Homework 2.4: Applications of Piecewise

Name: Key

Math 3

1. Use the piecewise function to evaluate the following:

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

a. f(-1) = 5 (-1, 5)

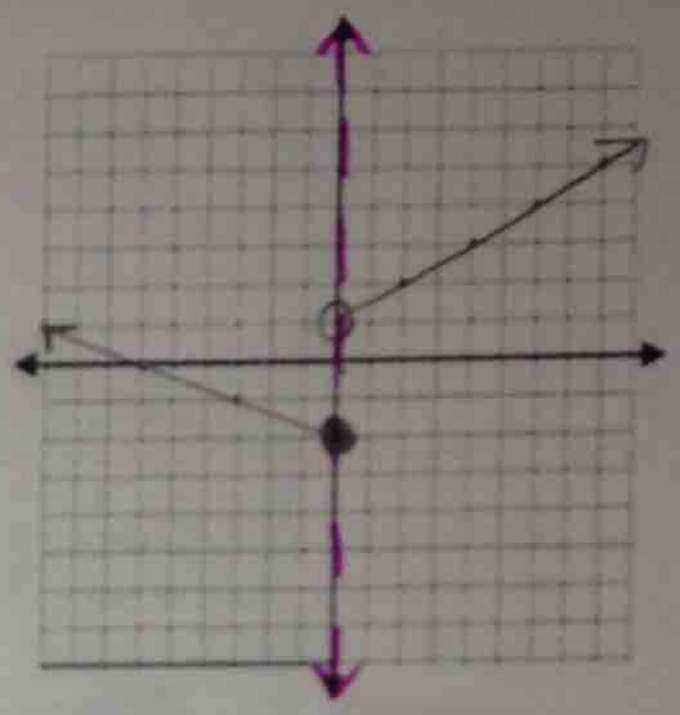
b. f(-4) = -1/2 (-4, -1/2)

c. f(9) = 8 (9, 8)

d. f(6) = 54 (6, 54)

2. Graph the following piecewise function.

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



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

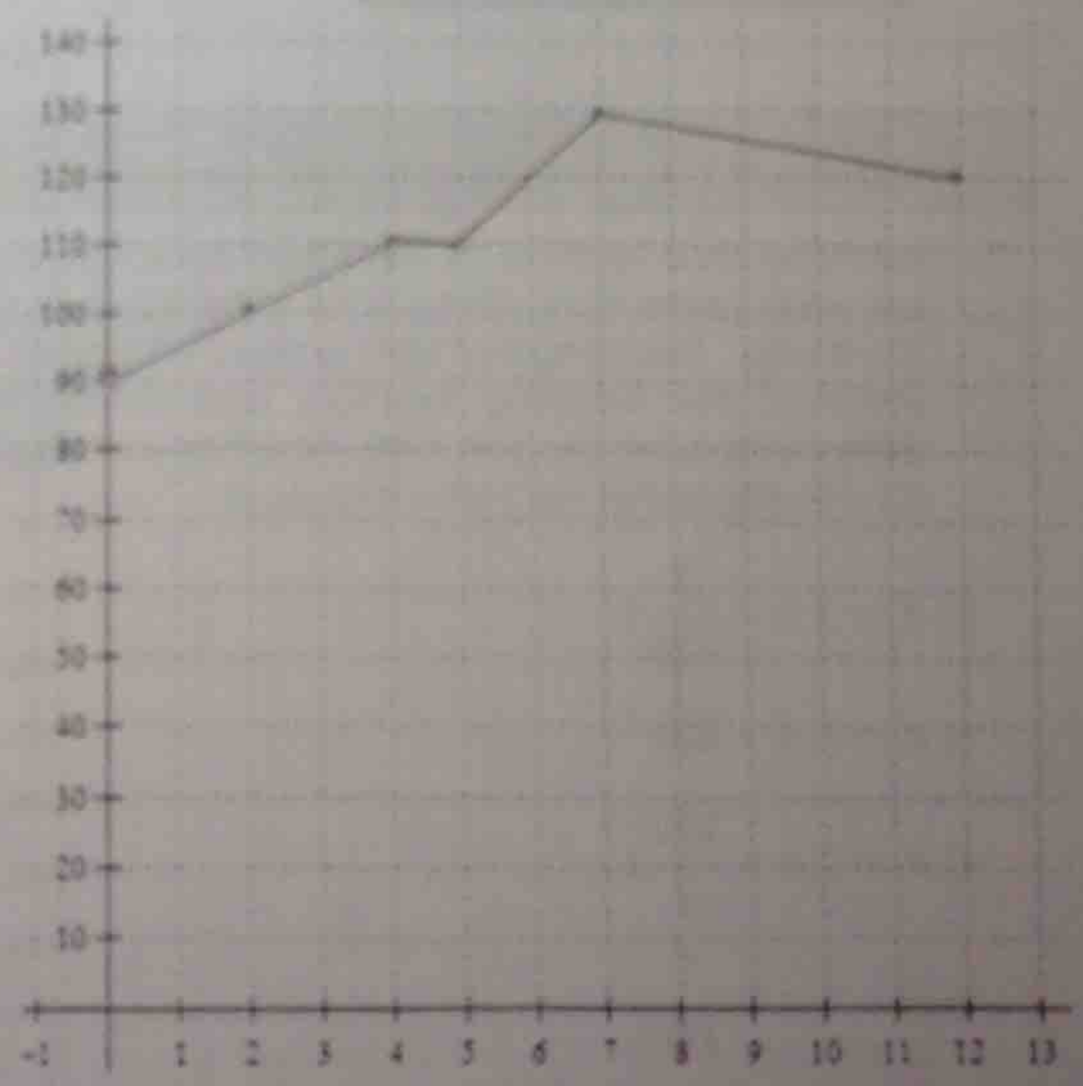
$$f(x)=\begin{cases}-x+4, & x\le 0\\ -3x+18, & x>0\end{cases}$$

