

# Illinois IAR Grade 7 to Grade 8 Math Summer Bridge Workbook

*8-Week Review and Grade 8 Readiness Workbook*

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# $y = mx + b$ Summer Math Bridge $a^2 + b^2 = c^2$

## Grade 7 to Grade 8 Workbook



**This workbook is a bridge: it keeps Grade 7 math strong while making the first month of Grade 8 feel familiar.**

Students revisit the Grade 7 ideas that matter most—proportional reasoning, percents, rational numbers, expressions, equations, inequalities, geometry, and data—then preview the Grade 8 language connected to those skills. Each topic has a short review and a fuller workbook practice set, so students get enough written, visual, and problem-solving practice to build fluency.



### **For families and teachers**

Use one workbook lesson per day, about 20-25 minutes. Let students try first, then use the answer explanations as quick reteaching after mistakes. Friday mixed reviews show which skills are ready and which need another short review.

### **For students**

Keep your work neat, show your thinking, and fix missed problems. The goal is not to rush through the workbook; the goal is to start Grade 8 ready to build on what you already know.

# How to Use This Bridge Workbook



## The page order is the plan.

Move through the workbook one day at a time. Each week has four workbook practice days and one Friday mixed review, so the routine stays predictable even when summer is busy.



**Practice days** Read the quick review, study the example or model, and complete the 12-14 workbook problems.

**Friday review** Complete the mixed review without rushing. Use it to practice choosing the right method.

**Review answers** Check the answer key, then read the explanation for every missed problem. Correct the work in pencil before moving on.

**Extra support** If a skill is shaky, do one similar problem the next day before starting the new page.



### Keep it steady

Most workbook lessons should take about 20-25 minutes. Stop before practice turns into frustration.



### Show thinking

Use equations, graphs, tables, labels, or scratch work. Organized work is a Grade 8 habit.



### Fix mistakes

A corrected mistake is useful practice. The answer key is written to reteach, not only to score.

# What's Inside?

An 8-week workbook plan for Grade 7 review and Grade 8 readiness.

<b>Week 1</b>	Unit rates, constants of proportionality, equations, graphs, and Grade 8 proportional graph language.
<b>Week 2</b>	Percent change, financial percent applications, integers, and rational-number operations.
<b>Week 3</b>	Rational decimals, irrational numbers, integer exponents, exponent laws, and scientific notation.
<b>Week 4</b>	Expressions, distribution, factoring, two-step equations, and Grade 8 linear equations.
<b>Week 5</b>	Inequalities, slope as rate of change, slope-intercept form, and systems of equations.
<b>Week 6</b>	Functions, comparing functions, linear and nonlinear patterns, and building linear models.
<b>Week 7</b>	Scale drawings, triangle construction, transformations, and the Pythagorean theorem.
<b>Week 8</b>	Surface area, volume, sampling, population comparisons, two-way tables, and probability readiness.

## Quick Reviews

Each topic begins with a compact review of the skill students need before starting the practice.

## Friday Reviews

Friday pages mix the week's skills so students can practice choosing the right method.

## Workbook Practice

Practice sets include equations, word problems, tables, graphs, models, and short written reasoning.

## Answers

The answer key includes explanations that show how to think through the problem, not just the final answer.

**Review. Practice. Preview. Correct. Get Ready.**

# WEEK

1

## Proportional Reasoning and Graphs

### This Week's Days

<i>Week 1 Day 1: Unit Rates and Proportional Relationships</i> .....	<b>2</b>
<i>Week 1 Day 4: Grade 8 Preview: Graphing Proportional Relationships</i> .....	<b>4</b>
<i>Week 1 Day 5: Week 1 Proportional Relationships Mixed Review</i> .....	<b>6</b>



Day 1

## Unit Rates and Proportional Relationships

WORKBOOK LAB

 Read it  Model it  Use it

A **unit rate** tells how much there is for 1 unit. Unit rates are the bridge from Grade 7 proportional reasoning to Grade 8 slope.

-  To find a unit rate, divide the amount by the number of units.
-  A complex fraction such as  $\frac{\frac{3}{4}}{\frac{1}{6}}$  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 constant unit rate is the multiplier from  $x$  to  $y$ .
-  The graph of a proportional relationship is a straight line through  $(0, 0)$ .

