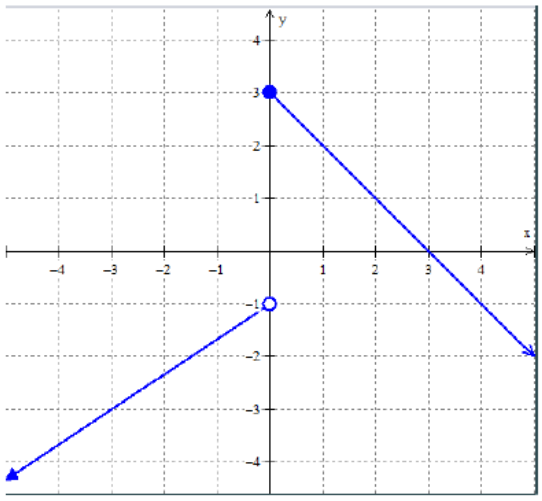
Piecewise Functions

Piecewise Functions –



Algebraically

$$f(x) = \begin{cases} 2x + 8, & x \le -2 \\ x^2 - 3, & -2 < x \le 3 \\ \sqrt{x+3}, & x > 3 \end{cases}$$

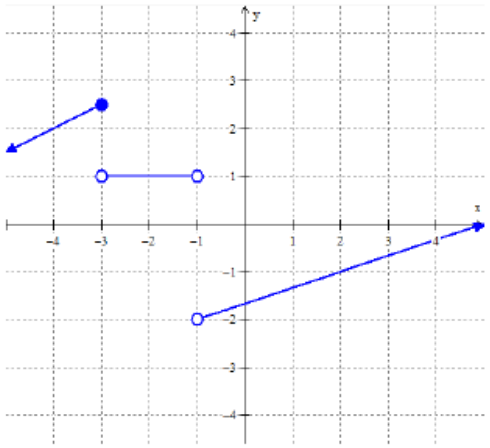
$f(-4) =$	$f(6) =$	$f(-2) =$	$f(0) =$

TRY IT!

$$f(x) = \begin{cases} 2x^3 - 1, & x < 1 \\ 3, & 1 \le x < 5 \\ |x - 2|, & x \ge 5 \end{cases}$$

