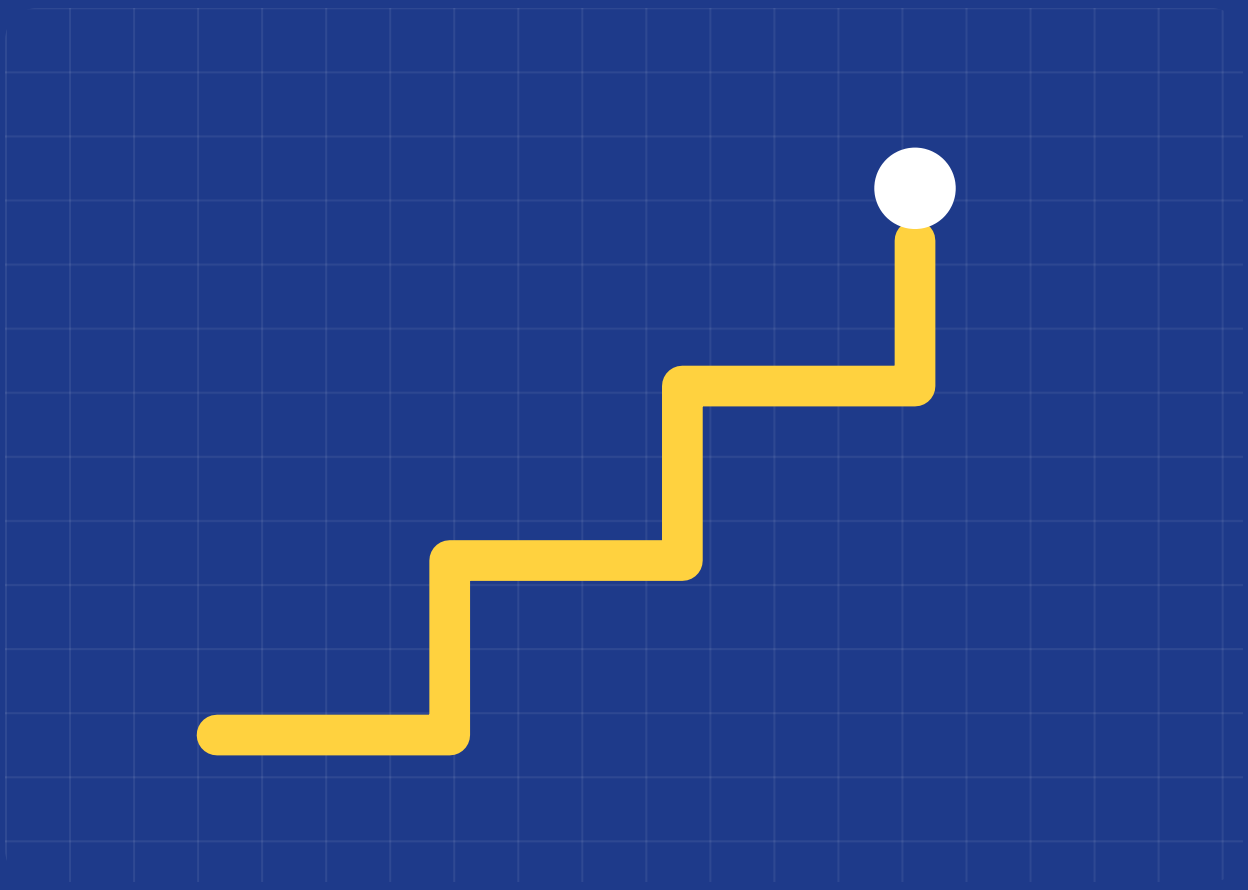
UpOnly Learning



GRADE 6

FREE SAMPLE WORKBOOK

Math Grade 6

One step at a time. · Ages 11–12 · Free sample: 1 of 9 topics

UO-MATH-6

OUR STORY

One step at a time

I'm Dr. Evan J. Hasson. I've run a specific chiropractic practice for over twelve years, and I'm a dad of three. My work is about alignment: get the structure right, and everything else works better.

