

# Montana MontCAS Grade 7 Math Summer Review

*8-Week Core Review with Practice, Quizzes & Answers*

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# Grade 7 Summer Math Review

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This 8-week plan reviews the Grade 7 math students already learned this year.

## How each week works

- Monday through Thursday are short review days.
- Each day starts with a focused Lesson Review.
- Each practice day has 6 problems.
- Friday is a 10-question quiz.
- Answers explain the thinking, not just the final number.

**Complete the practice first, then use the answer key to check your reasoning.**

# Your 8-Week Summer Review Plan

Use this book four days a week, then take the quiz on Friday.

## Weekly Schedule

| Week | Monday | Tuesday | Wednesday    | Thursday     | Friday     |
|------|--------|---------|--------------|--------------|------------|
| 1    | Day 1  | Day 2   | Day 3        | Day 4        | Quiz 1     |
| 2    | Day 5  | Day 6   | Day 7        | Day 8        | Quiz 2     |
| 3    | Day 9  | Day 10  | Day 11       | Day 12       | Quiz 3     |
| 4    | Day 13 | Day 14  | Day 15       | Day 16       | Quiz 4     |
| 5    | Day 17 | Day 18  | Day 19       | Day 20       | Quiz 5     |
| 6    | Day 21 | Day 22  | Day 23       | Day 24       | Quiz 6     |
| 7    | Day 25 | Day 26  | Day 27       | Day 28       | Quiz 7     |
| 8    | Day 29 | Day 30  | Mixed Review | Final Review | Final Quiz |

### For students

Read the Lesson Review first. Try all 6 problems before checking answers. If you miss one, read the explanation and fix your work.

### For parents and teachers

The daily pages are meant to be short. If a student struggles, use the answer explanation as the teaching step, then have the student correct the problem.

### Goal

By the end of 8 weeks, students will have completed 192 daily practice problems and 80 quiz questions, with review across the full Grade 7 math year.



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*Your 8-week summer review plan*

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# WEEK

1

## *Proportional Relationships and Percents*

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## Day 1 Unit Rates and Proportional Relationships

A **unit rate** tells how much there is for 1 unit, such as miles per hour or dollars per pound.

- To find a unit rate, divide: amount  $\div$  number of units.
- A complex fraction like  $\frac{\frac{3}{4}}{\frac{1}{6}}$  means  $\frac{3}{4} \div \frac{1}{6}$ .
- A relationship is **proportional** when every ratio  $\frac{y}{x}$  is the same.
- In a proportional relationship, the graph is a straight line through  $(0, 0)$ .
- The constant unit rate is the multiplier that connects  $x$  and  $y$ .

Always check both the numbers and the meaning of the units.

### Practice

1. Find the unit rate:  $\frac{\frac{3}{4} \text{ mile}}{\frac{1}{6} \text{ hour}}$ . \_\_\_\_\_
2. A recipe uses  $\frac{2}{5}$  cup of oil for  $\frac{1}{3}$  batch. How much oil is used for 1 batch?
3. Does the table show a proportional relationship?

|     |   |    |    |
|-----|---|----|----|
| $x$ | 2 | 4  | 6  |
| $y$ | 9 | 18 | 27 |

4. Does the table show a proportional relationship?

|     |   |    |    |
|-----|---|----|----|
| $x$ | 1 | 3  | 5  |
| $y$ | 4 | 10 | 16 |

5. A proportional graph passes through  $(0, 0)$  and  $(5, 15)$ . What is the unit rate and equation?
6. Six tickets cost \$16.50 at the same rate. How much do 10 tickets cost?



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## Day 4 Percent Problems and Proportions

Percent means “per 100,” so every percent problem connects a part, a whole, and a percent.

- To find a part, multiply:  $\text{part} = \text{percent} \times \text{whole}$ .
- To find a whole, divide:  $\text{whole} = \text{part} \div \text{percent}$ .
- To find a percent, divide  $\frac{\text{part}}{\text{whole}}$  and convert to a percent.
- The proportion method is  $\frac{\text{part}}{\text{whole}} = \frac{p}{100}$ .
- Convert percents to decimals before multiplying, such as  $35\% = 0.35$ .



Ask what is missing first: the part, the whole, or the percent.

### Practice

1. What is 35% of 240?
2. 45 is 60% of what number?
3. 18 is what percent of 72?
4. In a survey, 28 out of 80 students chose art club. What percent chose art club?
5. Solve with a proportion: what is 18% of 150?
6. A club has 125 members. If 24% volunteered at the food drive, how many members volunteered?



