AFM Unit 2 – Piecewise Functions REVIEW Name: key 2017

Identify the domain and range for the following. Be sure to write your answers in interval notation.

1. $f(x) = \sqrt{x+4}$ $x+4 \geq 0$, $x \geq -4$

Domain: $[-4, \infty)$

Range: $[0, \infty)$

2. $f(x) = x^2 + 3x - 1$

Domain: $(-\infty, \infty)$

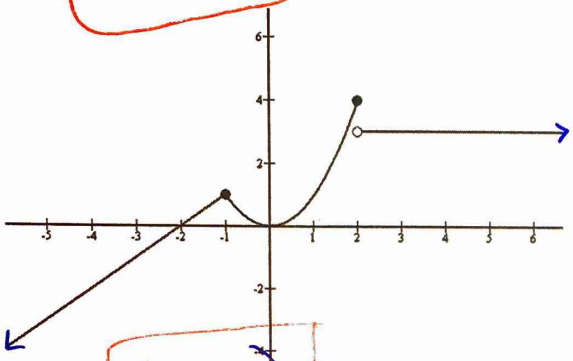
Range: $[-3.25, \infty)$

*use 2nd trace to find minimum

3. $f(x) = \begin{cases} x^2; & x < 0 \\ x+2; & x \geq 0 \end{cases}$

Domain: $(-\infty, \infty)$

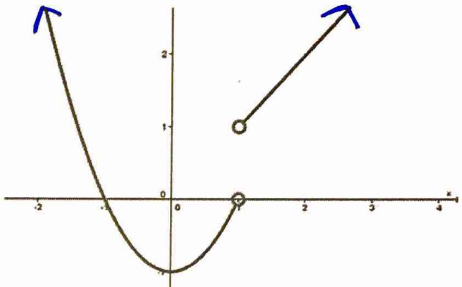
Range: $(0, \infty)$



4.

Domain: $(-\infty, \infty)$

Range: $(-\infty, 4]$



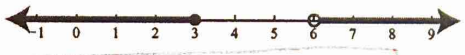
5.

Domain: $(-\infty, 1) \cup (1, \infty)$

Range: $[-1, \infty)$

Use interval notation to express the values on the number lines shown below:

6.



$(-\infty, 3] \cup (6, \infty)$

7.

$(-\infty, \infty)$

Solve the following inequalities. Graph on a number line and write your answer in interval notation.

8. $-8 < 3x - 2 \leq 10$

$-6 < 3x \leq 12$

$-2 < x \leq 4$

$(-2, 4]$

10. $2x + 5 > 11$ and $-4x - 3 < 15$

$2x > 6$ $\quad -4x < 18$

$x > 3$ AND $x > -9/2$ or -4.5

$(3, \infty)$

9. $\left(\frac{2x}{5} + \frac{x}{2} < 4\right) \cdot 10$ *multiply by 10 to get rid of the fractions!

$\frac{20x}{5} + \frac{10x}{2} < 40$ *simplify!

$4x + 5x < 40$

$9x < 40$

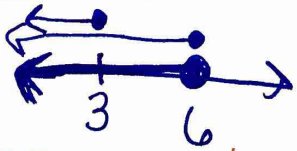
$x < 40/9$ or 4.44

$(-\infty, \frac{40}{9})$

11. $3x - 1 \leq 8$ or $2x \leq 12$

$3x \leq 9$ $\quad x \leq 6$

$x \leq 3$ OR

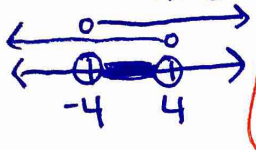


$(-\infty, 6]$

12. $|-3p| < 12$ less than → AND!

ⓐ $-3p < 12$ ⓑ $-3p > -12$

$p > -4$ AND $p < 4$



$(-4, 4)$

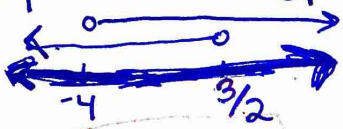
13. $4|8a + 10| > -88$

$|8a+10| > -22$ greater → OR!

