

# Ratios and Proportional Relationships: math practice, Grade 7 – download the PDF

22 problems graded by difficulty (★ easy, ★★ medium, ★★★ hard). Try first, without looking at the solutions!

## 1 Price per ounce

★ ★ ★

A 15-ounce box of raisins costs \$4.20.

- Find the unit price in dollars per ounce.
- At the same unit price, how much would a 22-ounce box cost?

## 2 Swimming speed

★ ★ ★

Cara swims  $\frac{1}{4}$  mile in  $\frac{1}{5}$  hour. Find her speed in miles per hour.

## 3 A proportional table

★ ★ ★

Does this table show a proportional relationship? Explain.

| x | 3   | 6  | 9    | 12 |
|---|-----|----|------|----|
| y | 7.5 | 15 | 22.5 | 30 |

4

**Not proportional**

Does this table show a proportional relationship? Explain.

| $x$ | 1 | 2 | 3  | 4  |
|-----|---|---|----|----|
| $y$ | 4 | 7 | 10 | 13 |

5

**Printer speed**

A printer prints 18 pages in 3 minutes at a steady rate. Let  $x$  be minutes and  $y$  be pages.

- Find the constant of proportionality.
- Write an equation.
- How long does it take to print 42 pages?

6

**True or false?**

Decide whether each statement is true or false, and justify.

- A straight line through  $(0, 0)$  is the graph of a proportional relationship.
- A curve that passes through  $(0, 0)$  is the graph of a proportional relationship.
- A straight line through  $(0, 2)$  and  $(4, 10)$  is the graph of a proportional relationship.

### 7 The point (1, r)



The graph of a proportional relationship passes through (4, 14). Here  $x$  is pounds of apples and  $y$  is the cost in dollars.

- What is the point on the graph with  $x = 1$ ?
- Explain what it means.
- How much do 10 pounds cost?

### 8 A slow snail



A snail crawls  $\frac{2}{3}$  foot in  $\frac{1}{4}$  hour.

- Find its speed in feet per hour.
- How far does it crawl in  $1\frac{1}{2}$  hours?

### 9 Scaling a recipe



Using  $2\frac{1}{4}$  cups of flour, Jonas makes  $\frac{3}{4}$  of a batch of muffins.

- How many cups of flour make one full batch?
- How many cups are needed for  $2\frac{1}{2}$  batches?

### 10 Fill in the table



This table shows a proportional relationship. Find the missing value and write the equation.

| $x$ | 4  | 7    | 10 | 16 |
|-----|----|------|----|----|
| $y$ | 14 | 24.5 | 35 | ?  |

### 11 Gas mileage



A car uses 3 gallons of gas to travel 96 miles. Let  $x$  be gallons and  $y$  be miles.

- Write the equation  $y = kx$ .
- How far can the car go on 7.5 gallons?
- How many gallons are needed for 400 miles?

### 12 Better buy

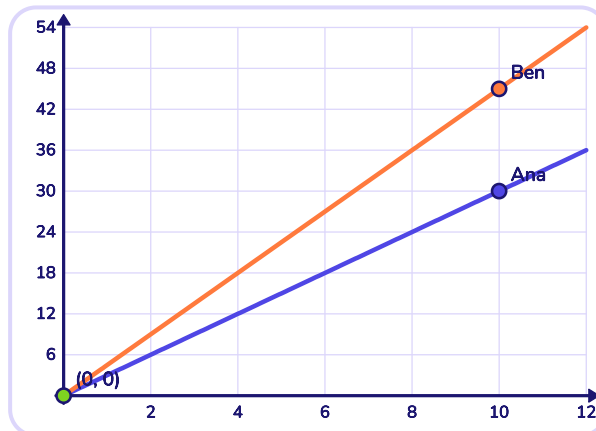


Store A sells 5 pounds of rice for \$13.50. Store B sells 8 pounds of the same rice for \$20.80. Which store has the lower unit price?

### 13 Two runners



The graph shows the distance in meters run by Ana and Ben after  $x$  seconds.



- Find each runner's speed.
- Write an equation for each runner.
- After 12 seconds, how much farther has Ben run than Ana?

**14 Mixing paint**

Blue and white paint are mixed in the ratio **3 : 5**. How many liters of each are in 24 liters of the mixture?

**15 Jacket on sale**

A \$64 jacket is 15% off, and then 5% sales tax is added to the sale price. What is the final cost?

**16 Fractions in a table**

The table shows values of  $x$  and  $y$ .

| $x$ | $\frac{1}{2}$ | $\frac{3}{2}$ | $\frac{5}{2}$  |
|-----|---------------|---------------|----------------|
| $y$ | $\frac{3}{4}$ | $\frac{9}{4}$ | $\frac{15}{4}$ |

- Show that the relationship is proportional.
- Write the equation and find  $y$  when  $x = 4$ .

**17 Find the error**

Mia says the table below is proportional “because  $y$  goes up by 3 every time.”

| $x$ | 2 | 4 | 6  |
|-----|---|---|----|
| $y$ | 5 | 8 | 11 |

- Explain why Mia is wrong.
- Change the values of  $y$  for  $x = 4$  and  $x = 6$  so that the table is proportional.

**18 Two pumps**

Pump A fills  $\frac{3}{4}$  of a tank in  $\frac{1}{2}$  hour. Pump B fills  $\frac{5}{8}$  of an identical tank in  $\frac{1}{4}$  hour. Working together at these steady rates, how many minutes do they need to fill one whole tank?

**19 Markup then discount**

A store buys a skateboard for \$40 and marks the price up by 35%. Later it takes 20% off the marked price.

- Find the marked price and the final price.
- The final price is what percent more than the \$40 the store paid?

**20 Reading a map**

On a map,  $\frac{3}{4}$  inch represents  $1\frac{1}{2}$  miles.

- How many inches on the map represent 1 mile?
- Write an equation with  $x$  miles and  $y$  inches.
- Two towns are  $4\frac{3}{8}$  inches apart on the map. How many miles apart are they?

## 21 Rebuild from one point



A proportional relationship has a graph through  $(6, 15)$ .

- Find  $k$  and write the equation.
- Find  $x$  when  $y = 40$ .
- Is the point  $(10, 26)$  on the graph? Justify.

## 22 Cyclist units



A cyclist rides  $\frac{5}{6}$  mile in  $\frac{1}{18}$  hour.

- Find her speed in miles per hour.
- Convert it to feet per second (1 mile = 5,280 feet).
- Give the speed in kilometers per hour, using 1 mile  $\approx$  1.609 km.



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