x	f(x)
-2	6
0	4
1	15
10	-12
3	9

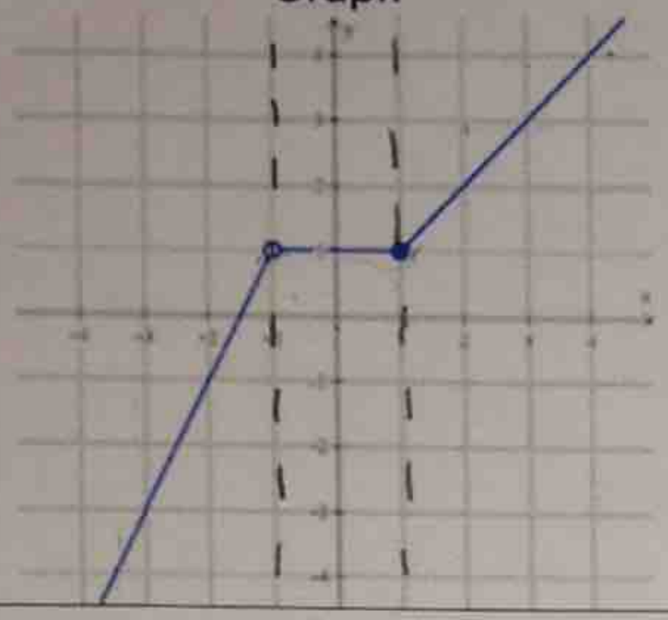
4. Sully's blood pressure changes throughout the school day. Sketch a graph of his blood pressure over time. **LABEL THE GRAPH!** Let x stand for the time since 8:00 am, so 10:00 am would be x = 2, 12:00 pm would be x = 4, etc...