 **Coach Tip:** Always include units. A rate of dollars per pound is different from pounds per dollar.

### Find unit rates.

1 A hiker walks 18 miles in 6 hours. Find the unit rate. \_\_\_\_\_

2 Use the table. What is the cost per notebook? \_\_\_\_\_

Notebooks	Total cost
5	\$13.75

3 Find the unit rate:  $\frac{\frac{3}{4} \text{ mile}}{\frac{1}{6} \text{ hour}}$ . \_\_\_\_\_

4 A recipe uses  $\frac{2}{5}$  cup of oil for  $\frac{1}{3}$  batch. How much oil is used for 1 batch? \_\_\_\_\_

### Test proportional relationships.

5 Does the table show a proportional relationship?

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

6 Does the table show a proportional relationship?

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

7 Complete the proportional table.



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Hours	1	2	5	8
Miles	6	12	—	—

8 Which table is proportional?

A. A: (1, 5), (2, 9), (3, 13)

B. B: (2, 7), (4, 14), (6, 21)

C. C: (1, 4), (3, 8), (5, 12)

D. D: (2, 6), (4, 10), (6, 16)

**☰ Graphs, equations, and applications.**

9 A proportional graph passes through (0, 0) and (5, 15). What is the unit rate and equation?  
\_\_\_\_\_

10 Use the graph. What is the unit rate?



11 Six tickets cost \$16.50 at the same rate. How much do 10 tickets cost? \_\_\_\_\_

12 Store A sells 3 pounds of rice for \$4.95. Store B sells 5 pounds for \$7.75. Which store has the lower unit price?



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Day 4

## Grade 8 Preview: Graphing Proportional Relationships

WORKBOOK LAB

Read it Model it Use it

In Grade 8, the constant of proportionality is also described as slope. A proportional graph has equation  $y = kx$  and passes through the origin.

- ✓ In a table, divide  $y$  by  $x$  for each nonzero  $x$ .
- ✓ In an equation, proportional relationships have the form  $y = kx$  with no added constant.
- ✓ On a graph, the line must pass through  $(0, 0)$ .
- ✓ The constant  $k$  is also the slope or unit rate.
- ✓ Once  $k$  is known, use  $y = kx$  to find missing values.



**Coach Tip:** A graph can be a straight line without being proportional. Proportional lines must include the origin.

## Find constants and equations.

- 1 In a table,  $x = 2, 4, 6$  and  $y = 5, 10, 15$ . What is the constant of proportionality? \_\_\_\_\_
- 2 A proportional graph contains the point  $(8, 12)$ . What is the unit rate? \_\_\_\_\_
- 3 Use the table to find  $k$ .

$x$	2	5	8
$y$	7	17.5	28

- 4 Use the graph through  $(0, 0)$  and  $(5, 20)$ . What is the equation? \_\_\_\_\_

## Identify proportional graphs.

- 5 Does a line through  $(0, 0)$  and  $(3, 7)$  show a proportional relationship? \_\_\_\_\_
- 6 Does the graph show a proportional relationship?



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7 Does the graph show a proportional relationship?



8 True or False:  $y = x + 2$  is proportional because it is a line.

True  False

**☰ Use equations and compare rates.**

9 Which equation represents a proportional relationship?

A.  $y = 4x$

B.  $y = 4x + 1$

C.  $y = x - 4$

D.  $y = 4$

10 If  $y = 18$  when  $x = 6$  in a proportional relationship, what is  $y$  when  $x = 10$ ? \_\_\_\_\_

11 A cyclist travels according to  $y = 14x$ , where  $x$  is hours and  $y$  is miles. Another cyclist travels 45 miles in 3 hours. Who is faster?

12 A line through the origin contains  $(9, 6)$ . Find  $y$  when  $x = 15$ . \_\_\_\_\_



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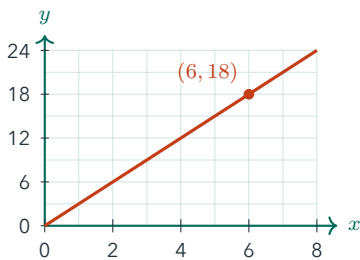
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**Equations and graphs.**

- 5 Four pounds of peaches cost \$11. Write the proportional equation for total cost  $y$  and pounds  $x$ .  
\_\_\_\_\_
- 6 True or False: A straight line that crosses the  $y$ -axis at  $(0, 2)$  can represent a proportional relationship.  True  False
- 7 A proportional line contains the point  $(7, 28)$ . What point on the line has  $x = 1$ ? \_\_\_\_\_
- 8 Use the graph to write the equation.



**Mixed applications.**

- 9 Use the table. A recipe uses oats proportionally. How many cups are needed for 25 snack bags?

Snack bags	10	25
Cups of oats	4	_____

- 10 Which relationship has the greatest constant of proportionality?

