

Accelerated 6 • Unit 5 Worksheet

Proportional Relationships

Name: _____

Date: _____

Part A • Quick Computations

$12 \cdot 7$ _____	$84 \div 6$ _____	$\pi \cdot 5$ (use $\pi \approx 3.14$) _____	circle area, $r=2$ _____
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Part B • Proportional or Not?

1. For each relationship, decide: IS it proportional? Give the constant of proportionality if yes.

- a. Cost of bananas at \$0.60 each. $y = \underline{\hspace{2cm}} \cdot x$. Proportional? ☐ Yes ☐ No
 - b. Phone bill: \$20 base + \$0.10 per minute. Proportional? ☐ Yes ☐ No
 - c. Area of a square as a function of its side length. Proportional? ☐ Yes ☐ No
 - d. Number of slices when sharing a pizza equally among n people. Proportional? ☐ Yes ☐ No
- Hint: think about 'inverse'.

Which test did you use most? (graph, table, equation)

2. Here is a partial table. Decide whether it COULD represent a proportional relationship.

x	y
2	5
4	10
6	15
10	25

Proportional? If yes, what is $k = y/x$? Verify it works for every row.

3. Another table. Decide whether it COULD represent a proportional relationship.

x	y
1	5
2	8
3	11
4	14

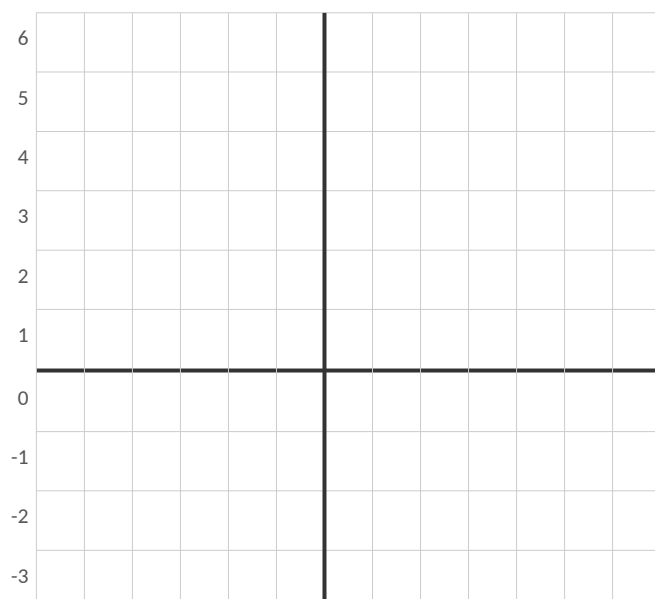
Proportional? Why or why not? What pattern DO you see in the data?

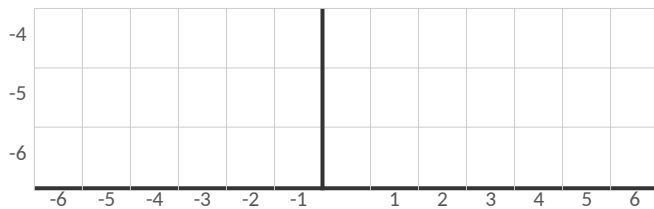
Part C • Graphs of Proportional Relationships

4. Sketch the graphs of these THREE relationships on the same axes (label each):

- a. $y = 2x$
- b. $y = \frac{1}{2}x$
- c. $y = x + 1$

Which TWO are proportional? How do you know just from the graph?





Part D • Circles

5. A circle has diameter 10 cm. Use $\pi \approx 3.14$.

- Find its circumference. $C = \underline{\hspace{2cm}}$ cm
- Find its area. $A = \underline{\hspace{2cm}}$ cm²
- If you DOUBLE the diameter (to 20 cm), what happens to C ? to A ? Explain the pattern.

6. Lin says: "The relationship between a circle's diameter and circumference IS proportional. The constant of proportionality is π ." Test this claim by completing the table.

diameter (cm)	circumference (cm)	C/d
1	≈ 3.14	
2	≈ 6.28	
5	$\underline{\hspace{2cm}}$	
10	$\underline{\hspace{2cm}}$	

Does C/d stay the same? What does this confirm?

Part E • Thinking Deeply

7. Mai believes: "If x and y are proportional with constant k , then x and y^2 are also proportional (with constant k^2)." Test by computing a few values for $k = 3$ (so $y = 3x$).

Table of x , y , y^2 :

Is x and y^2 proportional? Is the constant k^2 ?

8. TWO circles: one with radius 3 cm, one with radius 6 cm. The bigger circle has DOUBLE the radius.

What is the ratio of their circumferences? _____

What is the ratio of their areas? _____

Generalize: if you double a circle's radius, its circumference _____ and its area _____.

9. Diego: "A line through the origin with slope 0.5 IS a proportional relationship." Han: "But the line $y = 0.5x + 0$ is the same as $y = 0.5x$, which is also proportional, so they're the same thing." Sara: "What about $y = 0.5x - 3$?"

Which of these are proportional? Mark each.

☐ $y = 0.5x$ ☐ $y = 0.5x + 0$ ☐ $y = 0.5x - 3$

What is the ONE thing that determines whether a linear equation is proportional?

10. Design a proportional relationship FROM SCRATCH, with a real-world context. Give: the situation, the equation, a table of values, and a graph.
