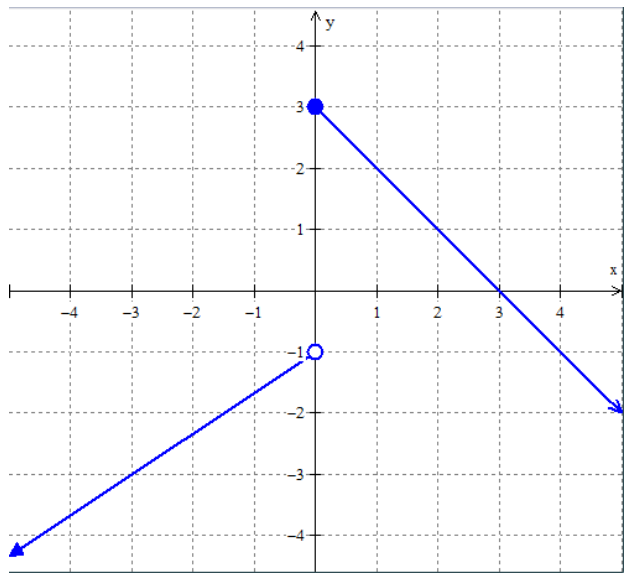


# 3.3 Piecewise Functions

Write your questions here!



## Piecewise Functions –



### Algebraically

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

$f(-4) =$

$f(6) =$

$f(-2) =$

$f(0) =$

### TRY IT!

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

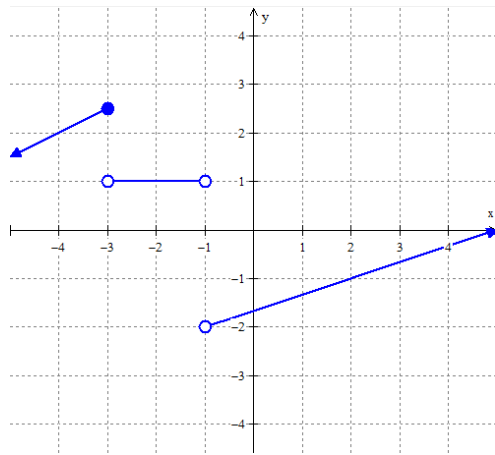
$f(8) =$

$f(0) =$

$f(4) =$

$f(5) =$

# Graphically

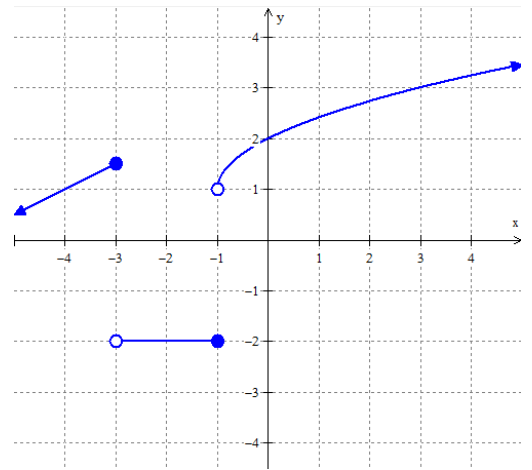


$$f(2) =$$

$$f(-3) =$$

$$f(-1) =$$

$$f(-4) =$$



$$f(0) =$$

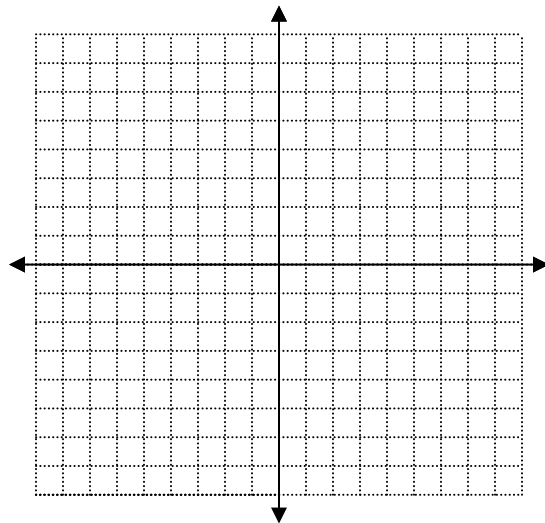
$$f(-4) =$$

$$f(-1) =$$

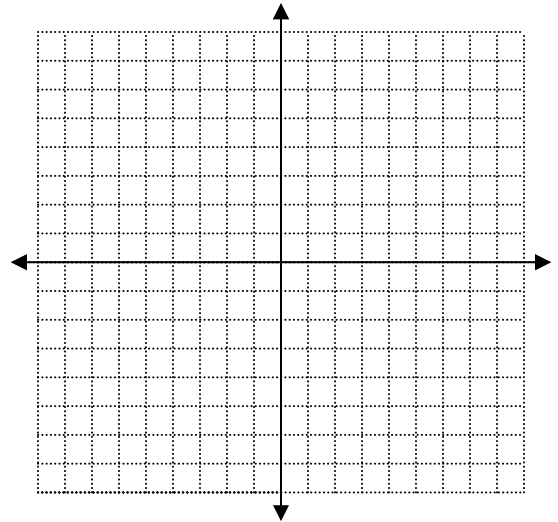
$$f(3) =$$

## TRY IT!

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



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



