

Interpreting and Comparing Functions in Context

Grade 11 – Algebra 2 math · Test Answer Key · Standards: F-IF.B.4, F-IF.B.5, F-IF.B.6, F-IF.C.8a, F-IF.C.9

Each answer shows the method and a scoring guide. Give partial credit for a correct setup with an arithmetic slip, and add the points for a total out of 20.

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Question 1 Rectangle area model (3 points)

- The width and length $15 - w$ are positive: $0 < w < 15$.
- $A = -w^2 + 15w = -(w - 7.5)^2 + 56.25$. **$-(w - 7.5)^2 + 56.25$.**
- Maximum 56.25 ft^2 at $w = 7.5 \text{ ft}$.**

Scoring: 1 point per part.

Question 2 Average rate of change (2 points)

$k(1) = -2$ and $k(3) = 81 - 9 = 72$. Rate = $(72 - (-2))/(3 - 1) = 74/2 = 37$.

Scoring: 1 point for both values, 1 point for the quotient.

Question 3 Rates from a table (2 points)

0 to 2: $18/2 = 9$. 2 to 4: $32/2 = 16$. 4 to 6: $46/2 = 23$. **9, 16 and 23 ft/s: the drone is speeding up.**

Scoring: 1 point for the three rates, 1 point for the trend.

Question 4 Zeros by completing the square (2 points)

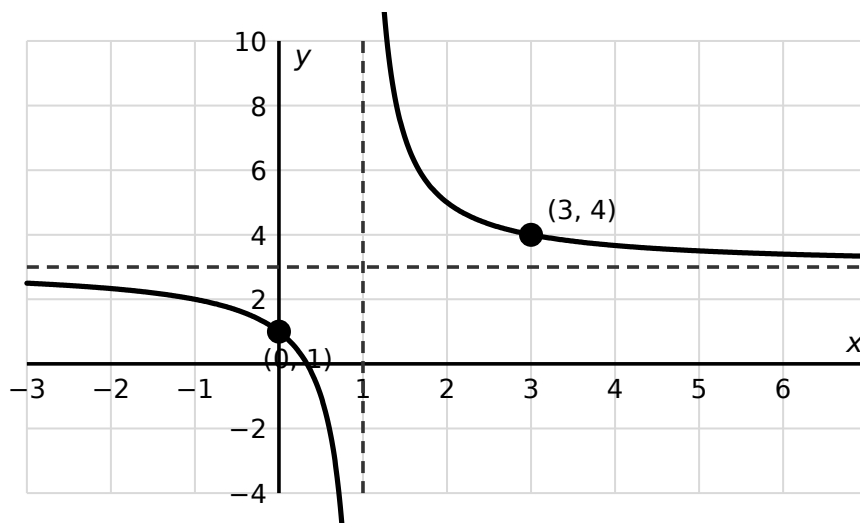
$(x - 4)^2 - 9 = 0$, so $x - 4 = \pm 3$ and $x = 1$ or 7 . The vertex is $(4, -9)$. **Zeros 1 and 7; vertex $(4, -9)$.**

Scoring: 1 point for vertex form, 1 point for the zeros.

Question 5 Features of a rational graph (3 points)

- All real numbers except $x = 1$: **$x \neq 1$.**

- b. $x = 1$, where the denominator is 0.
 c. As $|x|$ grows, $2/(x - 1) \rightarrow 0$, so $y = 3$.



Check points: $(3, 4)$ and $(0, 1)$.

Scoring: 1 point per part.

Question 6 Compare a line and an exponential (3 points)

- a. A: 3. B: $(32 - 4)/3 = 28/3 \approx 9.33$.
 b. $A(5) = 25$ and $B(5) = 4 \cdot 2^5 = 128$.
 c. **B**, because it doubles each step (exponential growth), which eventually outpaces any constant rate.

Scoring: 1 point per part.

Question 7 Trig model features (2 points)

Period = $2\pi \div (\pi/4) = 8$. Maximum = $20 + 5 = 25$ and minimum = $20 - 5 = 15$. **Period 8; max 25; min 15.**

Scoring: 1 point for the period, 1 point for the extremes.

Question 8 Value of a device (2 points)

$V(2) = 1200(0.81) = 972$. Rate = $(972 - 1200)/2 = -114$. **The value falls by an average of \$114 per year over the first two years.**

Scoring: 1 point for the value, 1 point for the interpretation with units.

Question 9 Domain of a logarithm (1 point)

The argument must be positive, so $x - 4 > 0$. **$x > 4$.**

Scoring: 1 point.