Sully's Day

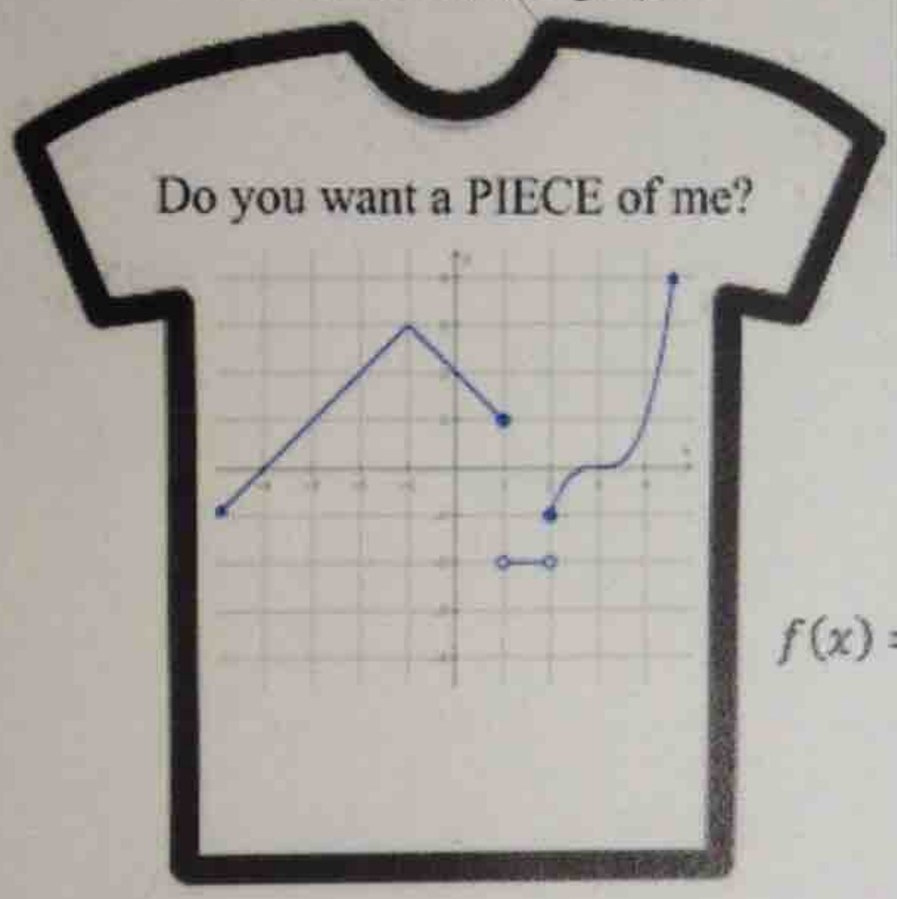
- Sully's blood pressure starts at 90 and rises 5 points every hour for the first 4 hours.
- Sully chills out for lunch from 12-1 and maintains a cool 110 blood pressure.
- Last period of the day is from 1-3 pm and Sully's blood pressure rises from 110 at 10 points per hour.
- School ends and Sully's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



