Plot the Rate

Graph proportional relationships from rules and situations.

MA.7.AR.4.3 · Given a mathematical or real-world context, graph proportional relationships from a table, equation or a written description.

Name _____ Date _____

Graph From a Rule

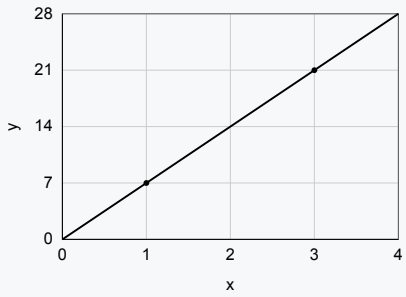
For y = kx, compute ordered pairs and plot them. An abstract proportional line passes through the origin. Use separate points for whole-item counts; connect a continuous measurement only over its valid interval.

Worked example

For y = 7x, the completed graph includes (1,7) and (3,21). Compare its plotted points with the equation.

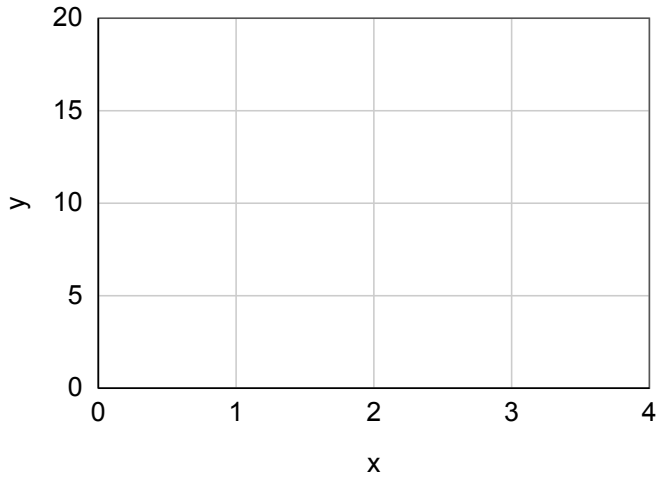
1. Choose x = 1.
2. y = 7(1) = 7, so plot (1, 7).
3. y = 7(3) = 21, so plot (3, 21).

(1, 7) and (3, 21)



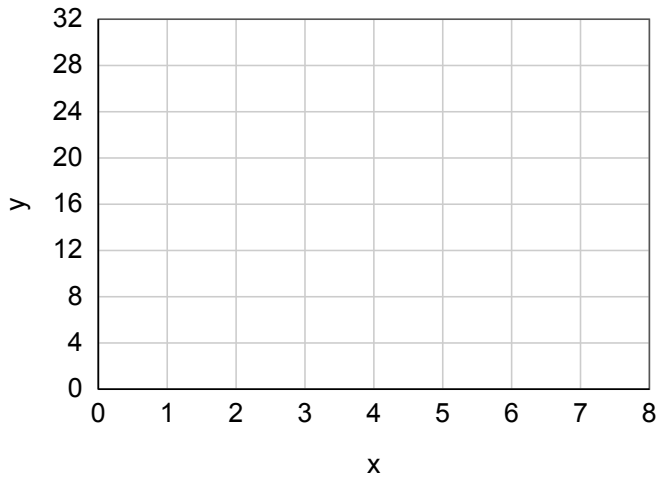
1. Practice

Graph the abstract relationship y = 5x on the grid. Label two points and explain the unit rate.



2. Practice

Graph the abstract relationship y = 4x on the grid. Label two points and explain the unit rate.

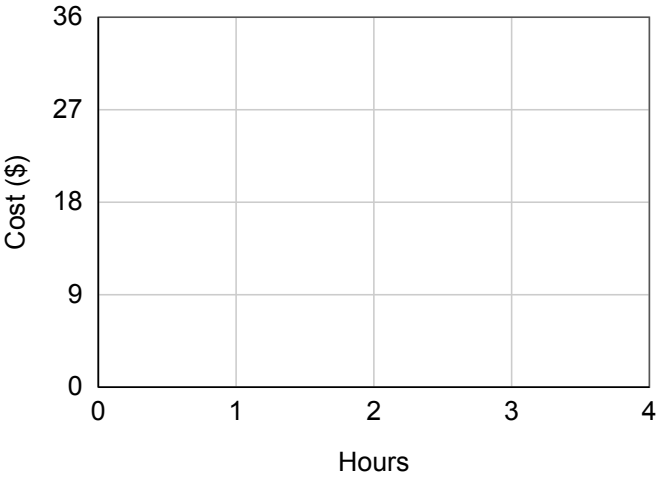


3. Practice

For y = 6x, what point do you graph when x = 5?