$f(8) =$	$f(0) =$	$f(4) =$	$f(5) =$

Graphically

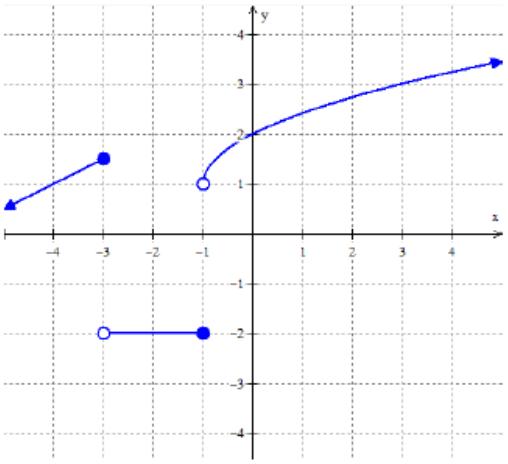


$f(2) =$

$f(-3) =$

$f(-1) =$

$f(-4) =$



$f(0) =$

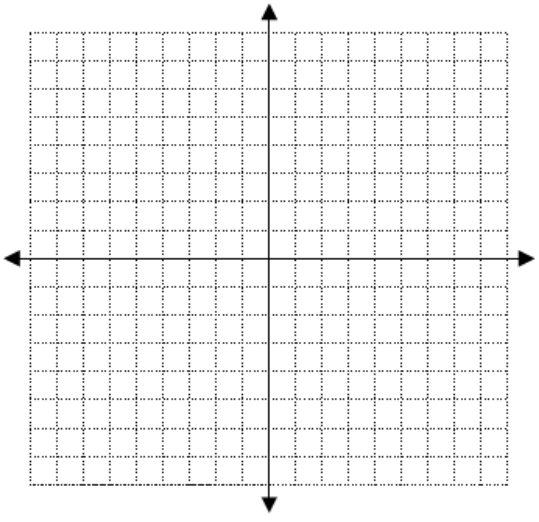
$f(-4) =$

$f(-1) =$

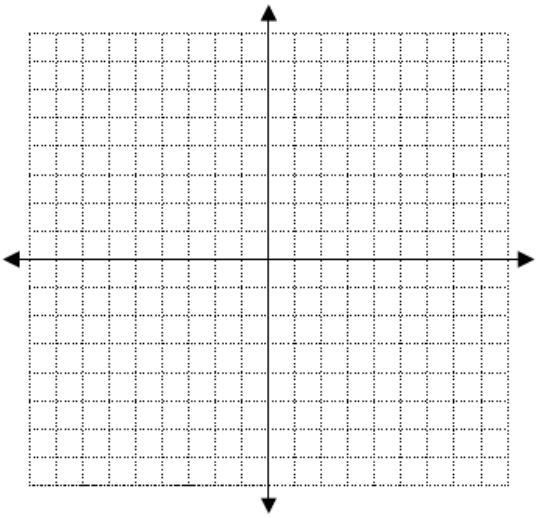
$f(3) =$

TRY IT!

$$f(x) = \begin{cases} -2x + 1, & x < 0 \\ \frac{2}{3}x - 3, & x \geq 0 \end{cases}$$



$$f(x) = \begin{cases} 5, & x \leq 2 \\ 2x - 4, & x > 2 \end{cases}$$



Use the piecewise function to evaluate the following.

1.

$$f(x)=\begin{cases}-2x^2-1, & x\le 2\\ \frac{4}{5}x-4, & x>2\end{cases}$$

a. $f(0)=$ b. $f(5)=$

c. $f(2)=$ d. $f(-3)=$

2.

$$f(x)=\begin{cases}x^3-7x, & x\le -3\\ 8, & -3<x\le 3\\ \sqrt{2x+3}, & x>3\end{cases}$$

a. $f(-5)=$ b. $f(11)=$

c. $f(0)=$ d. $f(3)=$

3.

$$f(x)=\begin{cases}\frac{3}{x+4}, & x<-5\\ x^2-3x, & -5<x\le 0\\ x^4-7, & x>0\end{cases}$$

a. $f(-1)=$ b. $f(4)=$

c. $f(-10)=$ d. $f(0)=$

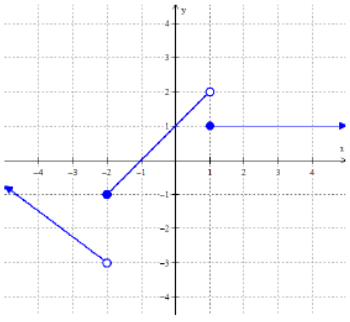
4.

$$f(x)=\begin{cases}|2x+7|, & x\le -4\\ 1+x^2, & -4<x\le 1\\ 6, & 1<x<3\\ \frac{1}{3}x+8, & x\ge 3\end{cases}$$

a. $f(5)=$ b. $f(1)=$

c. $f(-4)=$ d. $f(2)=$

5.



a. $f(-1)=$

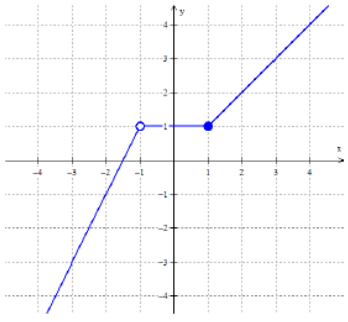
b. $f(2)=$

c. $f(1)=$

d. $f(-2)=$

e. $f(0)=$

6.



a. $f(-3)=$

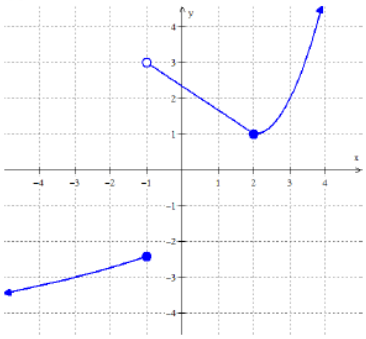
b. $f(4)=$

c. $f(1)=$

d. $f(-1)=$

e. $f(0)=$

7.



a. $f(3) =$

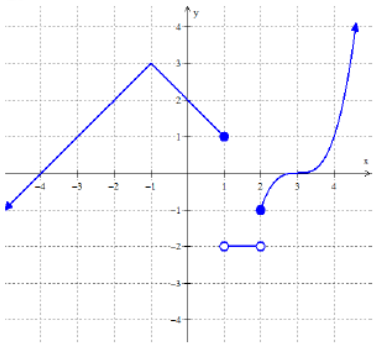
b. $f(-1) =$

c. $f(-3) =$

d. $f(2) =$

e. $f(0.5) =$

8.



a. $f(-4) =$

b. $f(1) =$

c. $f(3) =$

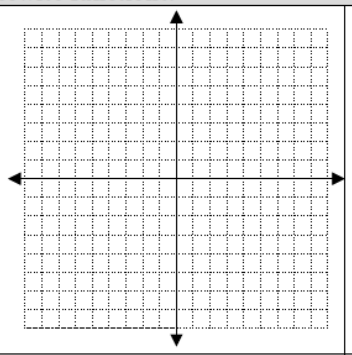
d. $f(2) =$

e. $f(1.5) =$

Graph the following piecewise functions.