At home, nothing was aligned. I was spending thousands a month on tutors, extracurriculars and programs, and when I asked about enrolling a second or third child the answer was always the same: that'll be double, that'll be triple. The charter school had a waiting list. The good public school had a waiting list. The private schools had the kind of list where it helps to know someone, or to give generously first.

And underneath all of it, the same quiet threat: if you don't pay for this, your child will fall behind. Not sold with evidence. Sold with fear.

So I did my own research, and here is what I found: none of it is secret. The standards are published. The order a child should learn in is written down and freely available. It is just scattered. Nobody had done the work of pulling it together, putting it in order and handing it over. So I did.

When every step has its place, confusion has nowhere to hide.

I built this for my own kids. I'm giving it to yours.

Dr. Evan J. Hasson, DC
Founder and dad of three

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No guaranteed results, and mistakes happen. Every student learns differently. We write and review every question and answer key carefully, and we still get things wrong — an answer key can be wrong, and a question can be worded badly or have two defensible answers. Check the answer key before you hand it over, and trust your own judgment over ours. Found a problem? **Photograph the page and email it to support@uponlylearning.com** — the picture tells us more than a description, and we fix it for every family.

Safety. Some activities use household items such as scissors, coins or food. An adult should supervise and skip anything unsafe for the student.

Not professional advice. This workbook does not replace an evaluation by a qualified educator or specialist. The founder is a Doctor of Chiropractic; UpOnly Learning does not provide medical or health advice.

Full terms: uponlylearning.com/legal

INTRODUCTION

How to use this workbook

Each topic follows the same steps, so your student always knows what comes next.

① **Quick Check.** 10 questions before you teach. Read them aloud for younger students. A high score means you can move faster.

② **Learn It.** Key words, step-by-step teaching with lines you can read aloud, worked examples and the mistakes to watch for.

③ **We Do It Together.** 10 questions you do side by side. The answer and the "why" are printed right after each question, so you can talk it through.

④ **You Try.** 10 questions your student does alone.

Answers with short explanations for every question are in the **Answer Key** at the end of each topic, so students can work without peeking. Go over each wrong answer together using the explanation.

This workbook is printed in full color. To save ink, choose "Black and white" or "Grayscale" in your printer settings; every page still works in black and white.

Want online checks that score themselves and track each student's progress? Visit uponlylearning.com.

GRADE 6

CONTENTS · UO-MATH-6

Math: Grade 6

Free Sample Workbook · Ages 11–12 · 1 of 9 topics, with a Quick Check, a lesson, We Do It Together, You Try and an answer key

Our story

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How to use this workbook

Topic 1 · Ratios and rates

Ratio language, unit rates, percents 6.RP

Quick Check · Learn It · We Do It Together · You Try · Answer Key

Ratios and rates

The student will use ratio language to describe relationships, find and use unit rates, complete tables of equivalent ratios and plot their pairs on a coordinate plane, use ratios to convert measurement units, and find a percent of a quantity or the whole when given a part and the percent.

① Quick Check

Do this before the lesson. It shows what your student already knows. Score: ____ / 10

1. What is 50% of 44?

A 2.2 **B** 50 **C** 88 **D** 22

2. Sam runs 20 miles in 4 hours. How many miles per hour is that?

A 16 miles per hour **B** 5 miles per hour **C** 24 miles per hour **D** 80 miles per hour

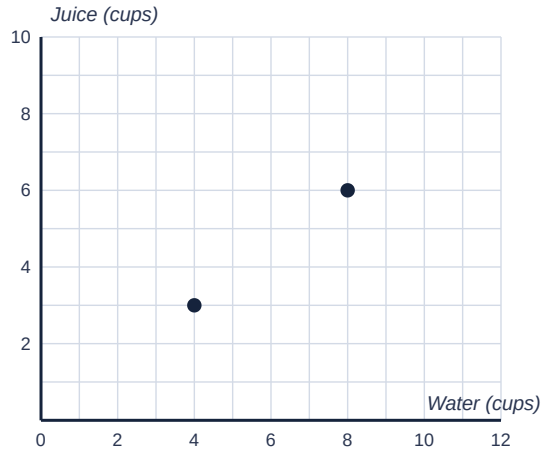
3. A class has 12 girls and 9 boys. What is the ratio of boys to all students?

