

Modeling Real Situations With Linear Functions

Grade 8 math · Test Answer Key · Standards: 8.F.B.4, 8.F.B.5

Use the scoring lines. Accept equivalent forms of an equation. For sketches, award credit for the correct sequence of rising, level and falling sections, not for exact positions.

Standards: 8.F.B.4, 8.F.B.5 · **Level:** Grade 8

Question 1 Table to rule (3 points)

- a. The outputs rise 6 over a run of 2, so the rate is 3.
- b. At $x = 0$ the output is 14.
- c. $y = 3x + 14$.

(a) 3 (b) 14 (c) $y = 3x + 14$

Scoring: 1 point per part.

Question 2 Two points (3 points)

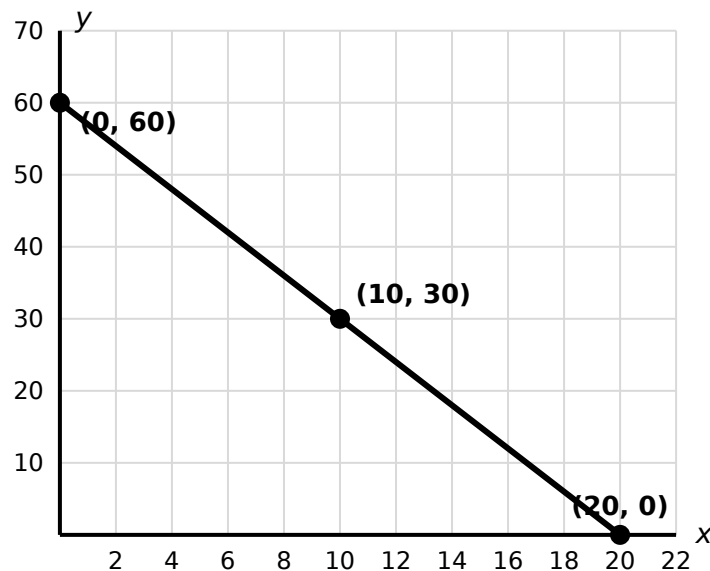
- a. $(8 - (-4)) \div (7 - 3) = 12 \div 4 = 3$.
- b. $-4 = 3(3) + b = 9 + b$, so $b = -13$.
- c. $y = 3x - 13$. Check (7, 8): $21 - 13 = 8$.

(a) 3 (b) -13 (c) $y = 3x - 13$

Scoring: 1 point per part.

Question 3 Draining a pool (3 points)

- a. Rate = $(30 - 60) \div (10 - 0) = -3$ gallons per minute; initial value 60.
- b. $y = -3x + 60$.
- c. $-3x + 60 = 0$ gives $x = 20$.



Empty after 20 minutes.

(a) -3 and 60 (b) $y = -3x + 60$ (c) 20 minutes

Scoring: 1 point per part.

Question 4 Trail club fees (3 points)

- $y = 9x + 25$.
- $9(8) + 25 = 97$.
- The rate 9 is the cost of each hike; 25 is the initial value, the membership fee paid before any hike.

(a) $y = 9x + 25$ (b) \$97 (c) \$9 per hike and a \$25 fee

Scoring: 1 point per part.

Question 5 Hiker's elevation (3 points)

- A: elevation increases steadily; a rising line.
- B: elevation stays the same; a level line, so the hiker is on flat ground or resting.
- C: elevation decreases steadily; a falling line.

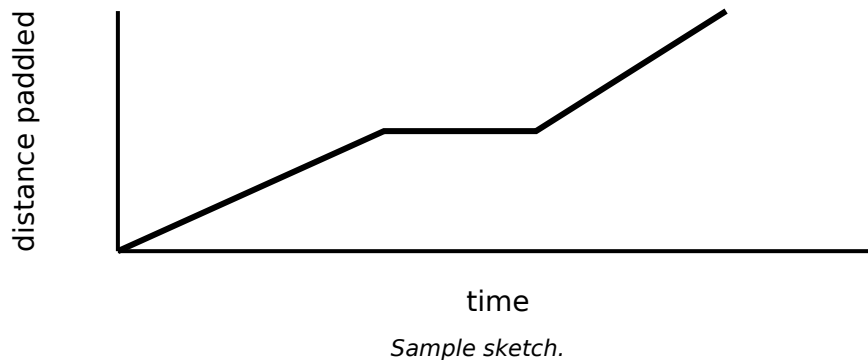
(a) increasing (b) constant (c) decreasing

Scoring: 1 point per section.

Question 6 Sketch a story (2 points)

The graph rises in a straight line, goes level while the kayaker rests, then rises again in a

steeper straight line.



Rise, level, steeper rise

Scoring: 1 point for the level rest section, 1 point for a steeper second climb.

Question 7 Drone model (2 points)

Rate = $(36 - 12) \div (4 - 1) = 8$ feet per second. Then $12 = 8(1) + b$ gives $b = 4$.

Rate 8; $y = 8x + 4$

Scoring: 1 point for the rate, 1 point for the function.

Question 8 Linear or not? (1 point)

The outputs change by 3 and then by 5. The rate is not constant, so the function is not linear.

Not linear

Scoring: 1 point for the conclusion with the changes 3 and 5.