

Accelerated 7 • Unit 9 Worksheet

Putting It All Together

Name: _____

Date: _____

Part A • Tessellations and Transformations

1. Explain why equilateral triangles tessellate the plane, but regular pentagons do not. Use angle measures.

2. Sketch (or describe in words) a tessellation using ANY ONE of: equilateral triangle, square, regular hexagon. Then identify a rigid transformation (translation, rotation, or reflection) that maps one of your shapes onto another. Be specific.

Part B • Running a Restaurant — Multi-step Modeling

3. A pizzeria sells personal pizzas for \$7.50 each. Ingredients cost \$1.75 per pizza. Rent + utilities are \$1200/week. The owner wants \$400 profit per week.

a. Write an equation modeling profit as a function of pizzas sold per week.

b. How many pizzas must be sold weekly to hit the target profit?

c. If the owner can sell at most 300 pizzas a week, is the target reachable? Justify.

4. A drink station holds a cylindrical tank, radius 12 cm, height 30 cm.

a. What is the maximum volume (in cm^3 , in terms of π)? In liters ($1 \text{ L} = 1000 \text{ cm}^3$)?

b. If a customer drinks 350 mL each visit, about how many customers can it serve before refilling?

Part C • Making Connections — Algebra Ready

5. Two cars start from the same place. Car A travels at 50 mph. Car B leaves 1 hour later at 65 mph in the same direction.

a. Write equations for the distance of each car as a function of time t (in hours since Car A left).

b. When does Car B catch Car A?

c. How far have they each traveled by then?

6. Solve and check.

a. $4(2x - 1) = 3(x + 2) + x$

b. $-2(3x + 4) + 5x = -(x - 8)$

Part D • Estimation and Prediction

7. The global population is approximately 8×10^9 . If everyone in the world stood in a single line shoulder-to-shoulder (~ 0.5 m wide), how long would the line be?

Estimate length in meters and in km:

Compare to Earth's circumference ($\sim 40,000$ km):

8. Predicting temperature. A scatter plot of (latitude, average high temperature in July) for U.S. cities shows a roughly linear, negative relationship.

a. What might the slope of a line of fit mean?

b. For latitude 40° , the line of fit gives 80°F . For latitude 50° , the line gives 70°F . What slope is implied?

c. Predict the temperature at latitude 35° using this line. How confident are you in this prediction?

Part E • Year-End Reflection and Synthesis

9. Pick TWO topics from this year and explain how they connect to each other. (Examples: rigid transformations and congruence; similar triangles and slope; functions and volume.)

10. Consider the lines $y = 2x + 3$ AND $y = (1/3)x - 1$. Find their intersection algebraically. How do you know they are not parallel?

Solution: (____ , ____)

How do you know the lines aren't parallel?

11. Andre says: "All my math classes feel like learning a list of rules." In what ways has this year been about RULES, and in what ways has it been about REASONING? Give one example of each from the year.

12. What's ONE math topic you would explain to a younger student? Pick the topic, then write a clear explanation as if teaching it.