A 9:21 **B** 9:12 **C** 12:21 **D** 9:3

4. What is 30% of 80?

A 2.4 **B** 110 **C** 240 **D** 24

5. A punch recipe uses 4 cups of water for every 3 cups of juice. The graph shows two pairs from the recipe. How much juice goes with 12 cups of water?

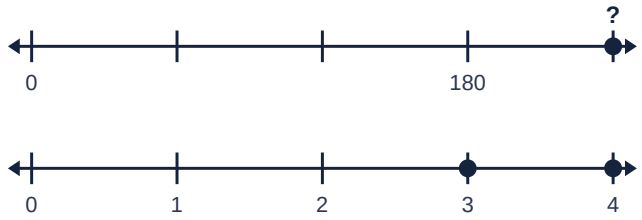


A 12 cups **B** 16 cups **C** 8 cups **D** 9 cups

6. A class has 12 girls and 9 boys. What is the ratio of girls to boys in simplest form?

A 4:3 **B** 12:9 **C** 4:7 **D** 3:4

7. A train goes 180 miles in 3 hours. The top line shows miles and the bottom line shows hours. At the same speed, how far does it go in 4 hours?



A 720 miles **B** 60 miles **C** 184 miles **D** 240 miles

8. A 12-ounce cereal box costs $3.00 and a 20-ounce box costs $4.40. Which is the better buy?

A The 20-ounce box, at $0.22 per ounce compared with $0.25 **B** They cost the same per ounce

C The 12-ounce box, because it costs less **D** The 12-ounce box, at $0.22 per ounce compared with $0.25

9. The picture shows red beans (shaded) and white beans in the ratio 3:2. Which statement is true?



A Red beans are 2/5 of all the beans **B** For every 3 red beans there are 2 white beans

C There are 3 more red beans than white beans **D** For every 3 white beans there are 2 red beans

10. Store A sells 3 notebooks for $5.10 and Store B sells 5 for $8.00. Which is the better buy?

A Store A, at $1.70 each compared with $1.60 **B** They cost the same per notebook

C Store A, because $5.10 is less than $8.00 **D** Store B, at $1.60 each compared with $1.70

② Learn It

Key words

- **ratio**: A comparison of two quantities, such as 3 red beans to 2 white beans, written 3:2, 3 to 2, or 3/2.
- **equivalent ratios**: Ratios that describe the same relationship, like 3:2 and 6:4.
- **rate**: A ratio that compares two quantities with different units, such as 150 miles in 3 hours.
- **unit rate**: A rate for one unit of the second quantity, such as 50 miles per 1 hour.
- **percent**: A rate per 100. 45% means 45 out of every 100.

Warm-up

1. Put 3 red and 2 white beans on the table. Ask: How many red for every white? How many white for every red? How many red out of all the beans?
2. Ask: If 4 pencils cost $2, how much does 1 pencil cost?
3. Ask: What fraction is 50 out of 100? What is that as a percent?

