

I. Evaluate each piecewise function using the given function. Show work in the specific provided space!

1.) $f(x) = \begin{cases} 3x+5 & \text{if } x < 0 \\ 4x-3 & \text{if } x \geq 0 \end{cases}$

x	Work to find f(x) or y	Pt (x,y)
-4	$3(-4)+5 = -7$	$(-4, -7)$
-1	$3(-1)+5 = 2$	$(-1, 2)$
0	$4(0)-3 = -3$	$(0, -3)$
3	$4(3)-3 = 9$	$(3, 9)$

2.) $f(x) = \begin{cases} 2x-3 & \text{if } x \neq 2 \\ -4 & \text{if } x = 2 \end{cases}$

x	Work to find f(x) or y	Pt (x,y)
-2	$2(-2)-3 = -7$	$(-2, -7)$
1	$2(1)-3 = -1$	$(1, -1)$
2	-4	$(2, -4)$
-5	$2(-5)-3 = -13$	$(-5, -13)$

3.) $f(x) = \begin{cases} 3 & \text{if } x < -3 \\ 2x+1 & \text{if } x > -3 \end{cases}$

x	Work to find f(x) or y	Pt (x,y)
-5	3	$(-5, 3)$
4	$2(4)+1 = 9$	$(4, 9)$
-3	Undefined	\emptyset
-2	$2(-2)+1 = -3$	$(-2, -3)$

4.) $f(x) = \begin{cases} 3-4x & \text{if } x \leq 0 \\ 3x+2 & \text{if } 0 < x \leq 2 \\ 2|x-2| & \text{if } x > 2 \end{cases}$

x	Work to find f(x) or y	Pt (x,y)
-4	$3-4(-4) = 19$	$(-4, 19)$
1	$3(1)+2 = 5$	$(1, 5)$
0	$3-4(0) = 3$	$(0, 3)$
4	$2 4-2 = 4$	$(4, 4)$

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

x	Work to find f(x) or y	Pt (x,y)
0	undefined	\emptyset
-3	$-3+2 = -1$	$(-3, -1)$
3	$3-3 = 0$	$(3, 0)$
2	$3(1-2(2))^2 = 27$	$(2, 27)$

6.) $f(x) = \begin{cases} 4-2x & \text{if } -1 \leq x \leq 1 \cup x \neq 0 \\ -1 & \text{if } x = 0 \\ \sqrt{2x+4} & \text{if } x < -1 \cup x > 1 \end{cases}$

x	Work to find f(x) or y	Pt (x,y)
0	-1	$(0, -1)$
-3	$\sqrt{2(-3)+4} = \text{undef}$	\emptyset
2	$\sqrt{2(2)+4} = \sqrt{8} = 2\sqrt{2}$	$(2, 2\sqrt{2})$
1	$4-2(1) = 2$	$(1, 2)$

II. Complete each problem below. Show work!

- 7.) In a certain country, income tax is assessed according to the following function:

$$f(x) = \begin{cases} 0 & \text{if } 0 \leq x \leq 10,000 \\ 0.08x & \text{if } 10,000 < x \leq 20,000 \\ 1600 + 0.15x & \text{if } x > 20,000 \end{cases}$$

Find: b.) T(12,000) c.) T(25,000)

960

5535

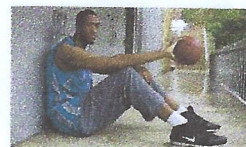
$0.08(12000)$

$1600 + 0.15(25000)$

- 8.) An eccentric billionaire wants to help some local students with their finances. A function is created based on their heights:

$$f(x) = \begin{cases} 0.04x^3 + 50 & \text{if } x < 65'' \text{ tall} \\ 2.25x^2 - 10 & \text{if } x \geq 65'' \text{ tall} \end{cases}$$

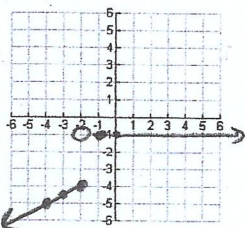
Kenny George, who is 7'8" tall is possibly the tallest player in the history of college basketball. How much money would he receive?



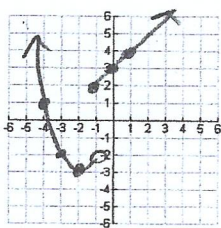
$7 \times 12 + 8 = 92'' \rightarrow 2.25(92)^2 - 10 = \underline{819,034}$

III. Graph each piecewise function ACCURATELY.

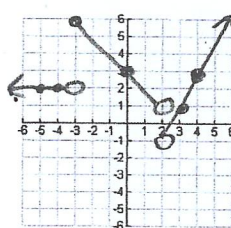
9.) $f(x) = \begin{cases} \frac{1}{2}x-3 & \text{if } x \leq -2 \\ -2 & \text{if } x > -2 \end{cases}$



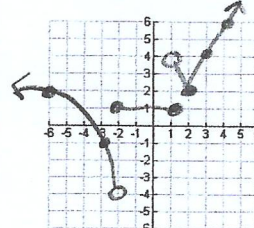
10.) $f(x) = \begin{cases} x^2+4x+1 & \text{if } x < -1 \\ x+3 & \text{if } x \geq -1 \end{cases}$



11.) $f(x) = \begin{cases} 2 & \text{if } x < -3 \\ 3-x & \text{if } -3 \leq x < 2 \\ 2x-5 & \text{if } x \geq 2 \end{cases}$



12.) $f(x) = \begin{cases} 3\sqrt{x-2}-4 & \text{if } x < -2 \\ 1 & \text{if } -2 \leq x \leq 1 \\ 2|x-2|+2 & \text{if } x > 1 \end{cases}$



IV. Determine the domain and range of each given piecewise graph in interval notation.

Problem # 13	Problem # 14	Problem # 15	Problem # 16
D: $(-\infty, \infty)$ R: $[-4] \cup (0, 5]$	D: $(-\infty, 4) \cup (0, 4)$ R: $(-\infty, 3)$	D: $[-6, 3) \cup (3, \infty)$ R: $(-6, \infty)$	D: $(-\infty, 1) \cup [2, \infty)$ R: $(-\infty, 5]$