Relationship	$x$	$y$
A	4	18
B	6	24
C	9	45

- 11 A machine fills 18 bottles in 2 minutes at a constant rate. How many bottles will it fill in 7 minutes?  
\_\_\_\_\_
- 12 A proportional relationship is shown by  $m = 1.25p$ . What is  $m$  when  $p = 16$ ? \_\_\_\_\_



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# WEEK

5

## *Inequalities, Slope, and Linear Equations*

### *This Week's Days*

<i>Week 5 Day 1: Writing, Solving, and Graphing Inequalities</i> .....	<b>9</b>
<i>Week 5 Day 4: Grade 8 Preview: Solving Systems</i> .....	<b>11</b>



Day 1

## Writing, Solving, and Graphing Inequalities

WORKBOOK LAB

Read it Model it Use it

Inequalities compare quantities using  $<$ ,  $>$ ,  $\leq$ , or  $\geq$ . Solve them with balanced steps, and graph the full set of values that make the statement true.

- ✓ Use inverse operations just as you do with equations.
- ✓ Reverse the inequality sign when multiplying or dividing by a negative number.
- ✓ Use an open circle for  $<$  or  $>$  and a closed circle for  $\leq$  or  $\geq$ .
- ✓ Shade left for less than and shade right for greater than.



**Coach Tip:** Check your graph by testing one value from the shaded side in the original inequality.

### Solve inequalities with balanced steps.

- 1 Solve  $x + 9 < 17$ . \_\_\_\_\_
- 2 Solve  $4y \geq 28$ . \_\_\_\_\_
- 3 Solve  $2n - 5 \leq 13$ . \_\_\_\_\_
- 4 Solve  $\frac{p}{3} + 4 > 10$ . \_\_\_\_\_

### Handle negative coefficients carefully.

- 5 Solve  $-3a < 18$ . \_\_\_\_\_
- 6 Solve  $12 - 2m \leq 20$ . \_\_\_\_\_
- 8 The table lists possible values. Which values satisfy  $-2k + 1 < 9$ ?

- 7 True or False: The solution to  $-5x \geq 30$  is  $x \geq -6$ .
  True
 False

$k$	-5	-4	0	3
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### Graph and write inequalities.

- 9 Describe the graph of  $x \leq -1$ .



- 10 What inequality is shown?

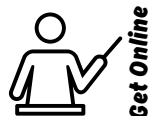


### Use inequalities in situations.

- 11 A field trip costs \$12 plus \$3 per student. The group can spend at most \$60. Write and solve an inequality for students  $s$ .

Fixed cost	Cost per student	Budget
\$12	\$3	\$60

- 12 Mia needs at least 42 points. She has 18 points and earns 6 points per task. Write and solve an inequality for tasks  $t$ .



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Day 4

## Grade 8 Preview: Solving Systems

WORKBOOK LAB

 Read it  Model it  Use it

A system of equations asks for values that make both equations true at the same time. On a graph, the solution is the intersection point.

-  Use substitution when one equation is already solved for a variable.
-  Use elimination when adding or subtracting equations removes a variable.
-  Intersecting lines have one solution.
-  Parallel lines have no solution, and identical lines have infinitely many solutions.



 **Coach Tip:** Check the ordered pair in both equations so you know it solves the whole system.

### Solve by substitution.

- 1** Solve  $y = x + 4$  and  $y = 2x + 1$ .
- 2** Solve  $y = 3x - 2$  and  $x + y = 14$ .
- 3** Solve  $x = 2y + 1$  and  $x + y = 16$ .
- 4** Solve  $y = -x + 9$  and  $y = x + 1$ .

### Solve by elimination.

- 5** Solve  $x + y = 13$  and  $x - y = 3$ .
- 6** Solve  $2a + b = 19$  and  $2a - b = 5$ .
- 7** Solve  $3x + 2y = 24$  and  $3x - 2y = 0$ .
- 8** Solve  $m + n = 25$  and  $m - n = 9$ .



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### ☰ Use graphs and classify systems.

- 9 Use the graph to name the solution.



- 10 Classify  $y = 2x + 5$  and  $y = 2x - 4$ .

- 11 Classify  $2y = 6x + 8$  and  $y = 3x + 4$ .

- 12 True or False: A system with different slopes has exactly one solution.  True

False

### ☰ Model with systems.

- 13 Adult tickets cost \$10, student tickets cost \$6, and 9 tickets cost \$70. How many adult tickets were bought?

Ticket type	Cost	Count
Adult	\$10	$a$
Student	\$6	$s$

- 14 A cafe sold 16 drinks. Coffees cost \$4, smoothies cost \$7, and total sales were \$82. How many smoothies were sold?

Drink	Cost	Count
Coffee	\$4	$c$
Smoothie	\$7	$s$



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# WEEK

8

## Measurement and Data Readiness

### This Week's Days

<i>Week 8 Day 1: Surface Area and Volume</i> .....	<b>14</b>
<i>Week 8 Day 4: Grade 8 Preview: Two-Way Tables</i> .....	<b>16</b>



Day 1

Surface Area and Volume

WORKBOOK LAB

Read it Model it Use it

Surface area measures the outside of a solid, and volume measures the space inside it. Grade 8 volume formulas still depend on careful base areas and units.