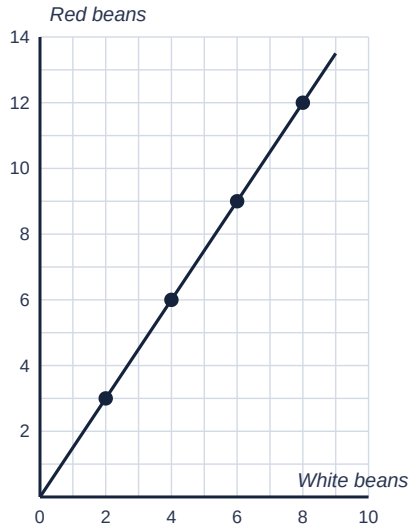
> *Ratios are everywhere: recipes, sports stats, sale prices and maps. Today you'll learn to speak the language of ratios.*

Teach

1. Ratio language: with 3 red and 2 white beans, the ratio of red to white is 3:2, white to red is 2:3, and red to total is 3:5. Order matters, so always say which quantity comes first.
2. Equivalent ratios: double the beans to 6 red and 4 white. The ratio 6:4 describes the same mix. Build a table: red 3, 6, 9, 12; white 2, 4, 6, 8. Each column is found by multiplying both numbers by the same number.
3. Rates and unit rates: a car travels 150 miles in 6 hours. To find miles per 1 hour, divide: 150 ÷ 6 = 25 miles per hour. The unit rate makes comparing easy.
4. Use unit price to compare deals: 12 ounces of cereal for $3.00 is $0.25 per ounce. 20 ounces for $4.40 is $0.22 per ounce. The 20-ounce box is the better buy.
5. Percent as a rate per 100: 30% means 30 per 100, or 30/100. To find 30% of 80, think 30/100 × 80 = 24. Another way: 10% of 80 is 8, so 30% is 3 × 8 = 24.
6. Finding the whole: if 18 is 45% of a number, then 45 parts per 100 is 18. 1% is 18 ÷ 45 = 0.4, so 100% is 0.4 × 100 = 40.
7. Graph a ratio table: write each column of the bean table as a pair (white, red): (2, 3), (4, 6), (6, 9), (8, 12). Plot the pairs on a coordinate plane with white beans on the x-axis and red beans on the y-axis. The points line up on a straight line that starts at (0, 0). A ratio with more red beans for each white bean, such as 2 red for every 1 white, makes a steeper line.

8. Convert units with ratios: 1 foot : 12 inches is a ratio, so 5 feet = 5 × 12 = 60 inches and 54 inches = 54 ÷ 12 = 4.5 feet. Rates convert the same way: 60 miles per hour is 60 miles in 60 minutes, which is 1 mile per minute.

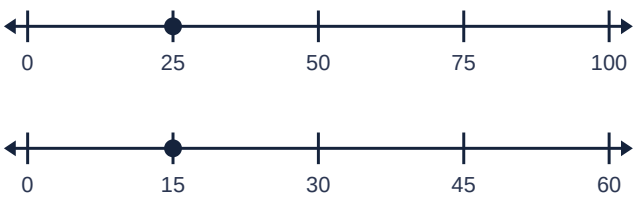
White beans	2	4	6	8
Red beans	3	6	9	12



> *The unit rate is your secret weapon. Once you know how much for one, you can figure out how much for any amount.*

Guided practice

1. A lemonade recipe uses 2 cups of lemon juice for every 5 cups of water. Build a table together for 4, 6 and 8 cups of lemon juice.
2. Use the store flyer to choose two sizes of the same product. Have the student find each unit price and decide which is the better buy.
3. Find 25% of 60 together, first using 25/100 × 60 and then using the fact that 25% is one quarter.
4. Draw a double number line for 0% to 100% above 0 to 60 to show 25% lining up with 15.
5. Have the student plot the lemonade table on graph paper, with cups of lemon juice on the x-axis and cups of water on the y-axis: (2, 5), (4, 10), (6, 15), (8, 20). Ask: Do the points line up with (0, 0)? Which point shows 1 cup of lemon juice? (1, 2.5)



> *Set up a table or a double number line. It keeps the two quantities lined up so nothing gets mixed up.*

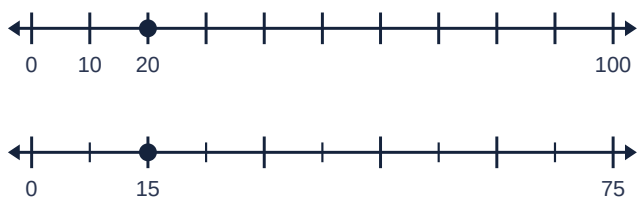
Worked examples

Mei types 315 words in 7 minutes. At this rate, how many words can she type in 12 minutes?

