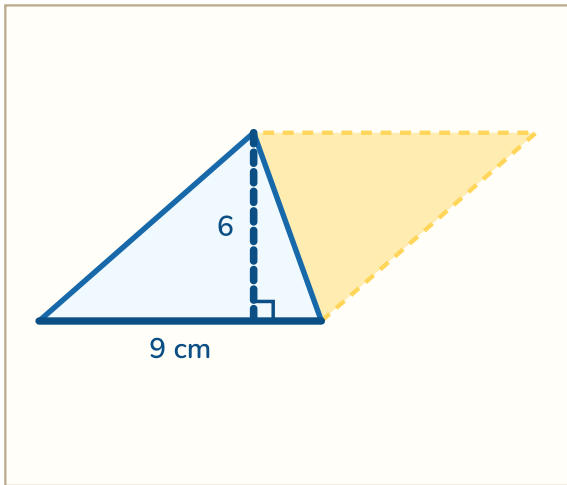
Area of Figures

Area

1.



— cm²



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

The base is the side it stands on: 9 cm.

The height is the DASHED line — straight up from the base, at a right angle to it: 6 cm. It is not the sloping side, even though the sloping side is longer and is written right next to it.

Now the halving. Turn a second copy of the triangle upside down against this one and the two together make a parallelogram — $9 \times 6 = 54$. The triangle is exactly half of it.

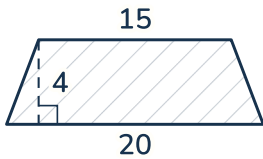
So half of 54 is 27 square cm.

Solutions (13 of 18)

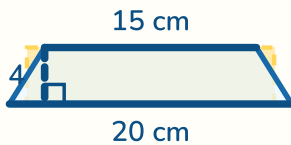
Area of Figures (continued)

Area (continued)

2.



— cm²



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

The two PARALLEL sides are 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.

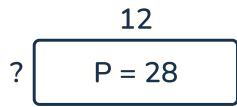
Then it is that width times the height: $17.5 \times 4 = 70$ square cm.

Solutions (14 of 18)

Missing Sides

Find the missing side

1.



— cm

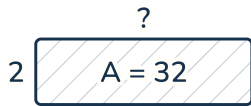
$$\begin{aligned} 28 \div 2 &= 14 \\ 14 - 12 &= 2 \text{ cm} \end{aligned}$$

Forwards, the perimeter goes round twice: 28 is $12 + ? + 12 + ?$ — each side counted two times.

So undo the doubling FIRST: half of 28 is 14, and that is one long side plus one short one. Taking 12 off the whole 28 is the natural wrong move — it forgets that 12 is in there twice.

Now take the side you know off that half: $14 - 12 = 2$ cm.

2.



— cm

$$\begin{aligned} 32 \div 2 &= 16 \text{ cm} \\ \text{check: } 2 \times 16 &= 32 \end{aligned}$$

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.

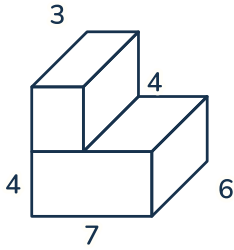
$32 \div 2 = 16$ cm. Check it forwards: $2 \times 16 = 32$, which is what the question said.

Solutions (15 of 18)

Volume of Prisms

Volume of a rectangular prism

1.



_____ cm³

filled box: 336

notch: 96

$$336 - 96 = \mathbf{240 \text{ cubic cm}}$$

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 $7 \times 6 \times 4 = 168$, and the block standing on it is $3 \times 6 \times 4 = 72$.

$$168 + 72 = 240 \text{ cubic cm.}$$

Second way: fill the notch in to make one big box. That box is $7 \times 6 \times 8 = 336$, and the notch taken back off is $4 \times 6 \times 4 = 96$.

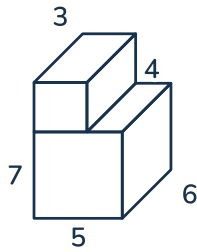
$336 - 96 = 240$ cubic cm. Two methods agreeing is how you know.

Solutions (16 of 18)

Volume of Prisms (continued)

Volume of a rectangular prism (continued)

2.



_____ cm³

filled box: 330

notch: 48

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

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 $2 \times 6 \times 4 = 48$.

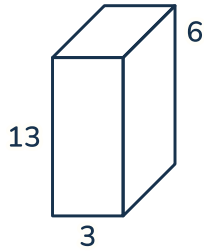
$330 - 48 = 282$ cubic cm. Two methods agreeing is how you know.

Solutions (17 of 18)

Surface Area

Surface area of a box

1.



_____ cm²

$$\text{front and back: } 2 \times 3 \times 13 = 78$$

$$\text{the two sides: } 2 \times 6 \times 13 = 156$$

$$\text{top and bottom: } 2 \times 3 \times 6 = 36$$

$$\text{total: } \mathbf{270}$$

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

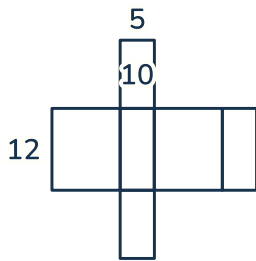
Front and back are 3 by 13, and they are identical — so that pair is $2 \times 3 \times 13 = 78$.

The two sides are 6 by 13, and they are identical — so that pair is $2 \times 6 \times 13 = 156$.

Top and bottom are 3 by 6, and they are identical — so that pair is $2 \times 3 \times 6 = 36$.

Three pairs, six faces, none missed: $78 + 156 + 36 = 270$ square cm.

2.



_____ cm²

$$\text{front and back: } 2 \times 5 \times 12 = 120$$

$$\text{the two sides: } 2 \times 10 \times 12 = 240$$

$$\text{top and bottom: } 2 \times 5 \times 10 = 100$$

$$\text{total: } \mathbf{460}$$

A net lays all six faces out flat, so none of them is hidden — which is the whole reason a net is easier than the solid. They still come in three PAIRS.

Front and back are 5 by 12, and they are identical — so that pair is $2 \times 5 \times 12 = 120$.

The two sides are 10 by 12, and they are identical — so that pair is $2 \times 10 \times 12 = 240$.

Top and bottom are 5 by 10, and they are identical — so that pair is $2 \times 5 \times 10 = 100$.

Three pairs, six faces, none missed: $120 + 240 + 100 = 460$ square cm.

Solutions (18 of 18)

Finding the Mean

The mean

1. Mean

42, 45, 30, 6, 42

$$\begin{array}{r} 42 \quad 45 \quad 30 \quad 6 \quad 42 \\ 42 + 45 + 30 + 6 + 42 = 165 \\ 165 \div 5 = 33 \end{array}$$

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: $165 \div 5 = 33$.

2. Mean

4, 35, 4, 30, 32

$$\begin{array}{r} 4 \quad 35 \quad 4 \quad 30 \quad 32 \\ 4 + 35 + 4 + 30 + 32 = 105 \\ 105 \div 5 = 21 \end{array}$$

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

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

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