## SUMMARY:

Now,  
summarize  
your notes  
here!



Use the piecewise function to evaluate the following.

1.

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

a.  $f(0) =$

b.  $f(5) =$

c.  $f(2) =$

d.  $f(-3) =$

2.

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

a.  $f(-5) =$

b.  $f(11) =$

c.  $f(0) =$

d.  $f(3) =$

3.

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

a.  $f(-1) =$

b.  $f(4) =$

c.  $f(-10) =$

d.  $f(0) =$

4.

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

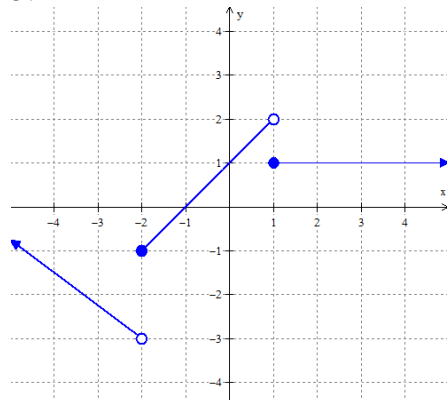
a.  $f(5) =$

b.  $f(1) =$

c.  $f(-4) =$

d.  $f(2) =$

5.



a.  $f(-1) =$

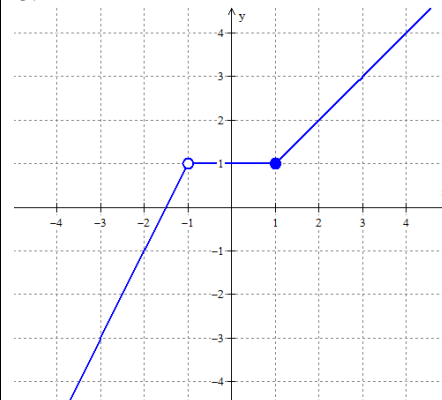
b.  $f(2) =$

c.  $f(1) =$

d.  $f(-2) =$

e.  $f(0) =$

6.