Minutes	7	1	12
Words	315	45	540

540 words. Unit rate: 315 ÷ 7 = 45 words per minute. Then 45 × 12 = 540 words.

A jacket costs $75. It is on sale for 20% off. How much money do you save?



$15. 10% of 75 is 7.50, so 20% is 2 × 7.50 = 15. Or 20/100 × 75 = 15.

Watch for these mistakes

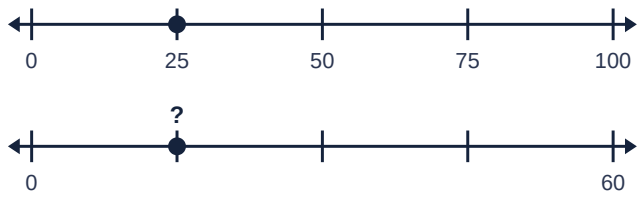
Mistake: The ratio 3:2 and the ratio 2:3 mean the same thing.
Fix: Use beans: 3 red to 2 white is a different mix from 2 red to 3 white. Have the student always name the quantities in order, such as red to white, before writing the numbers.

Mistake: To get an equivalent ratio, add the same number to both parts, so 2:5 is the same as 4:7.
Fix: Build both mixes with beans. 2:5 doubled is 4:10, not 4:7. Equivalent ratios come from multiplying or dividing both parts by the same number, not adding.

③ We Do It Together: 10 questions

> *Do these side by side. Read each question together, let your student answer, then read the answer and the "why" right below it and talk it through.*

1. The top line shows percent and the bottom line shows the amount. What is 25% of 60?



A 240 **B** 35 **C** 1,500 **D** 15

> **Answer: D** 15
> **Why:** 25% is one fourth. 60 ÷ 4 = 15.

2. There are 3 red beans (shaded) and 2 white beans. What is the ratio of white to red?



A 5:2 **B** 2:3 **C** 3:2 **D** 2:5

> **Answer: B** 2:3
> **Why:** Order matters. White comes first, so 2:3.

3. Five apples cost $2.00. What is the cost of one apple?

A $0.40 **B** $2.50 **C** $0.25 **D** $10.00

> **Answer: A** $0.40
> **Why:** Divide the total by the number of apples: 2.00 ÷ 5 = 0.40.

4. Which ratio is equivalent to 2:3?

A 3:2 **B** 4:6 **C** 4:5 **D** 2:6

> **Answer: B** 4:6
> **Why:** Multiply both parts by 2. Adding 2 to both parts gives 4:5, which is a different mix.

5. What is 15% of 60?

A 9 **B** 4 **C** 75 **D** 900

> **Answer: A** 9
> **Why:** 10% of 60 is 6 and 5% is 3, so 15% is 9.

6. Runner A goes 5 miles in 40 minutes. Runner B goes 4 miles in 30 minutes. Who runs faster?

A They run at the same speed **B** Runner B, at 7.5 minutes per mile compared with 8

C Runner A, because 5 miles is farther than 4 **D** Runner A, at 7.5 minutes per mile compared with 8

> **Answer: B** Runner B, at 7.5 minutes per mile compared with 8
> **Why:** A: 40 ÷ 5 = 8 minutes per mile. B: 30 ÷ 4 = 7.5. Fewer minutes per mile means faster.

7. What percent of 12 is 9?

A 75% **B** 90% **C** 33% **D** 25%

> **Answer: A** 75%
> **Why:** 9/12 = 3/4 = 75/100. Twenty-five percent is the part that is missing.

8. What is 40% of 25?

A 10 **B** 62.5 **C** 1,000 **D** 15

> **Answer: A** 10
> **Why:** 10% of 25 is 2.5, so 40% is 4 × 2.5 = 10.

