

Free Response Practice #1
Calculator NOT Permitted

Consider the piece-wise defined function, $p(x)$, whose equation is below to answer the questions that follow.

$$p(x) = \begin{cases} -2|x+6|+7, & -8 \leq x < -3 \\ \frac{1}{3}x-2, & -3 < x \leq 3 \\ (x-5)^2-5, & 3 < x < 8 \end{cases}$$

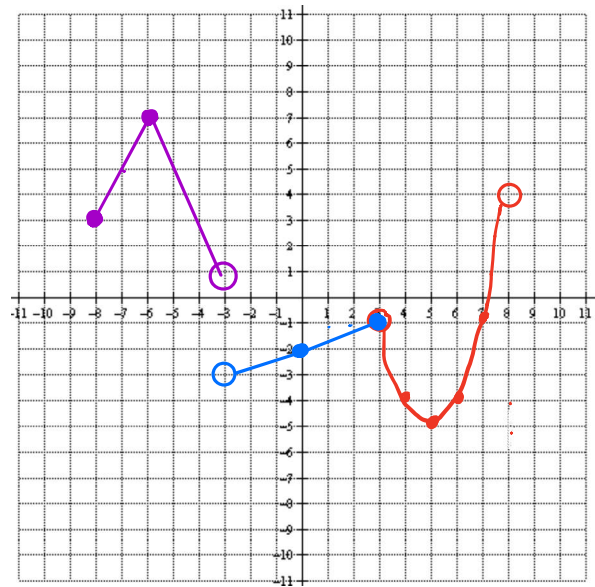
$\checkmark (-4, 7) \quad m = \pm 2 \quad \checkmark$
 $m = \frac{1}{3}, \quad b = -2$
 $\checkmark (5, -5) \quad \checkmark$

a. Find the values of $p(-3)$ and $p(4)$, if they exist. If a value does not exist, explain why it does not.

$p(-3)$ does not exist b/c
 $x = -3$ is not in the domain
of $p(x)$

$$\begin{aligned}
 p(4) &= (4-5)^2 - 5 \\
 &= (-1)^2 - 5 \\
 &= 1 - 5 \\
 p(4) &= -4
 \end{aligned}$$

b. Sketch an accurate graph of $p(x)$ on the grid to the right.



c. Explain how the graph in part b) validates your computations in part a).

The graph of $p(x)$ is undefined when $x = -3$, b/c there is no point when $x = -3$.

$p(4) = -4$ according to the graph $p(x)$ because there is a point at $(4, -4)$

d. Determine the domain and range of $p(x)$ based on the graph above.

Domain: $[-8, -3) \cup (3, 8)$ Range: $[-5, 7]$

Free Response Practice #1 Grading Rubric

Free Response Part A – 2 points total

_____ 1 $p(-3)$ is undefined because $x = -3$ is not an allowed domain value of the function since it is not included in any of the constraints of the equation.

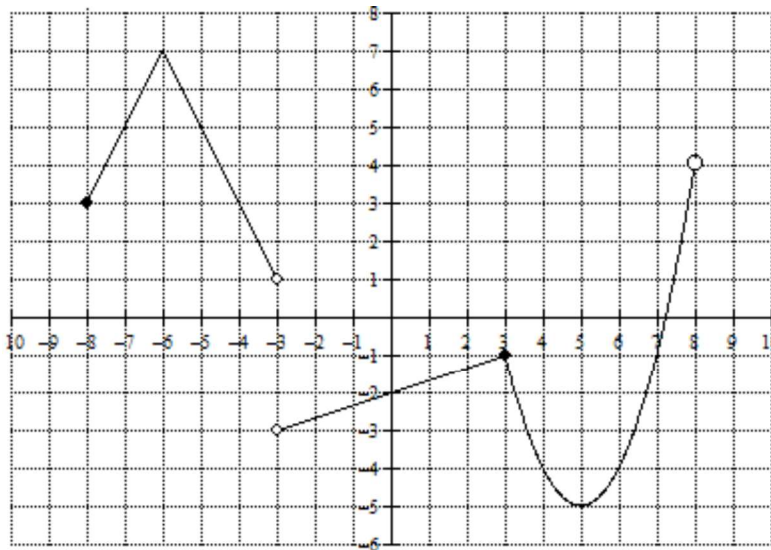
_____ 1 $p(4) = (4 - 5)^2 - 5 = (-1)^2 - 5 = 1 - 5 = -4$.

Free Response Part B – 3 points total

_____ 1 Correctly drawn graph for $-2|x+6|+7, -8 \leq x < -3$

_____ 1 Correctly drawn graph for $\frac{1}{3}x - 2, -3 < x \leq 3$

_____ 1 Correctly drawn graph for $(x-5)^2 - 5, 3 < x < 8$



Free Response Part C – 2 points total

_____ 1 $p(-3)$ is undefined according to the graph because when $x = -3$, there is not point included on the graph.

_____ 1 $p(4) = -4$ according to the graph because when $x = -4$, the point $(4, -4)$ is an included point on the graph.

Free Response Part D – 2 points total

_____ 1 Domain: $[-8, -3) \cup (-3, 8)$

_____ 1 Range: $[-5, 7]$