ⓐ $8a+10 > -22$ ⓑ $8a+10 < 22$

$8a > -32$ $8a < 12$

$a > -4$ OR $a < 3/2$ or 1.5



$(-\infty, \infty)$

*don't pick your rhyming word until you isolate the Absolute Value

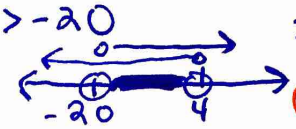
14. $-9|-8 - x| > -108$

$|-8-x| < 12$ less than → AND

ⓐ $-8-x < 12$ ⓑ $-8-x > -12$

$-x < 20$ $x > -4$

$x > -20$ $x < 4$



$(-20, 4)$

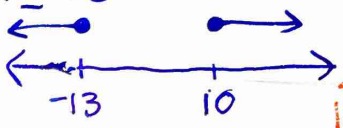
15. $|-3 - 2k| + 6 \leq -17$

$|-3-2k| \leq -23$ less than → AND

ⓐ $-3-2k \leq -23$ ⓑ $-3-2k \geq 23$

$-2k \leq -20$ $-2k \geq 26$

$k \geq 10$ AND $k \leq -13$



$\emptyset$

Write the equations of the lines with the given characteristics:

16. Contains the points (-1, -2) and (3, 4)

$x_1\ y_1\ x_2\ y_2$

$m = \frac{4-(-2)}{3-(-1)} = \frac{6}{4} = \frac{3}{2}$

$4 = (3/2)(3) + b$

$4 = 9/2 + b$

$-1/2 = b$

$y = \frac{3}{2}x - \frac{1}{2}$

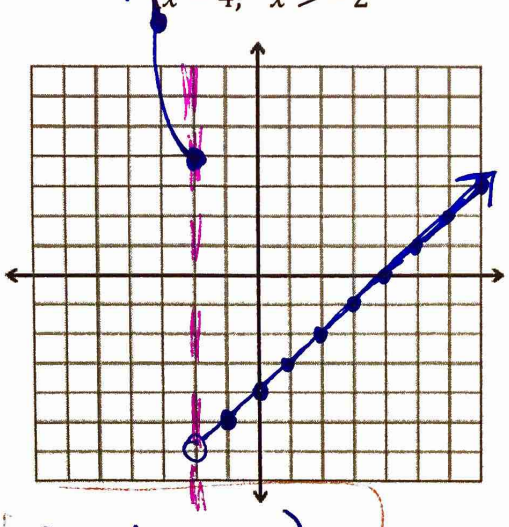
17. Undefined slope and contains the point (-6, 7)

VUXHOY

$x = -6$

Graph the following functions. State the domain and range of each in interval notation.

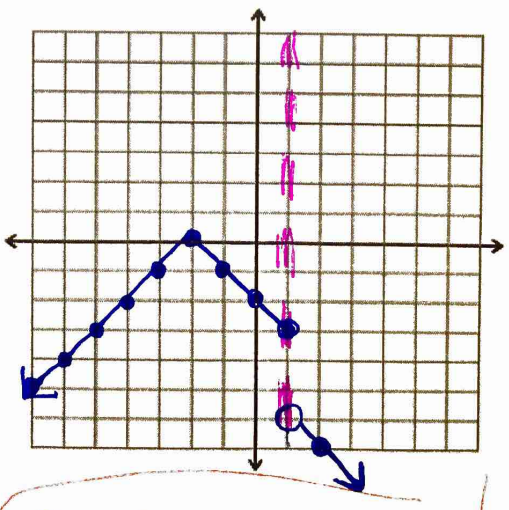
18. $f(x) = \begin{cases} x^2; & x \leq -2 \\ x - 4; & x > -2 \end{cases}$