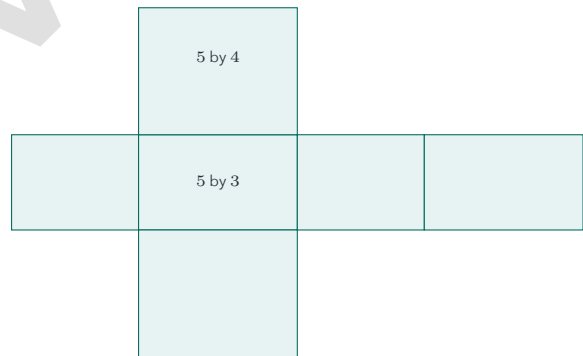
- ✓ Surface area is the total area of the outside faces.
- ✓ For a rectangular prism,  $SA = 2lw + 2lh + 2wh$ .
- ✓ Volume measures the space inside a solid.
- ✓ For any prism,  $V = Bh$ , where  $B$  is the area of the base.
- ✓ Use square units for surface area and cubic units for volume.

**Coach Tip:** Think of surface area as wrapping and volume as filling.

Find surface area.

1 Find the surface area of a rectangular prism with  $l = 5$  m,  $w = 4$  m, and  $h = 3$  m.

Face pair	Area
$lw$ pair	40
$lh$ pair	30
$wh$ pair	24



2 A cube has side length 6 cm. Find its surface area.

3 Use the net to find the surface area.

4 True or False: Surface area of a prism is measured in cubic units.

False

True



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**Find volume of prisms.**

- 5 Find the volume of a rectangular prism with dimensions 8 ft by 5 ft by 4 ft. \_\_\_\_\_

$l$	$w$	$h$
8	5	4



- 6 A triangular prism has a triangular base with base 10 in. and height 6 in. The prism length is 12 in. Find the volume.  
\_\_\_\_\_

- 7 Find the volume.

- 8 Find the volume of a rectangular prism with dimensions  $\frac{3}{2}$  ft, 4 ft, and  $\frac{5}{3}$  ft.  
\_\_\_\_\_

**Apply formulas and units.**

- 9 An aquarium is 50 cm long, 25 cm wide, and 30 cm tall. How many cubic centimeters can it hold? \_\_\_\_\_

- 10 A prism has base area 42 square inches and height 9 inches. Find the volume.  
\_\_\_\_\_

- 11 A rectangular prism has volume  $240 \text{ cm}^3$ ,

length 10 cm, and width 6 cm. Find the height. \_\_\_\_\_

- 12 Which expression gives the surface area of a 9 by 2 by 5 rectangular prism?

- A.  $9 + 2 + 5$       B.  $9 \cdot 2 \cdot 5$   
 C.  $2(9 \cdot 2) + 2(9 \cdot 5) + 2(2 \cdot 5)$       D.  $4(9 + 2 + 5)$



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Day 4

## Grade 8 Preview: Two-Way Tables

WORKBOOK LAB

Read it Model it Use it

A two-way table organizes counts for two categorical variables. Relative frequencies help compare patterns inside the table.

Club	Art	Band	Total
Girls	14	11	25
Boys	10	15	25
Total	24	26	50

- Rows and columns show the two categories being compared.
- Row totals and column totals summarize parts of the table.
- Joint frequencies are inside cells.
- Relative frequency is a count divided by a total.
- Conditional relative frequency uses a row or column total as the denominator.

**Coach Tip:** Choose the denominator that matches the words in the question, such as “of girls” or “of art club students.”

### Read totals and cells.

- 1 In a table, 18 students choose bus, 12 choose car, and 10 choose walk. How many students are counted? \_\_\_\_\_
- 2 A two-way table cell shows 14 girls chose art club. What does that cell represent?  
\_\_\_\_\_
- 3 Complete the missing total.

	Bus	Car	Total
Grade 7	18	12	?

- 4 True or False: A row total is found by adding all cells in one row.  True

False

### Find relative frequencies.

- 5 Out of 40 students, 18 choose bus. What fraction choose bus? \_\_\_\_\_

Bus	18
Total	40

- 6 In a row of 25 eighth graders, 15 prefer

online practice. What percent of eighth graders prefer online practice?  
\_\_\_\_\_

- 7 True or False: Conditional relative frequency always uses the grand total.

True

False



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- 8 A survey has 22 yes votes and 28 no votes. What is the ratio of yes to no votes?  
\_\_\_\_\_

 **Use a two-way table.**

Use the table for Questions 9-12.