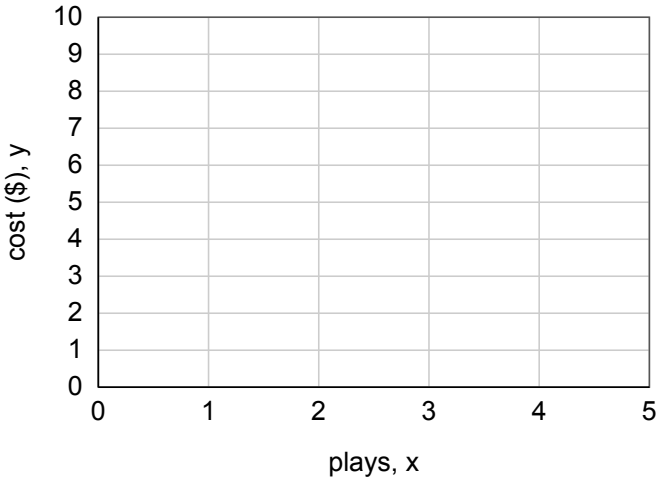
4. Practice

A bike rental costs $9 per hour. Let y be total cost and x be hours. Write an equation and three points for x = 0, 2, and 4. Draw the graph for 0 to 4 hours, allowing fractional-hour rentals.



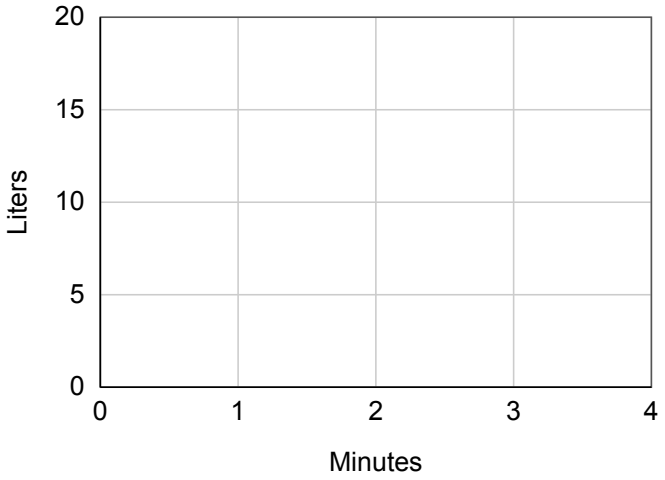
5. Apply

An arcade charges $2 per play. Let x be plays and y be total cost. On the grid, graph the relationship for every whole-number x from 0 through 5. Do not connect the points; only whole plays are available.



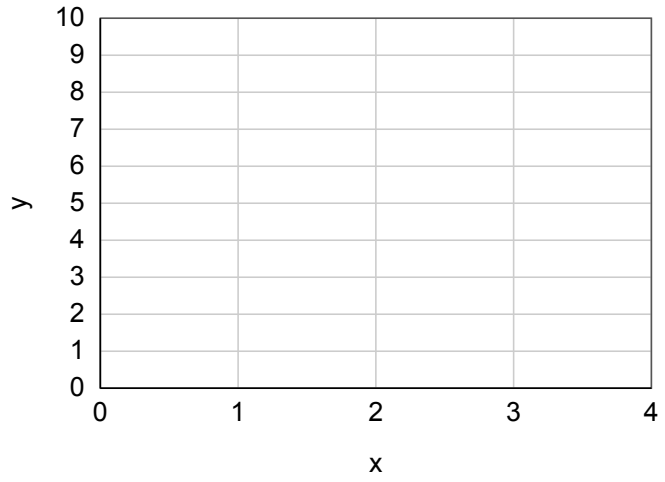
6. Apply

At a constant rate, a tap releases 5 liters per minute. Let x be minutes and y be liters. Graph the relationship for 0 to 4 minutes, including fractional times. Label (0,0), (2,10) and (4,20).



7. Challenge

Graph y = 3/2x and y = 5/2x using x = 0, 2, and 4. Which line is steeper? Explain using the rates. Label each line with its equation.