D: $(-\infty, \infty)$

R: $(-6, \infty)$

19. $f(x) = \begin{cases} -|x+2|; & x \leq 1 \\ -x - 5; & x > 1 \end{cases}$

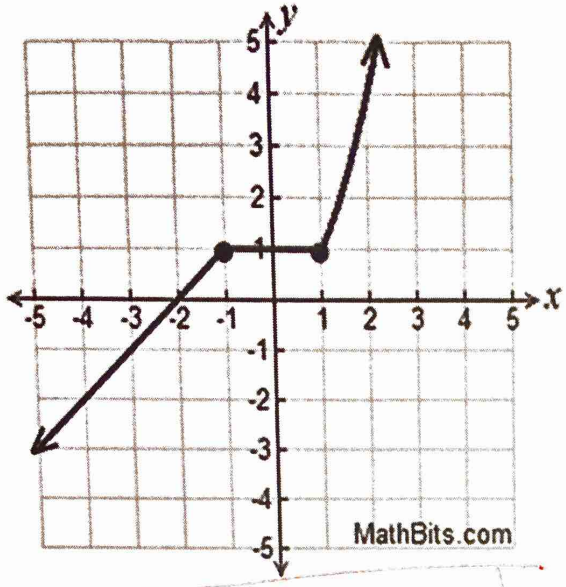


D: $(-\infty, \infty)$

R: $(-\infty, 0]$

State the intervals at which each graph is increasing, decreasing, or constant.

20.

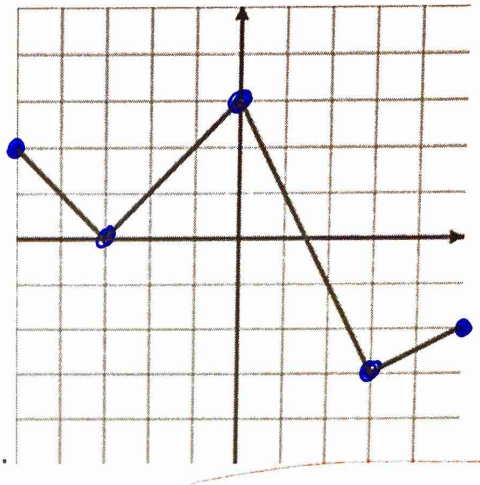


Increasing: $(-\infty, -1)$ $(1, \infty)$

Decreasing: none

Constant: $(-1, 1)$

21.



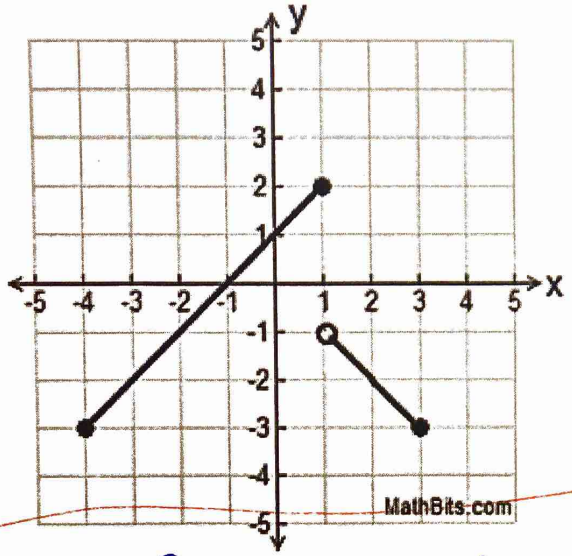
Increasing: $(-3, 0)$ $(3, 5)$

Decreasing: $(-5, -3)$ $(0, 3)$

Constant: none

Write the piecewise function for the graphs shown below. Then state the domain and range for each in interval notation.