	Video	Text	Total
Grade 7	18	12	30
Grade 8	16	24	40
Total	34	36	70

- 9 What fraction of all students prefer video?  
\_\_\_\_\_
- 10 What percent of Grade 8 students prefer text? \_\_\_\_\_
- 11 What percent of students who prefer video are in Grade 7? \_\_\_\_\_
- 12 Which grade has the higher conditional relative frequency for video preference?  
\_\_\_\_\_

PREVIEW



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## ANSWER KEY

# Answer Key & Explanations

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*Use the answers to check your work, then read the explanations to learn the method.*

### ✔ **How to review**

*First compare your final answer. If it does not match, read the explanation slowly and redo the problem beside it. The goal is to understand the move that gets you from the question to the final answer.*

### 📅 Week 1 Day 1: Unit Rates and Proportional Relationships

#### ✓ Answers

- 1 3 miles per hour      2 \$2.75 per notebook      3  $\frac{9}{2}$  miles per hour, or 4.5 mph
- 4  $\frac{6}{5}$  cups, or  $1\frac{1}{5}$  cups      5 Yes      6 No      7 30, 48      8 B      9 Unit rate 3;  $y = 3x$
- 10 3      11 \$27.50      12 Store B

#### 💡 Explanations

- 1 A unit rate compares the distance to 1 hour. Divide 18 miles by 6 hours to get 3 miles per hour.
- 2 The word “per” means for 1 notebook. Divide \$13.75 by 5 to get \$2.75 per notebook.
- 3 Divide distance by time:  $\frac{3}{4} \div \frac{1}{6} = \frac{3}{4} \times 6 = \frac{18}{4} = \frac{9}{2}$ . This gives miles for 1 hour.
- 4 One whole batch is found by dividing by  $\frac{1}{3}$ . Compute  $\frac{2}{5} \div \frac{1}{3} = \frac{2}{5} \times 3 = \frac{6}{5}$ .
- 5 Check  $\frac{y}{x}$  in each column. The ratios are  $\frac{9}{2}$ ,  $\frac{18}{4}$ , and  $\frac{27}{6}$ , which all equal 4.5.
- 6 A proportional relationship needs one constant ratio. Here  $\frac{4}{1} = 4$ , but  $\frac{10}{3}$  is not 4, so the ratios do not match.
- 7 The table shows 6 miles per hour. Multiply each number of hours by 6:  $5 \times 6 = 30$  and  $8 \times 6 = 48$ .
- 8 For choice B, each ratio  $\frac{y}{x}$  equals 3.5. The other choices have changing ratios, so they are not proportional.
- 9 Use  $k = \frac{y}{x}$  with the nonzero point. Since  $\frac{15}{5} = 3$ , the proportional equation is  $y = 3x$ .
- 10 The graph goes through (4, 12). Divide the output by the input:  $\frac{12}{4} = 3$ , so the unit rate is 3.
- 11 First find the price for one ticket:  $16.50 \div 6 = \$2.75$ . Then multiply by 10 tickets to get \$27.50.
- 12 Store A costs  $4.95 \div 3 = \$1.65$  per pound. Store B costs  $7.75 \div 5 = \$1.55$  per pound, so Store B is lower.



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### 📅 Week 1 Day 4: Grade 8 Preview: Graphing Proportional Relationships

#### ✓ Answers

1 2.5

2 1.5

3 3.5

4  $y = 4x$ 

5 Yes

6 Yes

7 No

8 False

9 A

10 30

11 The second cyclist

12 10

#### 💡 Explanations

1 Divide  $y$  by  $x$ :  $5/2 = 10/4 = 15/6 = 2.5$ . The constant of proportionality is 2.5.

2 For a proportional relationship, the unit rate is  $y/x$ . Using (8, 12) gives  $12/8 = 1.5$ .

3 Divide  $y$  by  $x$  for each pair. Each ratio equals 3.5, so  $k = 3.5$ .

4 Find the constant by dividing 20 by 5. Since  $k = 4$ , the proportional equation is  $y = 4x$ .

5 A straight line through the origin has the form  $y = kx$ . The constant is  $7/3$ , so the relationship is proportional.

6 The graph is a straight line through the origin. That means it can be written as  $y = kx$ .

7 The line does not pass through the origin. A proportional graph must include (0, 0).

8 A proportional line must pass through the origin and have the form  $y = kx$ . The +2 gives a nonzero intercept.

9 A proportional equation has no added or subtracted constant. Only  $y = 4x$  has the form  $y = kx$ .

10 The constant is  $18 \div 6 = 3$ , so  $y = 3x$ . When  $x = 10$ ,  $y = 3(10) = 30$ .

11 The first cyclist travels 14 miles per hour. The second travels  $45 \div 3 = 15$  miles per hour, which is faster.

12 First find  $k = \frac{6}{9} = \frac{2}{3}$ . Then use  $y = \frac{2}{3}x$ , so  $y = \frac{2}{3}(15) = 10$ .



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### 📅 Week 1 Day 5: Week 1 Proportional Relationships Mixed Review