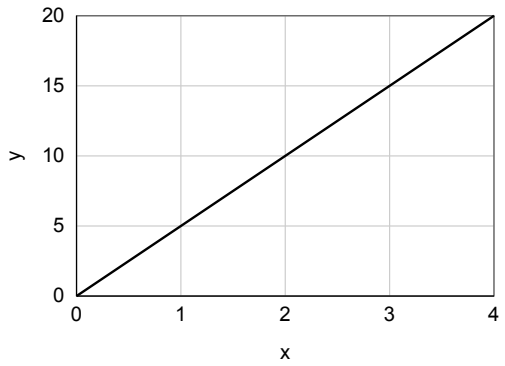


What to accept

For abstract equations, accept the displayed portion of the line through the origin and correct labeled points. For bike rental and water flow, graph the continuous segment over the stated interval. For arcade plays, require separate whole-number points. Accept equivalent correct rate explanations.

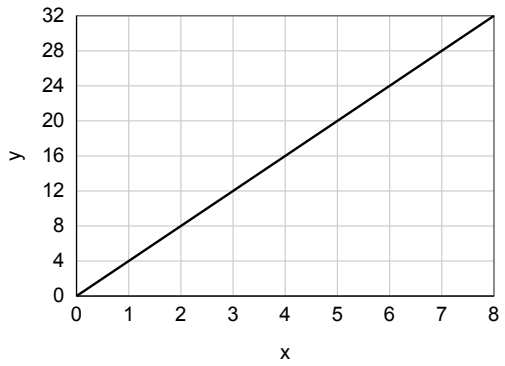
1. Practice

(2, 10) and (4, 20); line through origin; rate 5.



2. Practice

(6, 24) and (8, 32); line through origin; rate 4.

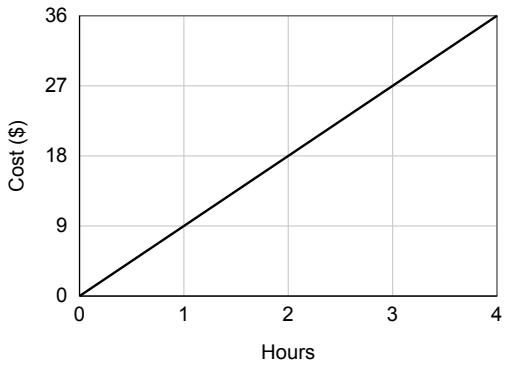


3. Practice

(5, 30)

4. Practice

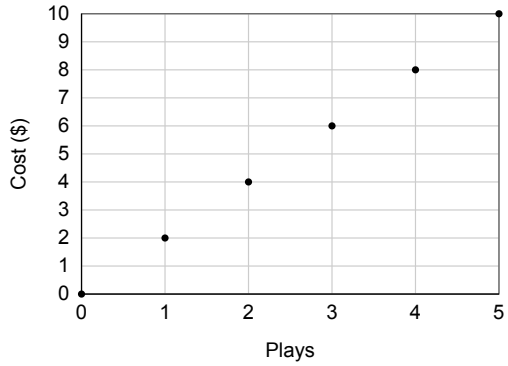
y = 9x; (0, 0), (2, 18), (4, 36)



5. Apply

y = 2x; separate points (0,0), (1,2), (2,4), (3,6), (4,8), (5,10).

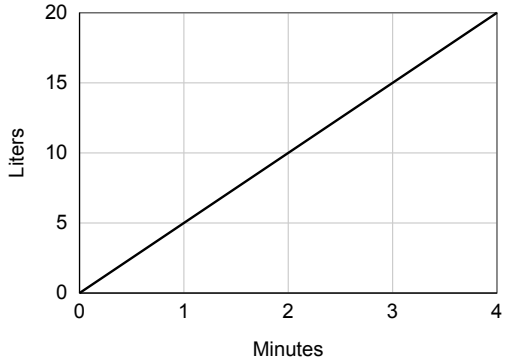
Every additional whole play costs $2.



6. Apply

y=5x; continuous segment through the stated points.

Volume increases by 5 liters per minute.



7. Challenge

For y = 3/2x: (0, 0), (2, 3), (4, 6). For y = 5/2x: (0, 0), (2, 5), (4, 10). The line y = 5/2x is steeper because it rises 5 units for every run of 2 units, while y = 3/2x rises 3 units for every run of 2 units.