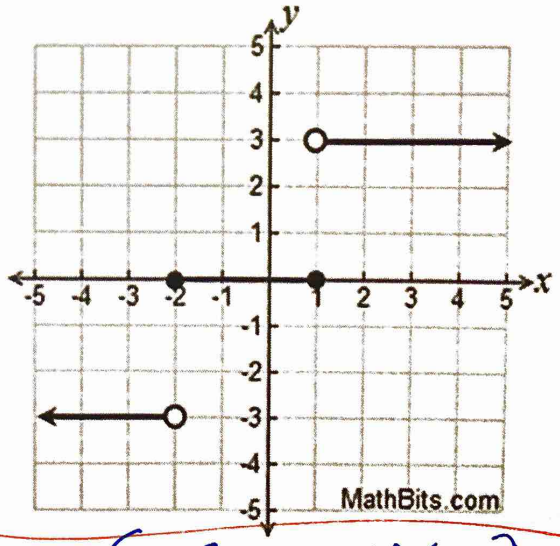
22.



$$f(x) = \begin{cases} x+1 & -4 \le x \le 1 \\ -x & 1 < x \le 3 \end{cases}$$

D: $[-4, 3]$ R: $[-3, 2]$

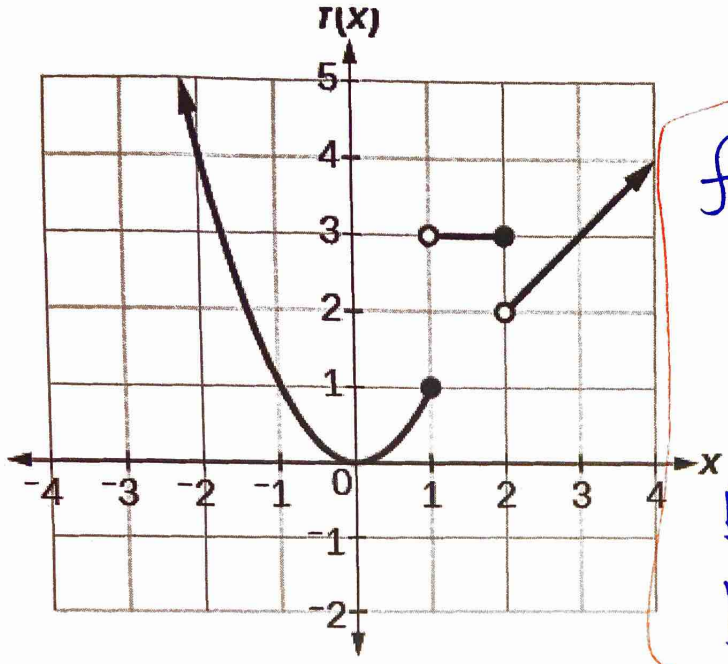
23.



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

D: $(-\infty, \infty)$ R: $[-3] \cup [0] \cup [3]$

24.

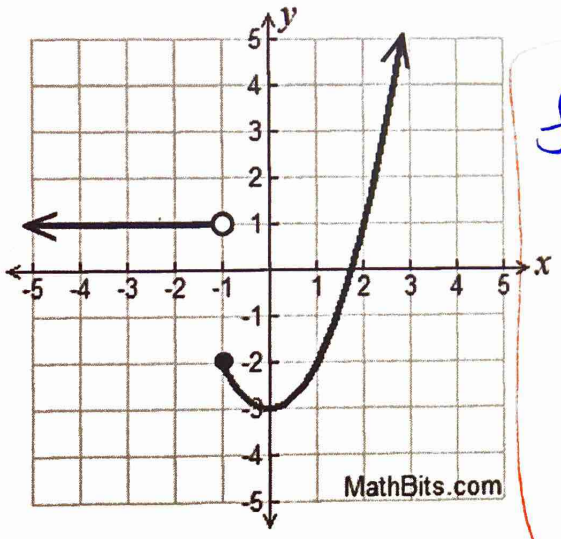


$$f(x) = \begin{cases} x^2 & x \le 1 \\ 3 & 1 < x \le 2 \\ x & x > 2 \end{cases}$$

D : $(-\infty, \infty)$

R : $[0, \infty)$

25.



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

D : $(-\infty, \infty)$

R : $[-3, \infty)$