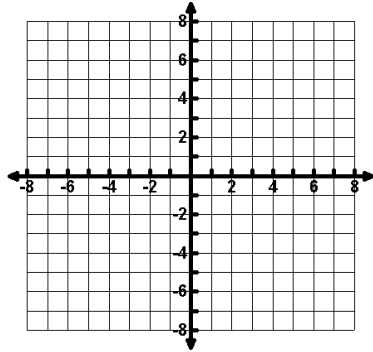**Name** _____   **Date:** _____

Graph the following piecewise functions & determine the characteristics:

1. $h(x) = \begin{cases} -2x - 6, & x < -3 \\ x - 2, & x \geq -3 \end{cases}$
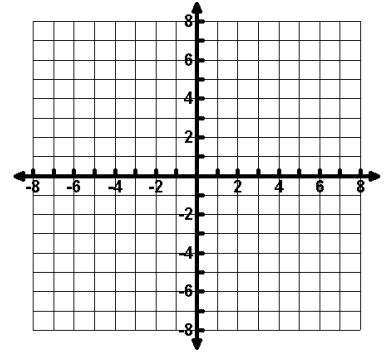
Increasing:

Decreasing:

Point of
Discontinuity:

2. $h(x) = \begin{cases} (x+1)^2 - 2, & x < 1 \\ x + 1, & x \geq 1 \end{cases}$
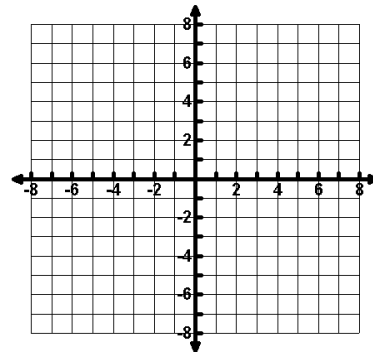
Domain:

Range:

Point of
Discontinuity:

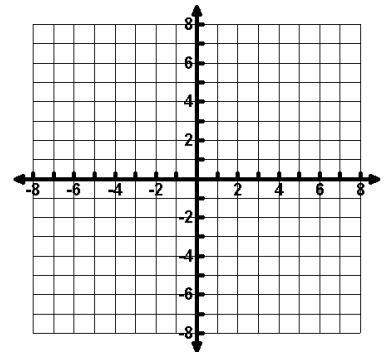3. $f(x) = \begin{cases} -x^2 + 2, & x < 1 \\ 2x + 1, & x \geq 1 \end{cases}$

Domain:

Range:

Point of
Discontinuity:

4. $f(x) = \begin{cases} 3, & x < 0 \\ x^2 - 3, & x \geq 0 \end{cases}$
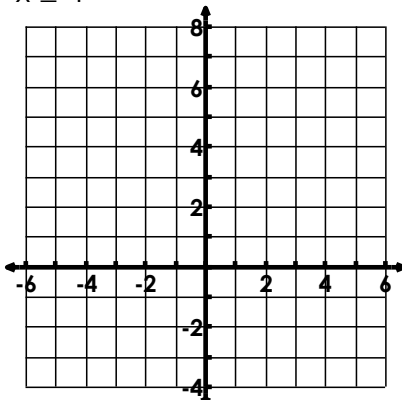
Constant:

Increasing:

5. $f(x) = \begin{cases} \dfrac{1}{2}x & x < 4 \\ -x + 3 & x \geq 4 \end{cases}$

Increasing:

Decreasing:

Point of
Discontinuity:
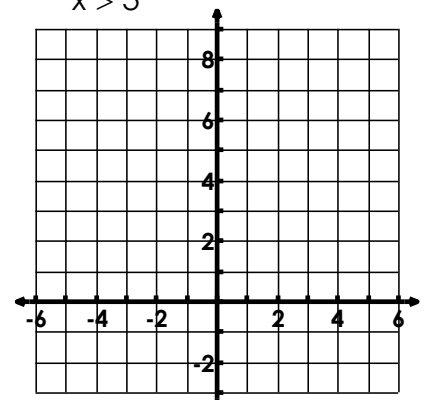
6. $f(x) = \begin{cases} -x + 3 & x \leq -1 \\ 2x & -1 < x \leq 3 \\ 5 & x > 3 \end{cases}$

Increasing:

Decreasing:

Constant:

Point of
Discontinuity:

Evaluate using the indicated function.

$f(x) = \begin{cases} x^2, & x > -1 \\ x - 2, & x \leq -1 \end{cases}$

$g(x) = \begin{cases} 2x, & x \leq -3 \\ 3x - 1, & x > -3 \end{cases}$

$h(x) = \begin{cases} |x| - 2, & x \geq 0 \\ |x - 2|, & x < 0 \end{cases}$
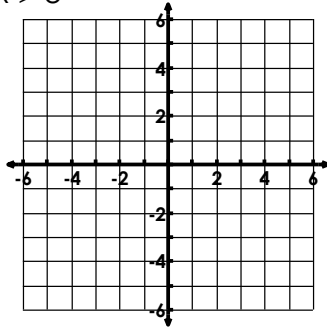
7. $f(4)$

8. $g(-3)$

9. $h(3)$

10. Graph: $f(x) = \begin{cases} 4 & x \le -1 \\ 2 & -1 < x \le 1 \\ 0 & 1 < x \le 3 \\ -2 & x > 3 \end{cases}$
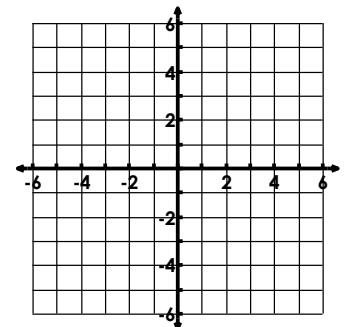
Range:

Constant:

11. Graph: $f(x) = \begin{cases} -2 & x \le -2 \\ 1 & -2 < x \le 2 \\ 4 & x > 2 \end{cases}$

Range:

Point of Discontinuity:

12. Your parents are giving you money based on the number of points you score in the basketball game.
- Up to 7 points: No money
- More than 7 points up to 15 points: $10
- More than 15 points: $20

Write a piecewise function to show the money based on points.

13. When a diabetic takes long-acting insulin, the insulin reaches its peak effect on the blood sugar level in about three hours. This effect remains fairly constant for 5 hours, then declines, and is very low until the next injection. In a typical patient, the level of insulin might be modeled by the following function on the right.

$f(t) = \begin{cases} 40t + 100 & 0 \le t \le 3 \\ 220 & 3 < t \le 8 \\ -80t + 860 & 8 < t \le 10 \\ 60 & 10 < t \le 24 \end{cases}$

Here, $f(t)$ represents the blood sugar level at time t hours after the time of the injection. If a patient takes insulin at 6 am, find the blood sugar level at each of the following times.
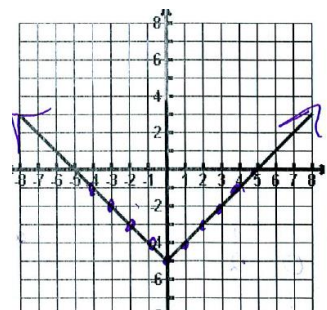
a. 7 am   b. 11 am   c. 3 pm   d. 5 pm

Given the graph, determine the piecewise function (include the domain restriction):

14.

$f(x) = \begin{cases} \underline{\hspace{3cm}} \\ \underline{\hspace{3cm}} \end{cases}$

15.

$f(x) = \begin{cases} \underline{\hspace{3cm}} \\ \underline{\hspace{3cm}} \end{cases}$