#### ✓ Answers

- 1 B    2 Store B    3 Yes    4 \$27, \$54, \$90    5  $y = 2.75x$     6 False    7 (1, 4)  
 8  $y = 3x$     9 10 cups    10 Relationship C    11 63 bottles    12 20

#### 💡 Explanations

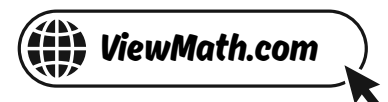
- 1 Divide  $\frac{2}{3}$  by  $\frac{1}{4}$ , which means multiply by 4. The unit rate is  $\frac{8}{3}$  miles per hour.
- 2 Store A costs  $12.50 \div 5 = \$2.50$  per notebook. Store B costs  $19.20 \div 8 = \$2.40$  per notebook, so Store B is lower.
- 3 Each ratio  $\frac{y}{x}$  equals 5. The same multiplier connects every  $x$  to  $y$ , so the relationship is proportional.
- 4 The unit rate is \$9 per hour. Multiply each number of hours by 9.
- 5 The unit price is  $11 \div 4 = \$2.75$  per pound. Total cost is 2.75 times the number of pounds.
- 6 A proportional graph must pass through (0, 0). Crossing at (0, 2) means the output is not zero when the input is zero.
- 7 The constant of proportionality is  $\frac{28}{7} = 4$ . The point with  $x = 1$  is (1,  $k$ ), so it is (1, 4).
- 8 Use the labeled point to find  $k = \frac{18}{6} = 3$ . A proportional equation has the form  $y = kx$ , so  $y = 3x$ .
- 9 Find cups per bag:  $4 \div 10 = 0.4$ . For 25 bags,  $0.4 \times 25 = 10$  cups.
- 10 Divide  $y$  by  $x$  for each relationship. A has 4.5, B has 4, and C has 5, so C is greatest.
- 11 The unit rate is  $18 \div 2 = 9$  bottles per minute. In 7 minutes, the machine fills  $9 \times 7 = 63$  bottles.
- 12 Substitute  $p = 16$  into the equation.  $m = 1.25(16) = 20$ , so the output is 20.



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### 📅 Week 5 Day 1: Writing, Solving, and Graphing Inequalities

#### ✓ Answers

1  $x < 8$

2  $y \geq 7$

3  $n \leq 9$

4  $p > 18$

5  $a > -6$

6  $m \geq -4$

7 False

8 0 and 3

9 Closed circle at  $-1$ , shade left

10  $x \geq 2$

11  $12 + 3s \leq 60; s \leq 16$

12  $18 + 6t \geq 42; t \geq 4$

#### 💡 Explanations

1 Subtract 9 from both sides to isolate  $x$ . Subtracting keeps the order the same, so the sign stays  $<$ .

2 Divide both sides by positive 4. The inequality sign does not change because division by a positive number preserves order.

3 Add 5 to get  $2n \leq 18$ , then divide by 2. The solution is every value less than or equal to 9.

4 Subtract 4 to get  $\frac{p}{3} > 6$ . Multiply by positive 3, so the sign stays the same and  $p > 18$ .

5 Divide by  $-3$  to isolate  $a$ . Because you divide by a negative number, the sign flips from  $<$  to  $>$ .

6 Subtract 12 to get  $-2m \leq 8$ . Divide by  $-2$  and reverse the sign, giving  $m \geq -4$ .

7 Dividing by  $-5$  must reverse the inequality sign. The correct solution is  $x \leq -6$ .

8 Solve first:  $-2k + 1 < 9$  gives  $-2k < 8$ , so  $k > -4$ . From the table, only 0 and 3 are greater than  $-4$ .

9 The symbol  $\leq$  includes the endpoint, so the circle is closed. Values less than  $-1$  are to the left.

10 The closed circle means 2 is included, and the shading goes right. That represents all values greater than or equal to 2.

11 At most means the total is no more than 60. Subtract 12 and divide by 3 to find that up to 16 students fit the budget.

12 At least means greater than or equal to. Subtract 18 to get  $6t \geq 24$ , so Mia needs 4 or more tasks.



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 **Week 5 Day 4: Grade 8 Preview: Solving Systems**
 **Answers**

- 1 (3, 7)    2 (4, 10)    3 (11, 5)    4 (4, 5)    5 (8, 5)    6 (6, 7)    7 (4, 6)  
 8 (17, 8)    9 (2, 3)    10 No solution    11 Infinitely many solutions    12 True  
 13 4 adult tickets    14 6 smoothies