9. Which statement about finding 10% of a number is true?

A Subtracting 10 from the number gives 10% of it **B** Dividing the number by 10 gives 10% of it

C Dividing the number by 100 gives 10% of it **D** Multiplying the number by 10 gives 10% of it

> **Answer: B** Dividing the number by 10 gives 10% of it
> **Why:** 10% is 10/100 = 1/10 of the number. Dividing by 100 gives 1%.

10. 6:15 is equivalent to 2:?

A 11 **B** 6 **C** 5 **D** 45

> **Answer: C** 5
> **Why:** 6 divided by 3 is 2, so divide 15 by 3 as well: 5. Subtracting 4 from both gives 2:11, which is not equivalent.

④ You Try: 10 questions

Now your student works alone. Check answers in the Answer Key at the end of this topic. Score: ____ / 10

1. What is 10% of 80?

A 8 **B** 18 **C** 800 **D** 0.8

2. A car travels 150 miles in 6 hours at a steady speed. What is its unit rate?

A 25 miles per hour **B** 900 miles per hour **C** 144 miles per hour **D** 24 miles per hour

3. A 12-ounce box of cereal costs $3.00. What is the price per ounce?

A $0.25 **B** $9.00 **C** $4.00 **D** $0.50

4. Rafael answered 35 questions and got 7 wrong. What percent did he get right?

A 20% **B** 80% **C** 7% **D** 28%

5. A $40 shirt is 25% off. What is the sale price?

A $10.00 **B** $30.00 **C** $15.00 **D** $65.00

6. A tip is 15% of a $20 bill. How much is the tip?

A $30.00 **B** $3.00 **C** $0.30 **D** $5.00

7. Paint uses blue and yellow in the ratio 2:3, as the tape diagram shows. Lucia needs 30 liters in all. How much of each color is needed?



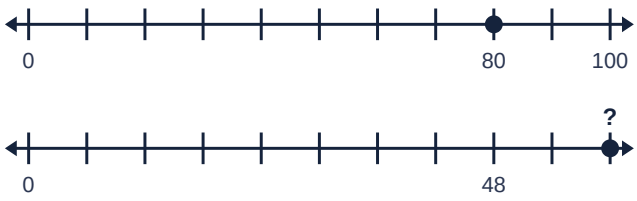
A 2 liters of blue and 3 liters of yellow **B** 12 liters of blue and 18 liters of yellow

C 15 liters of blue and 15 liters of yellow **D** 18 liters of blue and 12 liters of yellow

8. A car uses 6 gallons of gas to go 150 miles, and gas costs $4 per gallon. How much does the gas cost per mile?

A $25.00 **B** $0.04 **C** $0.16 **D** $24.00

9. Shoes on sale for 20% off cost $48. The top line shows percent of the original price and the bottom line shows dollars. What was the original price?



A $60.00 **B** $68.00 **C** $57.60 **D** $9.60

10. Which is greater, 40% of 90 or 90% of 40?

A 40% of 90 **B** 90% of 40 **C** It cannot be determined **D** They are equal

Ratios and rates: Answers and explanations

① Quick Check

1. What is 50% of 44?
   D 22
   50% is half. 44 ÷ 2 = 22.

2. Sam runs 20 miles in 4 hours. How many miles per hour is that?
   B 5 miles per hour
   20 ÷ 4 = 5.

3. A class has 12 girls and 9 boys. What is the ratio of boys to all students?
   A 9:21
   All students is 12 + 9 = 21, so the ratio is 9:21, or 3:7.

4. What is 30% of 80?
   D 24
   30% of 80 is 30/100 × 80 = 24. Another way: 10% is 8, so 30% is 3 × 8.

5. A punch recipe uses 4 cups of water for every 3 cups of juice. The graph shows two pairs from the recipe. How much juice goes with 12 cups of water?
   D 9 cups
   12 is 3 times 4, so the juice is 3 times 3 = 9. Adding 8 to both parts would give 11 cups of juice, which is wrong.