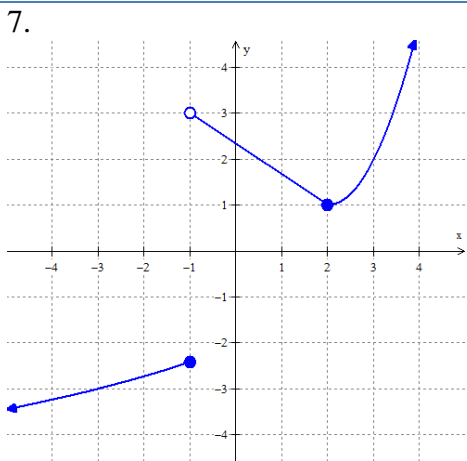
a.  $f(-3) =$

b.  $f(4) =$

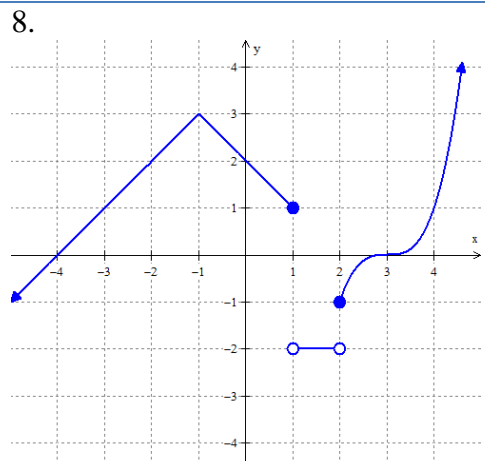
c.  $f(1) =$

d.  $f(-1) =$

e.  $f(0) =$

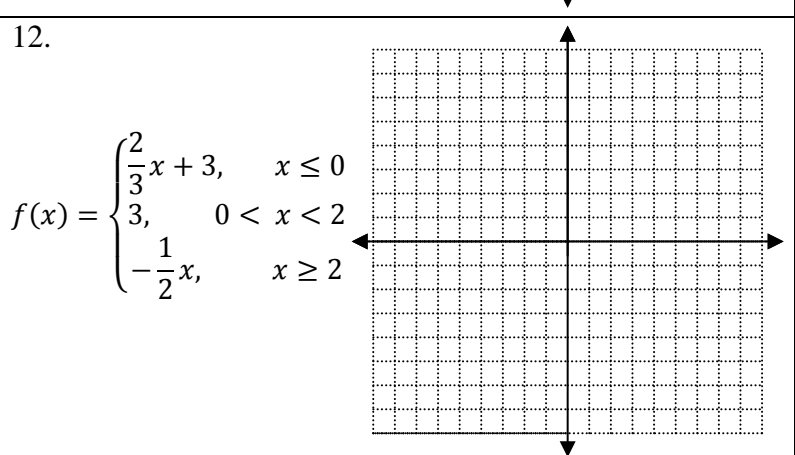
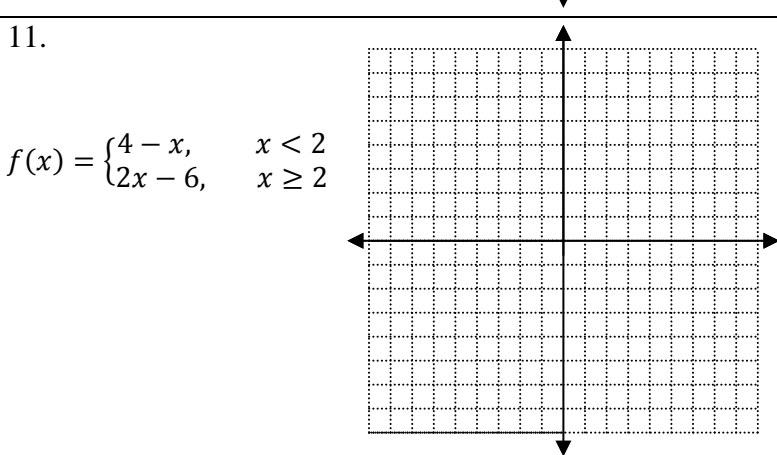
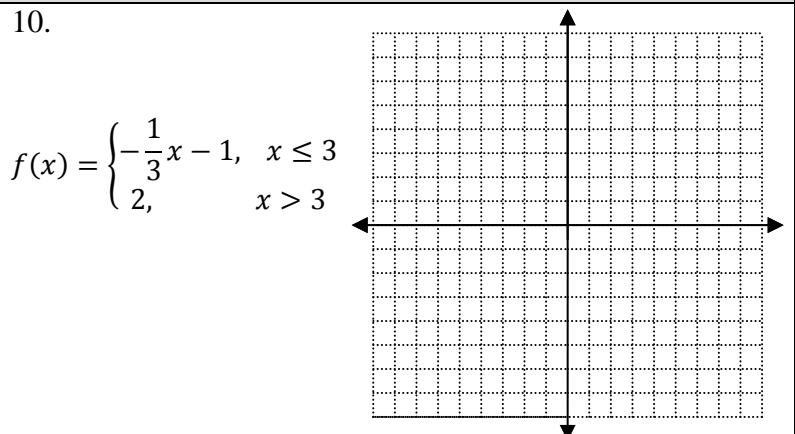
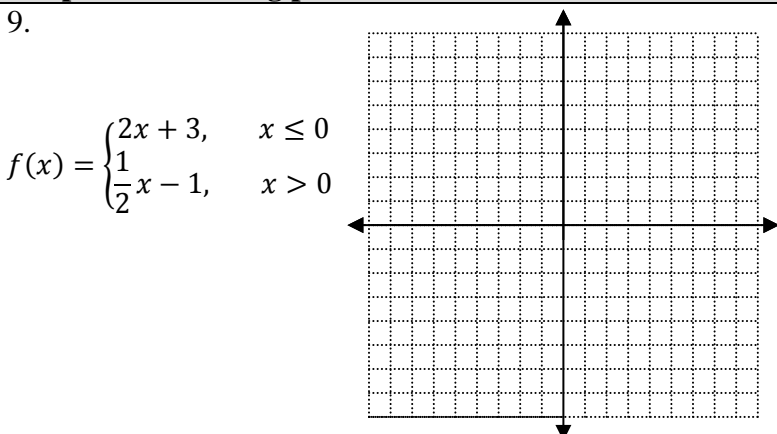