 **Explanations**

- 1 Set the two expressions for  $y$  equal:  $x + 4 = 2x + 1$ . Solving gives  $x = 3$ , and then  $y = 7$ .
- 2 Substitute  $3x - 2$  for  $y$ :  $x + 3x - 2 = 14$ . Then  $4x = 16$ , so  $x = 4$  and  $y = 10$ .
- 3 Substitute  $2y + 1$  for  $x$  to get  $2y + 1 + y = 16$ . Then  $3y = 15$ , so  $y = 5$  and  $x = 11$ .
- 4 Set  $-x + 9 = x + 1$ . This gives  $8 = 2x$ , so  $x = 4$ , and substituting gives  $y = 5$ .
- 5 Add the equations to eliminate  $y$ :  $2x = 16$ , so  $x = 8$ . Then  $8 + y = 13$ , so  $y = 5$ .
- 6 Add the equations to eliminate  $b$ :  $4a = 24$ , so  $a = 6$ . Then  $2(6) + b = 19$ , so  $b = 7$ .
- 7 Add the equations to get  $6x = 24$ , so  $x = 4$ . Substitute into  $3x + 2y = 24$  to get  $12 + 2y = 24$ , so  $y = 6$ .
- 8 Adding the equations gives  $2m = 34$ , so  $m = 17$ . Then  $17 + n = 25$ , so  $n = 8$ .
- 9 The solution to a graphed system is the intersection point. The two lines cross at  $x = 2$  and  $y = 3$ .
- 10 The lines have the same slope but different intercepts. They are parallel, so they never intersect.
- 11 Divide the first equation by 2 to get  $y = 3x + 4$ . The equations are the same line, so every point on it works.
- 12 Two nonvertical lines with different slopes are not parallel or identical. They intersect at one point, so there is one solution.
- 13 Let  $a + s = 9$  and  $10a + 6s = 70$ . Substitute  $s = 9 - a$  to get  $10a + 6(9 - a) = 70$ , so  $4a = 16$  and  $a = 4$ .
- 14 Let  $c + s = 16$  and  $4c + 7s = 82$ . Substitute  $c = 16 - s$  to get  $64 + 3s = 82$ , so  $s = 6$ .



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### 📅 Week 8 Day 1: Surface Area and Volume

#### ✓ Answers

1 94 m<sup>2</sup>2 216 cm<sup>2</sup>

3 94 square units

4 False

5 160 ft<sup>3</sup>6 360 in<sup>3</sup>

7 105 cubic units

8 10 ft<sup>3</sup>9 37,500 cm<sup>3</sup>10 378 in<sup>3</sup>

11 4 cm

12 C

#### 💡 Explanations

1 Use  $2lw + 2lh + 2wh$ .  $2(5)(4) + 2(5)(3) + 2(4)(3) = 40 + 30 + 24 = 94 \text{ m}^2$ .

2 A cube has 6 congruent square faces. Each face has area  $6^2 = 36$ , so  $6 \times 36 = 216 \text{ cm}^2$ .

3 The net represents a 5 by 4 by 3 prism. Add pairs of faces:  $2(5 \cdot 4) + 2(5 \cdot 3) + 2(4 \cdot 3) = 94$ .

4 Surface area measures outside faces, so it uses square units. Cubic units are used for volume.

5 For a rectangular prism, multiply the three dimensions.  $8 \times 5 \times 4 = 160 \text{ ft}^3$ .

6 The triangular base area is  $\frac{1}{2}(10)(6) = 30 \text{ in}^2$ . Multiply by the prism length:  $30 \times 12 = 360 \text{ in}^3$ .

7 The prism is rectangular, so multiply length, width, and height.  $7 \times 3 \times 5 = 105$  cubic units.

8 Multiply the edge lengths:  $\frac{3}{2} \times 4 \times \frac{5}{3}$ . The 3s cancel, giving  $2 \times 5 = 10 \text{ ft}^3$ .

9 The aquarium is a rectangular prism, so use  $V = lwh$ .  $50 \times 25 \times 30 = 37,500 \text{ cm}^3$ .

10 Use  $V = Bh$ . Multiply the base area by the height:  $42 \times 9 = 378 \text{ in}^3$ .

11 Use  $V = lwh$ . Since  $10 \times 6 = 60$ , solve  $60h = 240$ , so  $h = 4 \text{ cm}$ .

12 Surface area adds the areas of all six faces. The three different face areas each appear twice.



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 **Week 8 Day 4: Grade 8 Preview: Two-Way Tables**
 **Answers**

- 1 40   
 2 Students who are both girls and art-club choosers   
 3 30   
 4 True   
 5  $\frac{9}{20}$   
6 60%   
 7 False   
 8 11 : 14   
 9  $\frac{17}{35}$    
 10 60%   
 11 About 53%   
 12 Grade 7

