

Ratios and Rate Reasoning: practice solutions, Grade 6 – download the PDF

Written solutions to the chapter problems. Check each step, then correct yourself.

1 Writing ratios



- (a) Cats to dogs: $5 : 7$.
- (b) Dogs to cats: $7 : 5$ (the order is reversed).
- (c) There are $5 + 7 = 12$ animals, so cats to all animals is $5 : 12$. None of these can be simplified because the numbers share no common factor.

2 A winning season



Wins to losses is $9 : 3$. The GCF of 9 and 3 is 3, so $9 : 3 = 3 : 1$.

The team won 3 games for every game it lost.

3 Missing numbers



- (a) $2 \times 4 = 8$, so $3 \times 4 = 12$: $2 : 3 = 8 : 12$.
- (b) $3 \times 10 = 30$, so $2 \times 10 = 20$: $2 : 3 = 20 : 30$.
- (c) $5 \times 7 = 35$, so $4 \times 7 = 28$: $5 : 4 = 35 : 28$.

4 Simplest form



(a) GCF = 6: $18 : 24 = 3 : 4$.

(b) GCF = 5: $45 : 20 = 9 : 4$.

(c) GCF = 8: $16 : 40 = 2 : 5$.

5 Typing speed



Divide the number of words by the number of minutes: $120 \div 4 = 30$.

Noah types **30 words per minute**.

6 True or false?



(a) True. $4 : 6 = 2 : 3$ (divide by 2) and $10 : 15 = 2 : 3$ (divide by 5). Both simplify to **$2 : 3$** .

(b) False. $6 : 9 = 2 : 3$ but $8 : 10 = 4 : 5$. These simplest forms are different, so the ratios are not equivalent.

7 Notebook table



Multiply both rows of the first column (4 notebooks, \$6) by 2, 3, 4 and 5.

Notebooks	4	8	12	16	20
Cost (\$)	6	12	18	24	30

Twenty notebooks cost **\$30**.

8

Smoothie recipe

Strawberries to bananas is **3 : 2**. Since **$3 \times 4 = 12$** , multiply the bananas by 4: **$2 \times 4 = 8$** .

You need **8 cups** of banana slices.

9

Better deal at the store

Store A: **$3.00 \div 12 = 0.25$** dollar per ounce.

Store B: **$4.40 \div 20 = 0.22$** dollar per ounce.

Since **$0.22 < 0.25$** , **Store B** has the lower unit price.

10

A cyclist's speed

(a) **$36 \div 3 = 12$** , so her speed is **12 miles per hour**.

(b) In 5 hours she rides **$12 \times 5 = 60$** miles.

11

Printer on a double number line

Each 3-minute jump adds 12 pages: 0, 3, 6, 9, 12, 15 minutes match 0, 12, 24, 36, 48, 60 pages.

(a) At 9 minutes: **36 pages**.

(b) 60 pages match 15 minutes: **15 minutes**.

12

Trading cards

There are **$3 + 5 = 8$** boxes. One box is **$40 \div 8 = 5$** cards.

Rare cards: **$3 \times 5 = 15$** . Common cards: **$5 \times 5 = 25$** .

Check: **$15 + 25 = 40$** . There are **15 rare** and **25 common** cards.

13 Inches and centimeters



Multiply 2.54 by 5, 10 and 20.

Inches	1	5	10	20
Centimeters	2.54	12.7	25.4	50.8

3 feet = $3 \times 12 = 36$ inches, and $36 \times 2.54 = 91.44$. So 3 feet is **91.44 centimeters**.

14 Which paint is bluer?



Find the white paint that goes with 12 cans of blue. Mix A: $3 : 5 = 12 : 20$. Mix B: $4 : 6 = 12 : 18$.

For the same 12 cans of blue, Mix B uses less white (18 instead of 20), so **Mix B is bluer**.

Check with part-to-whole: $\frac{3}{8} = 0.375$ and $\frac{4}{10} = 0.4$, and $0.4 > 0.375$.

15 A new student group



(a) There are $4 + 3 = 7$ parts, so one part is $28 \div 7 = 4$ students. Boys: $4 \times 4 = 16$. Girls: $3 \times 4 = 12$.

(b) Now there are $12 + 4 = 16$ girls and still 16 boys. The ratio is $16 : 16 = 1 : 1$.

16 Fuel economy



(a) Car A: $150 \div 5 = 30$ miles per gallon. Car B: $210 \div 6 = 35$ miles per gallon. **Car B** goes farther.

(b) $420 \div 35 = 12$ gallons. Cost: $12 \times 3.60 = 43.20$. The trip costs **\$43.20**.

17 Mixing green paint



There are $2 + 3 = 5$ parts. One part is $45 \div 5 = 9$ liters.

Yellow: $2 \times 9 = 18$ liters. Blue: $3 \times 9 = 27$ liters. Check: $18 + 27 = 45$.

18 A fast train



(a) $270 \div 3 = 90$ kilometers per hour.

(b) $90 \text{ km} = 90,000 \text{ m}$ and $1 \text{ hour} = 3,600 \text{ s}$, so $90000 \div 3600 = 25$ meters per second.

(c) $2 \text{ h } 40 \text{ min} = 2\frac{2}{3} = \frac{8}{3}$ hours. Distance: $90 \times \frac{8}{3} = 240$ kilometers.

19 Find the mistake



(a) Adding the same number to both terms does not keep a ratio the same. Equivalent ratios come from **multiplying** (or dividing) both terms by the same number. Here $4 \times 2 = 8$ but $7 \times 2 = 14$, not 11.

(b) $x = 14$, so $4 : 7 = 8 : 14$. Also $\frac{4}{7} \approx 0.571$ and $\frac{8}{11} \approx 0.727$, which are different.

20 Baking with a fixed recipe



(a) One cup of sugar goes with $5 \div 2 = 2.5$ cups of flour. For 3 cups of sugar:
 $2.5 \times 3 = 7.5$ cups of flour.

(b) $17.5 \div 5 = 3.5$ and $2 \times 3.5 = 7$. She needs **7 cups** of sugar. Check: $17.5 : 7 = 5 : 2$.

21

Saving money

Maya has 7 boxes and Leo has 4 boxes, so the difference is $7 - 4 = 3$ boxes, which equals \$36.

One box is $36 \div 3 = 12$ dollars. Maya: $7 \times 12 = 84$ dollars. Leo: $4 \times 12 = 48$ dollars.

Check: $84 - 48 = 36$ and $84 : 48 = 7 : 4$.

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