- a.  $f(3) =$
- b.  $f(-1) =$
- c.  $f(-3) =$
- d.  $f(2) =$
- e.  $f(0.5) =$



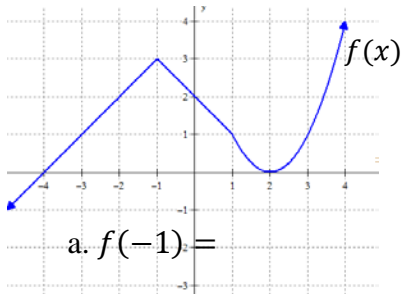
- a.  $f(-4) =$
- b.  $f(1) =$
- c.  $f(3) =$
- d.  $f(2) =$
- e.  $f(1.5) =$

**Graph the following piecewise functions.**



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

### 3.3 Piecewise Functions

### APPLICATION

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.  $f(-1) =$

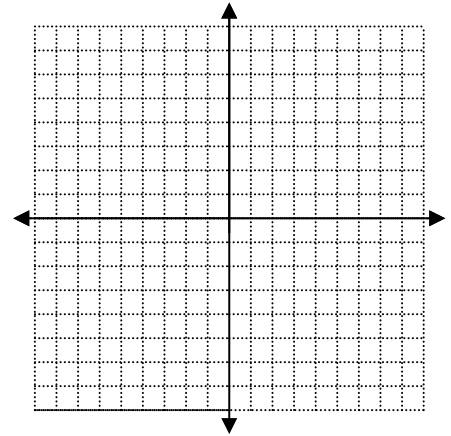
b.  $f(-4) =$

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.

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

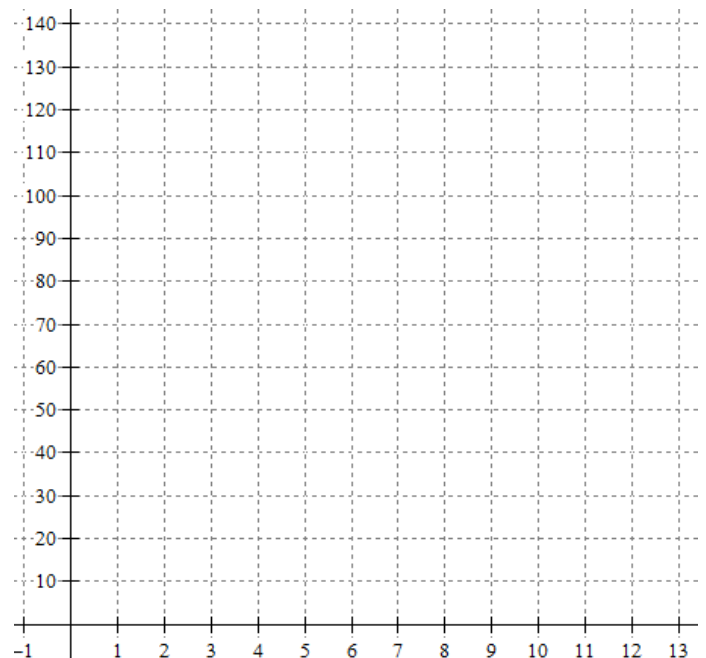
$x$	$f(x)$
-2	
0	
1	
	-12
	9

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...