6. A class has 12 girls and 9 boys. What is the ratio of girls to boys in simplest form?
   A 4:3
   Divide both numbers by 3: 12:9 becomes 4:3.

7. A train goes 180 miles in 3 hours. The top line shows miles and the bottom line shows hours. At the same speed, how far does it go in 4 hours?
   D 240 miles
   180 ÷ 3 = 60 miles per hour, and 60 × 4 = 240.

8. A 12-ounce cereal box costs $3.00 and a 20-ounce box costs $4.40. Which is the better buy?
   A The 20-ounce box, at $0.22 per ounce compared with $0.25
   3.00 ÷ 12 = 0.25 and 4.40 ÷ 20 = 0.22. The lower unit price is the better buy.

9. The picture shows red beans (shaded) and white beans in the ratio 3:2. Which statement is true?
   B For every 3 red beans there are 2 white beans
   A ratio of 3:2 compares the two groups part to part. Red is 3 out of every 5 beans.

10. Store A sells 3 notebooks for $5.10 and Store B sells 5 for $8.00. Which is the better buy?
    D Store B, at $1.60 each compared with $1.70
    A: 5.10 ÷ 3 = 1.70. B: 8.00 ÷ 5 = 1.60.

④ You Try

1. What is 10% of 80?

   A 8

   10% is one tenth. 80 ÷ 10 = 8.

2. A car travels 150 miles in 6 hours at a steady speed. What is its unit rate?

   A 25 miles per hour

   Divide miles by hours: 150 ÷ 6 = 25 miles for each hour.

3. A 12-ounce box of cereal costs $3.00. What is the price per ounce?

   A $0.25

   Divide the cost by the ounces: 3.00 ÷ 12 = 0.25.

4. Rafael answered 35 questions and got 7 wrong. What percent did he get right?

   B 80%

   He got 28 of 35 right, which is 4/5, or 80%. Twenty percent is the share he got wrong.

5. A $40 shirt is 25% off. What is the sale price?

   B $30.00

   25% of 40 is 10. The sale price is 40 - 10 = 30. Ten dollars is the discount.

6. A tip is 15% of a $20 bill. How much is the tip?

   B $3.00

   10% of 20 is 2 and 5% is 1, so 15% is 3.

7. Paint uses blue and yellow in the ratio 2:3, as the tape diagram shows. Lucia needs 30 liters in all. How much of each color is needed?

   B 12 liters of blue and 18 liters of yellow

   There are 5 parts in all, and 30 ÷ 5 = 6 liters per part. Blue is 2 × 6 = 12 and yellow is 3 × 6 = 18.

8. A car uses 6 gallons of gas to go 150 miles, and gas costs $4 per gallon. How much does the gas cost per mile?

   C $0.16

   The trip costs 6 × 4 = 24 dollars. 24 ÷ 150 = 0.16. The value 0.04 is gallons per mile.

9. Shoes on sale for 20% off cost $48. The top line shows percent of the original price and the bottom line shows dollars. What was the original price?

   A $60.00

   The sale price is 80% of the original. 80% is 48, so 10% is 6 and 100% is 60.

10. Which is greater, 40% of 90 or 90% of 40?

    D They are equal

    40/100 × 90 = 36 and 90/100 × 40 = 36. Both multiply the same numbers.

THE FULL WORKBOOK

Keep going with the full Math workbook

You just tried one topic. The full Grade 6 workbook has every topic below, each with a Quick Check, a lesson, We Do It Together, up to 90 You Try questions, Show What You Know and a full answer key.

1. Ratios and rates 6.RP
2. Dividing fractions 6.NS.A
3. GCF, LCM and decimals 6.NS.B
4. Negative numbers 6.NS.C
5. Expressions and exponents 6.EE.A
6. One-step equations and inequalities 6.EE.B
7. Two quantities that change together 6.EE.C.9
8. Area, surface area and volume 6.G
9. Statistics 6.SP

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