5. Use the picture of the piecewise function to answer the following:

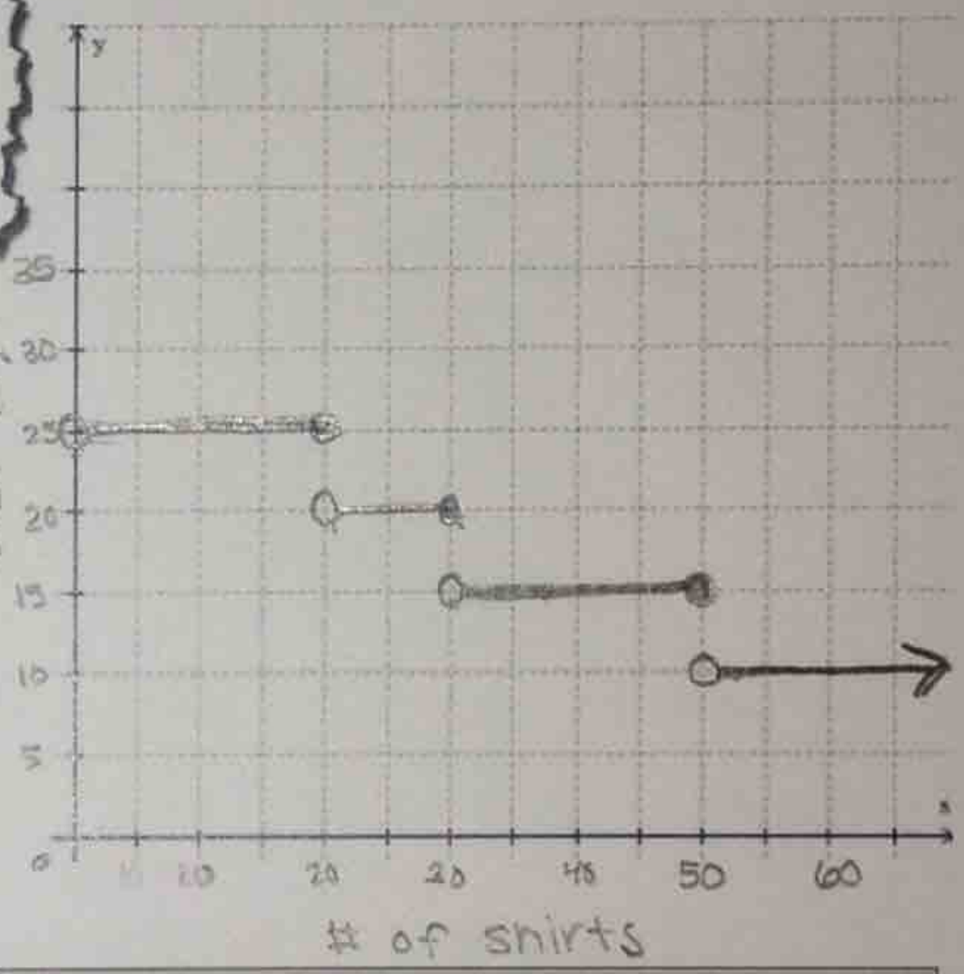
Graph	Equation of Pieces	Domain for Pieces	Piecewise Function
	$y = 2x + 3$ $y = 1$ $y = x$	$x < -1$ $-1 < x \leq 1$ $x \geq 1$	$f(x) = \begin{cases} 2x+3, & x < -1 \\ 1, & -1 < x < 1 \\ x, & x \geq 1 \end{cases}$

6. Ms. Russell wants to make t-shirts for his Math 3 students (shown below). Custom Ink will make the shirts and sell them for the following prices. Write a piecewise function to represent cost, y, in dollars and t-shirts, x. Graph it! Label the graph!



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

$$f(x) = \begin{cases} 25, & 0 < x \leq 20 \\ 20, & 20 < x \leq 30 \\ 15, & 30 < x \leq 50 \\ 10, & x > 50 \end{cases}$$



SAT Practice

7. Minli's house is located 1.4 miles from her school. When she walks home from school, it takes her an average of 24 minutes. Assuming that Minli walks at a constant rate, which of the following functions best models Minli's distance from home, d, in miles if she has walked a total of t minutes on her trip home that day?

- ✓ $d = 1.4 - \frac{7}{120}t$
- $d = 1.4 - 24t$
- $d = 1.4 - \frac{120}{7}t$
- $d = 1.4 + \frac{7}{120}t$

$d = rt$
$1.4 = 24r$
$r = 7/120$

$$P = P_0 + \rho g h$$

8. The absolute pressure, P, in a fluid density, ρ, at a given depth, h, can be found with the above equation, where P_0 is the atmospheric pressure and g is the gravitational acceleration. Which of the following is the correct expression for the depth in terms of the absolute pressure, atmospheric pressure, fluid density, and gravitational acceleration?

- ✓ $h = \frac{P - P_0}{\rho g}$
- $h = \frac{P + P_0}{\rho g}$
- $h = \frac{P}{\rho g} - P_0$
- $h = \frac{P}{\rho g} + P_0$

$P = P_0 + \rho g h$
$P - P_0 = \rho g h$
$h = \frac{P - P_0}{\rho g}$