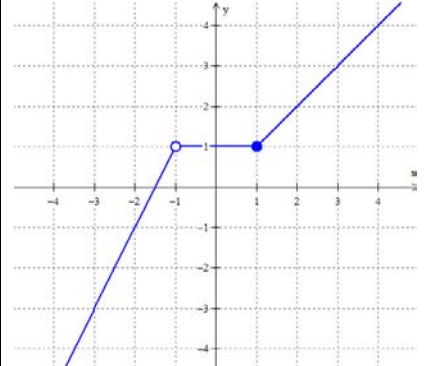


#### Sully’s Day

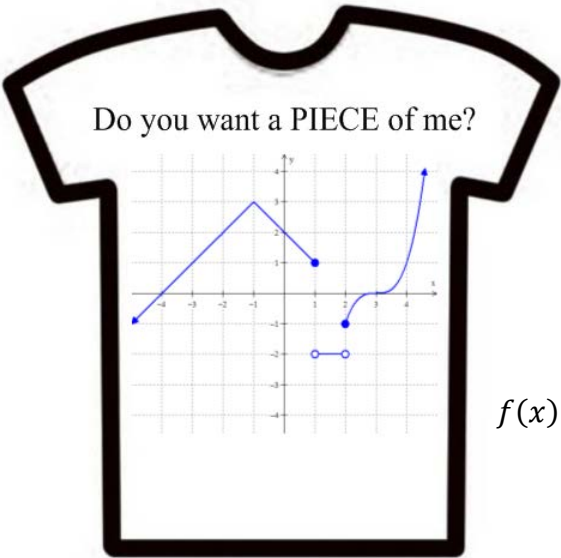
- Sully’s blood pressure starts at 90 and rises 5 points every hour for the first 4 hours.
- Sully chills out for lunch from 12-1 and maintains a cool 110 blood pressure.
- Last period of the day hits from 1-3 and Sully’s blood pressure rises from 110 at 10 points per hour.
- School ends and Sully’s 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
			$f(x) = \left\{ \begin{array}{l} \end{array} \right.$

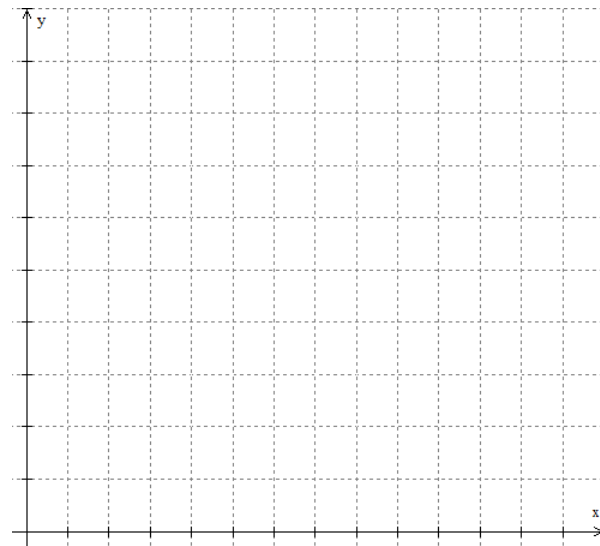
6. **VERBALLY** Mr. Brust wants to make t-shirts for his Algebra 2 students (shown below). Custom Ink will make the shirts for the following cost. Write a piecewise function to represent individual cost of a t-shirt as function of the number of shirts made. Graph it!



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

$f(x) = \left\{ \begin{array}{l} \end{array} \right.$

Label the graph!



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.

**MULTIPLE 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:

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

$$|xy| = 15$$

•	•	•	•
	0	0	0
①	①	①	①
②	②	②	②
③	③	③	③
④	④	④	④
⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