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 Week 1 Quiz

## Proportional Relationships and Percents

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Score: \_\_\_\_\_/10

1. Which unit rate is equal to  $\frac{\frac{2}{3} \text{ mile}}{\frac{1}{4} \text{ hour}}$ ?

A.  $\frac{1}{6}$  mphB.  $\frac{8}{3}$  mphC.  $\frac{3}{8}$  mph

D. 6 mph

2. Does the table show a proportional relationship?

|     |    |    |    |
|-----|----|----|----|
| $x$ | 2  | 6  | 9  |
| $y$ | 10 | 30 | 45 |

3. Four pounds of peaches cost \$11. Write the proportional equation for total cost  $y$  and pounds  $x$ .

4. True or False: A straight line that crosses the  $y$ -axis at  $(0, 2)$  can represent a proportional relationship.

 True

 False

5. What is 30% of 180? \_\_\_\_\_

6. 42 is 70% of what number? \_\_\_\_\_

7. What percent of 150 is 24? \_\_\_\_\_

8. Store A sells 5 notebooks for \$12.50. Store B sells 8 notebooks for \$19.20. Which store has the lower unit price?

9. A proportional line contains the point  $(7, 28)$ . What point on the line has  $x = 1$ ?

10. Solve the proportion  $\frac{x}{80} = \frac{35}{100}$ .



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WEEK

6

*Geometry and Measurement*

 *This Week's Days* 

*Day 23: Area of Circles and Composite Shapes ..... 6*



 Day 23

## Area of Circles and Composite Shapes

Circle area measures the space inside a circle.

- Use  $A = \pi r^2$  for the area of a circle.
- Always use the radius; if given diameter, divide by 2 first.
- A semicircle is half of a circle, so its area is  $\frac{1}{2}\pi r^2$ .
- Composite shapes are made from simpler shapes.
- Add areas for attached parts and subtract areas for cut-out parts.



Label square units because area measures two-dimensional space.

 **Practice**

1. Find the area of a circle with radius 5 cm. Use  $\pi \approx 3.14$ .
2. Find the area of a circle with diameter 18 m. Use  $\pi \approx 3.14$ .
3. Find the area of a semicircle with diameter 10 ft. Use  $\pi \approx 3.14$ .
4. A rectangle is 12 cm by 8 cm with a semicircle attached to the 8 cm side. Find the total area. Use  $\pi \approx 3.14$ .
5. A square has side length 10 in., and a circle with diameter 10 in. is cut out. Find the remaining area. Use  $\pi \approx 3.14$ .
6. A triangle has base 16 m and height 9 m. A semicircle with diameter 16 m is attached to the base. Find the total area. Use  $\pi \approx 3.14$ .



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## Check Your Answers

Use each explanation to check the method, not just the final answer.

Day 1



### Unit Rates and Proportional Relationships

1  $\frac{9}{2}$  miles per hour, or 4.5 mph

2  $\frac{6}{5}$  cups, or  $1\frac{1}{5}$  cups

3 Yes

4 No

5 Unit rate = 3; equation  $y = 3x$

6 \$27.50

#### 💡 Explanations

1 A unit rate asks for the amount in 1 hour, so divide  $\frac{3}{4}$  by  $\frac{1}{6}$ . Multiplying by the reciprocal gives  $\frac{3}{4} \times 6 = \frac{18}{4} = \frac{9}{2}$ .

2 Divide the oil by the fraction of a batch:  $\frac{2}{5} \div \frac{1}{3} = \frac{2}{5} \times 3 = \frac{6}{5}$ . This means one whole batch uses  $1\frac{1}{5}$  cups.

3 Each ratio  $\frac{y}{x}$  equals 4.5:  $\frac{9}{2} = 4.5$ ,  $\frac{18}{4} = 4.5$ , and  $\frac{27}{6} = 4.5$ . Since the ratio stays the same, the relationship is proportional.

4 For a proportional relationship,  $\frac{y}{x}$  must be constant. Here  $\frac{4}{1} = 4$  but  $\frac{10}{3} \neq 4$ , so the ratios do not match.

5 Use the nonzero point to find  $k = \frac{y}{x} = \frac{15}{5} = 3$ . A proportional equation has the form  $y = kx$ , so the equation is  $y = 3x$ .