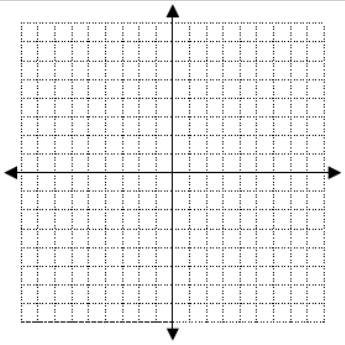
9.

$$f(x) = \begin{cases} 2x + 3, & x \le 0 \\ \frac{1}{2}x - 1, & x > 0 \end{cases}$$



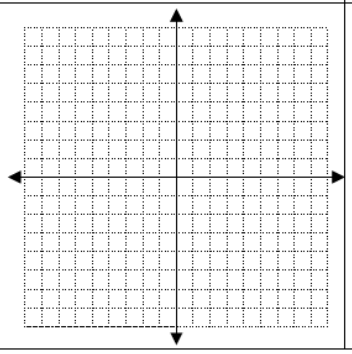
10.

$$f(x) = \begin{cases} -\frac{1}{3}x - 1, & x \le 3 \\ 2, & x > 3 \end{cases}$$



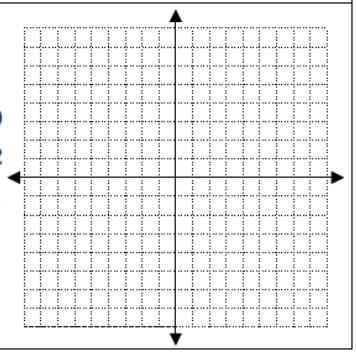
11.

$$f(x) = \begin{cases} 4 - x, & x < 2 \\ 2x - 6, & x \ge 2 \end{cases}$$



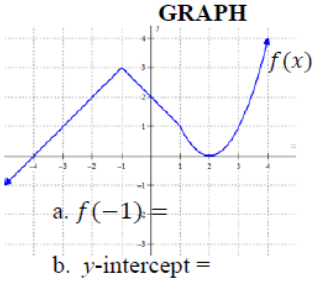
12.

$$f(x) = \begin{cases} \frac{2}{3}x + 3, & x \le 0 \\ 3, & 0 < x < 2 \\ -\frac{1}{2}x, & x \ge 2 \end{cases}$$



ALGEBRA SKILLZ!

GRAPH



a. $f(-1) =$

b. y-intercept =

c. $f(x) = 1$ when $x =$

d. x-intercept(s) =

SIMPLIFY

Simplify the radical.

a. $\sqrt{24}$

b. $4\sqrt{40}$

SOLVE

Solve for x.

a. $15 = \frac{5}{x} + 4$

FACTOR

b. $x^2 - 12x + 35$

1. Use the piecewise function to evaluate the following.

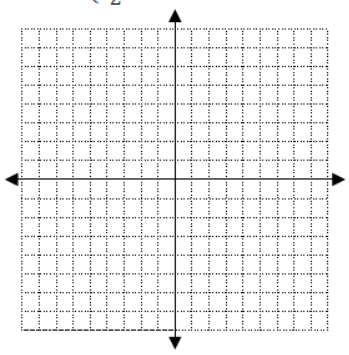
$$f(x) = \begin{cases} \frac{3}{x-2}, & x < -3 \\ 2x^2 - 3x, & -3 < x \leq 6 \\ 8, & x > 6 \end{cases}$$

a. $f(-1) =$ b. $f(-4) =$

c. $f(9) =$ d. $f(6) =$

2. Graph the following piecewise function.

$$f(x) = \begin{cases} -\frac{1}{3}x - 2, & x \leq 0 \\ \frac{1}{2}x + 1, & x > 0 \end{cases}$$



3. **NUMERICALLY** Use the piecewise function to fill in the table.