 **Explanations**

- 1 Add all category counts to find the total.  $18 + 12 + 10 = 40$  students.  
2 A cell inside a two-way table is a joint frequency. It counts items that fit both categories.  
3 A row total adds the counts in that row.  $18 + 12 = 30$ .  
4 The row total summarizes the counts across that row's categories.  
5 Relative frequency is count divided by total:  $\frac{18}{40}$ . Simplify by dividing by 2.  
6 Use the row total because the question says "of eighth graders."  $15/25 = 0.60 = 60\%$ .  
7 A conditional relative frequency uses the total for the condition, such as a row or column total.  
8 The ratio yes to no is 22 : 28. Divide both parts by 2 to simplify to 11 : 14.  
9 There are 34 video choices out of 70 students.  $\frac{34}{70}$  simplifies to  $\frac{17}{35}$ .  
10 Use the Grade 8 row total:  $24/40 = 0.60$ . So 60% of Grade 8 students prefer text.  
11 Use the video column total:  $18/34 \approx 0.529$ . That is about 53%.  
12 For Grade 7,  $18/30 = 60\%$ . For Grade 8,  $16/40 = 40\%$ , so Grade 7 is higher.

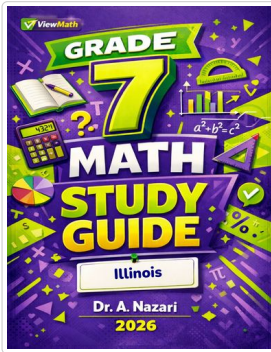


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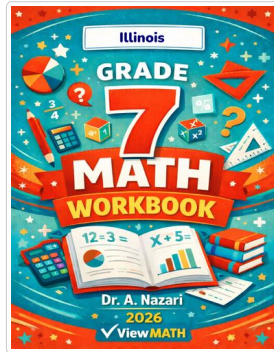
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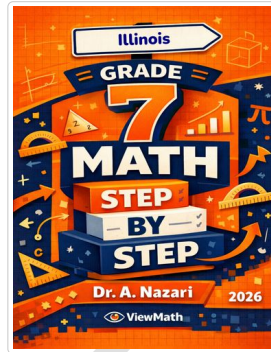
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**Workbook**



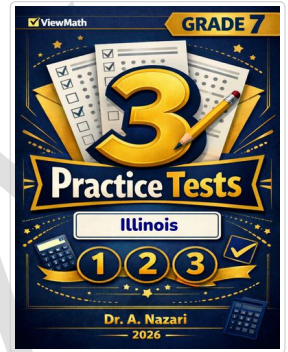
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**Step-by-Step**



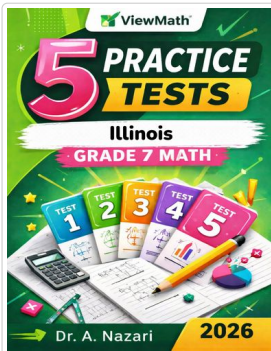
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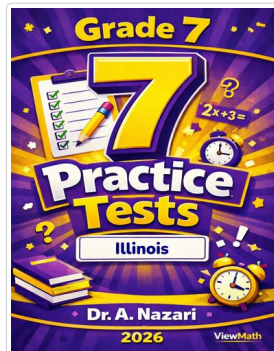
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**5 Practice Tests**



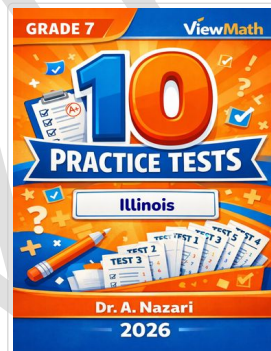
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**7 Practice Tests**



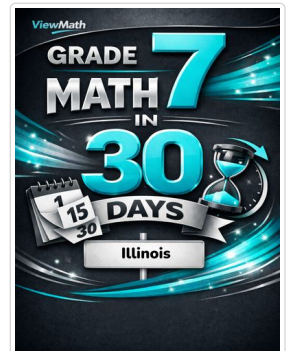
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**10 Practice Tests**



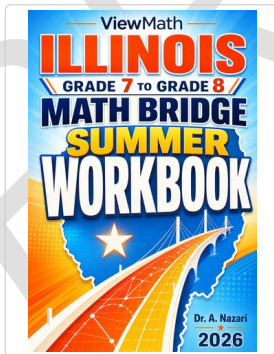
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**Math in 30 Days**



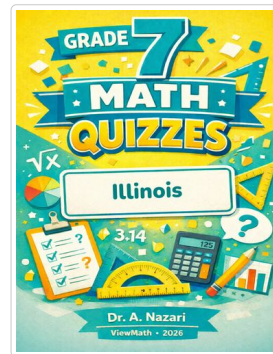
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**Summer Bridge**



**Summer Workbook**



**Quizzes**



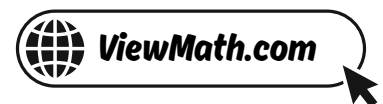
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