6 First find the unit rate:  $16.50 \div 6 = 2.75$  dollars per ticket. Then multiply by 10 tickets:  $2.75 \times 10 = \$27.50$ .



**Day 4**  **Percent Problems and Proportions**

1 84

2 75

3 25%

4 35%

5 27

6 30 members

 **Explanations**

1 Convert 35% to 0.35, then multiply by the whole.  $0.35 \times 240 = 84$ , so the part is 84.

2 Here 45 is the part and the whole is unknown. Divide by the percent as a decimal:  $45 \div 0.60 = 75$ .

3 Use  $\frac{\text{part}}{\text{whole}} = \frac{18}{72} = \frac{1}{4} = 0.25$ . Convert 0.25 to 25%.

4 Divide the part by the whole:  $\frac{28}{80} = 0.35$ . As a percent,  $0.35 = 35\%$ .

5 Set up  $\frac{x}{150} = \frac{18}{100}$ . Cross-multiplying gives  $100x = 2700$ , so  $x = 27$ .

6 Convert 24% to 0.24 and multiply by the total number of members.  $0.24 \times 125 = 30$ , so 30 members volunteered.

**Day Q1**  **Week 1 Quiz**

1 B

2 Yes

3  $y = 2.75x$ 

4 False

5 54

6 60

7 16%

8 Store B

9 (1, 4)

10  $x = 28$ 
 **Explanations**

1 Divide  $\frac{2}{3}$  by  $\frac{1}{4}$ , which means multiply by 4.  $\frac{2}{3} \times 4 = \frac{8}{3}$  miles per hour, so choice B is correct.

2 Each ratio  $\frac{y}{x}$  equals 5. Since the same multiplier connects every  $x$  to  $y$ , the relationship is proportional.

3 The unit price is  $11 \div 4 = \$2.75$  per pound. Total cost equals 2.75 times the number of pounds, so  $y = 2.75x$ .



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4 A proportional graph must pass through the origin  $(0, 0)$ . Crossing at  $(0, 2)$  means there is an output of 2 when the input is 0, so it is not proportional.

5 Convert 30% to 0.30 and multiply by the whole.  $0.30 \times 180 = 54$ .

6 The whole is unknown, so divide the part by the percent as a decimal.  $42 \div 0.70 = 60$ .

7 Use  $\frac{24}{150} = 0.16$ . Converting 0.16 to a percent gives 16%.

8 Store A costs  $12.50 \div 5 = \$2.50$  per notebook. Store B costs  $19.20 \div 8 = \$2.40$  per notebook, so Store B is lower.

9 The constant of proportionality is  $k = \frac{28}{7} = 4$ . The point where  $x = 1$  is  $(1, k)$ , so the point is  $(1, 4)$ .

10 The proportion represents 35% of 80. Cross-multiply to get  $100x = 2800$ , so  $x = 28$ .

### Day 23 Area of Circles and Composite Shapes

1  $78.5 \text{ cm}^2$

2  $254.34 \text{ m}^2$

3  $39.25 \text{ ft}^2$

4  $121.12 \text{ cm}^2$

5  $21.5 \text{ in}^2$

6  $172.48 \text{ m}^2$

#### Explanations

1 Use  $A = \pi r^2$ .  $A = 3.14 \times 5^2 = 3.14 \times 25 = 78.5 \text{ cm}^2$ .

2 The radius is half the diameter, so  $r = 9 \text{ m}$ . Then  $A = 3.14 \times 9^2 = 3.14 \times 81 = 254.34 \text{ m}^2$ .

3 The radius is 5 ft. A full circle has area  $3.14 \times 25 = 78.5$ , so the semicircle has half that area:  $39.25 \text{ ft}^2$ .

4 The rectangle area is  $12 \times 8 = 96$ . The semicircle has diameter 8, radius 4, and area  $\frac{1}{2}(3.14)(4^2) = 25.12$ , so the total is  $121.12 \text{ cm}^2$ .

5 The square area is  $10^2 = 100$ . The circle has radius 5, so its area is  $3.14 \times 25 = 78.5$ ; subtracting gives  $100 - 78.5 = 21.5$ .



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6 The triangle area is  $\frac{1}{2}(16)(9) = 72$ . The semicircle has radius 8 and area  $\frac{1}{2}(3.14)(64) = 100.48$ , giving total area  $172.48 \text{ m}^2$ .

PREVIEW



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