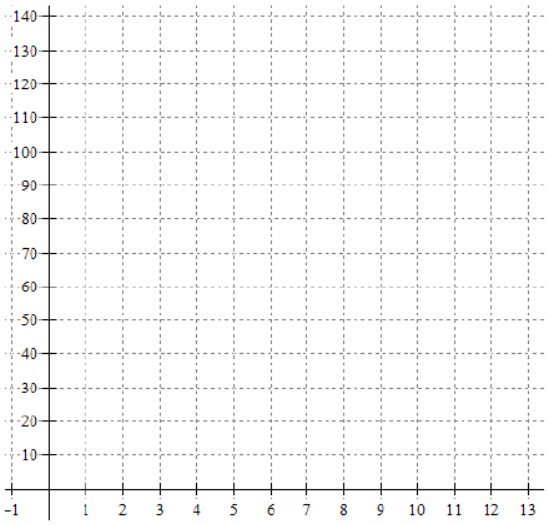
$$f(x) = \begin{cases} -x + 4, & x \leq 0 \\ -3x + 18, & x > 0 \end{cases}$$

x	*f(x)*
-2	
0	
1	
	-12
	9

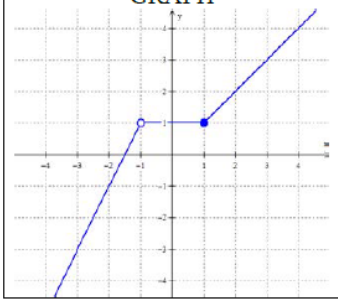
4. **GRAPHICALLY** Sully's blood pressure changes throughout the school day. Sketch a graph of his blood pressure over time. LABEL THE GRAPH! Let x stand for the time since 0800, so 1000 would be $x = 2$, 1200 would be $x = 4$, etc…

<u>Sully's Day</u>

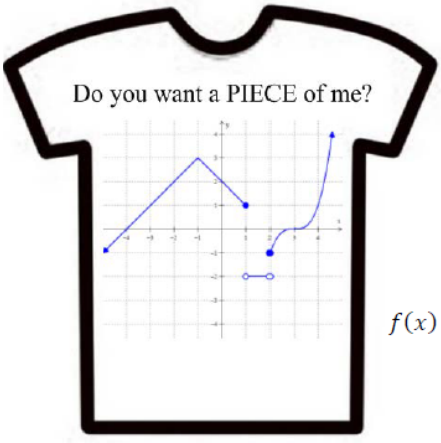
- Sully's blood pressure starts at 90 and rises 5 points every hour for the first 4 hours.
- Sully chills out for lunch from 12-1 and maintains a cool 110 blood pressure.
- Last period of the day hits from 1-3 and Sully's blood pressure rises from 110 at 10 points per hour.
- School ends and Sully's blood pressure starts dropping 2 points per hour until his 8 o'clock bedtime.



5. **ALGEBRAICALLY** Use the picture of the piecewise function to answer the following.

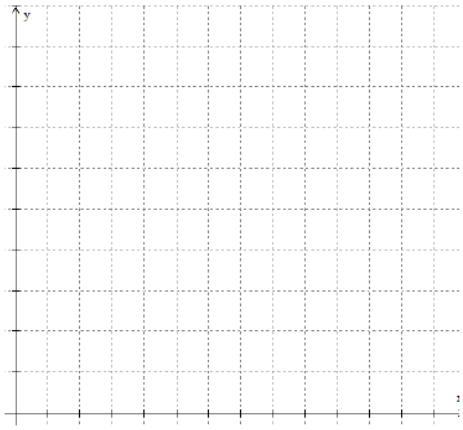
GRAPH	Equation of the pieces	Domain for the pieces	Piecewise function
			$f(x) =$

6. **VERBALLY** Mr. Brust wants to make t-shirts for his Algebra 2 students (shown below). Custom Ink will make the shirts for the following cost. Write a piecewise function to represent individual cost of a t-shirt as function of the number of shirts made. Graph it! Label the graph!



0-20 shirts = \$25 each
21-30 shirts = \$20 each
31-50 shirts = \$15 each
51+ shirts = \$10 each

$f(x) =$



7. **SAT PREP** Below are sample SAT questions. The SAT is the main standardized test that colleges look at for admission. One is multiple choices; the other is free response where you must grid in your answer. Blow it up.

MULITPLE CHOICE

A regulation for riding a certain amusement park ride requires that a child be between 30 inches and 50 inches tall. Which of the following inequalities can be used to determine whether or not the child's height h satisfies the regulation for this ride?

(A) $|h - 10| < 50$
(B) $|h - 20| < 40$
(C) $|h - 30| < 20$
(D) $|h - 40| < 10$
(E) $|h - 45| < 5$

GRID IN

If $x < 0 < y$, find the value of $x + y$ given:

$2|x - 9| = 24$
$|xy| = 15$