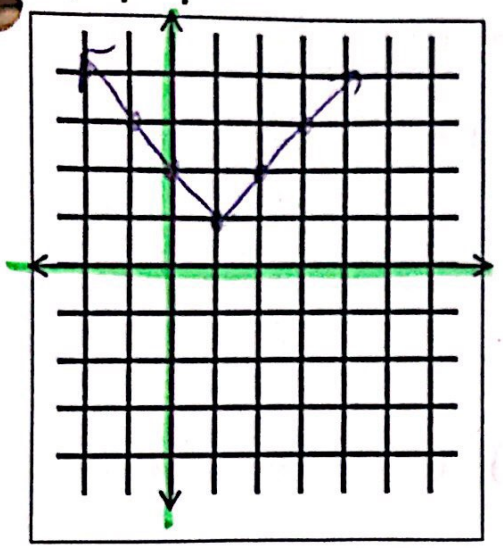
AFM - - Unit 1 Functions Test Review

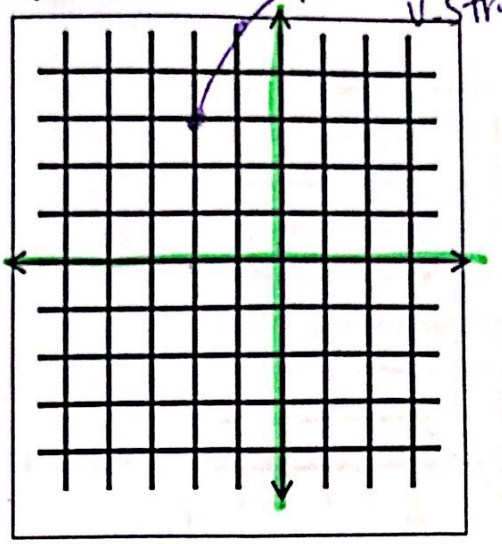
Name Key

I. Graph

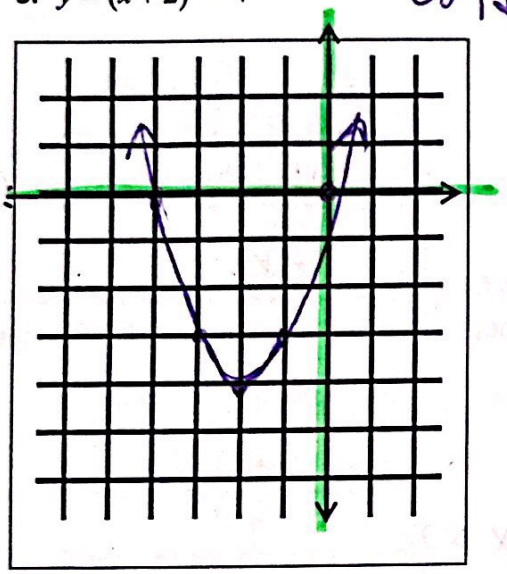
1. $y = |x-1|+1$ R1, ↑1



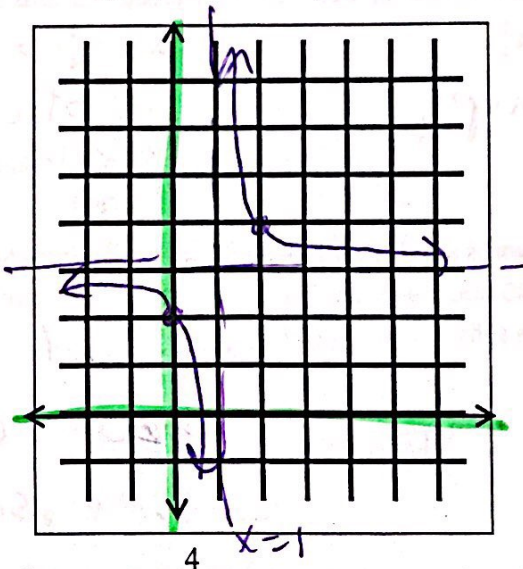
2. $y = 2\sqrt{x+2}+3$ L2 ↑3 V-Stretch



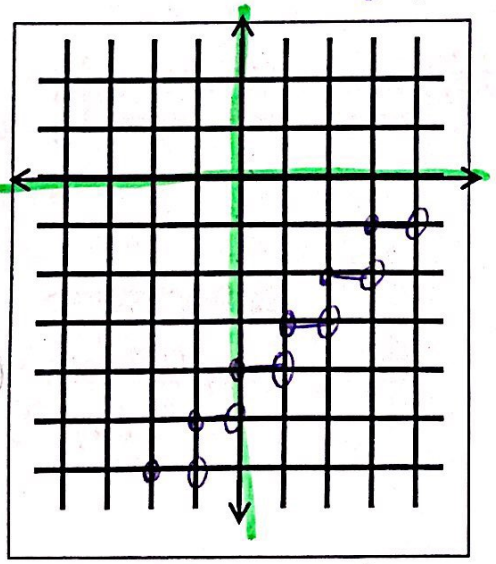
3. $y = (x+2)^2 - 4$ L2, ↓4



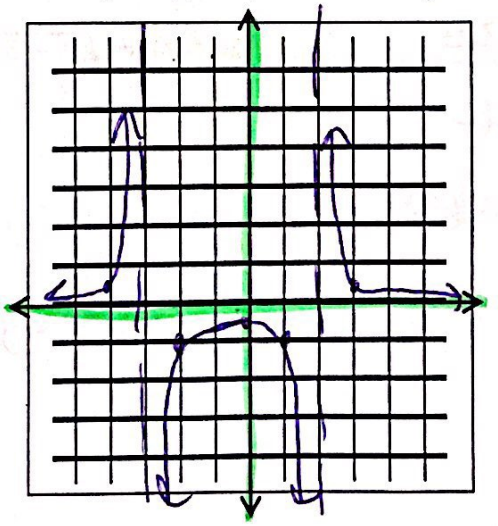
4. $y = \frac{1}{x-1}+3$ R1 ↑3



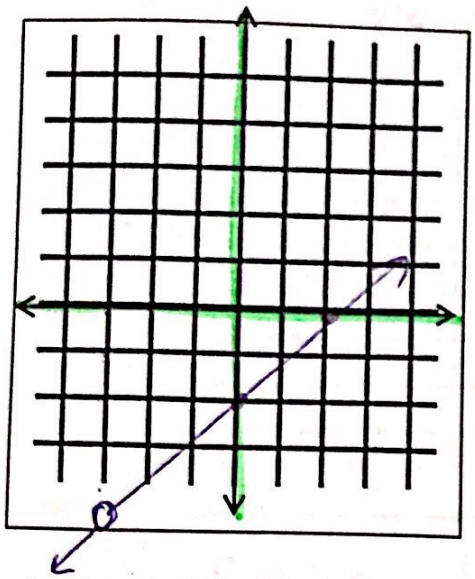
5. $y = [x]-4$ ↓4



6. $y = \frac{4}{(x-2)(x+3)}$ x=2, -3



7. $y = \frac{x^2+x-6}{x+3}$ $\frac{(x+3)(x-2)}{x+3}$



(-3, -5)

II. Short Answer

8. Find the following for $f(x) = \frac{-4}{x^2+4x+3}$. $(x+3)(x+1)$

VA: $x = -3, x = -1$

HA: $y = 0$

SA: none

Holes: none

x-int: none

y-int: $(0, -4/3)$

Domain: $(-\infty, -3) \cup (-3, -1) \cup (-1, \infty)$

9. Given the following, describe the transformations to their parent graph.

a. $y = [2x]$

H. comp $\frac{1}{2}$

b. $y = \frac{1}{4}(-x)^2 + 1$

- V. comp. $\frac{1}{4}$
- Reflect y-axis
- $\uparrow 1$

c. $y = -3(x-1)^3 - 4$

- Reflect x-axis
- V. Stretch 3
- R 1
- $\downarrow 4$

10. Dan works at a clothing store for men. He earns $8.00 an hour plus 50¢ for every item over 25 items that he sells. He works 40 hours a week. Write a function that represents how much money he will make as a function of the number of items he sells.

x = # Items Sold

$$f(x) = \begin{cases} 320 & 0 \le x \le 25 \\ 320 + .50(x-25) & x > 25 \end{cases}$$

State the domain (using interval notation) for the following:

11. $f(x) = \frac{2x+1}{x}$

$x \neq 0$

$(-\infty, 0) \cup (0, \infty)$

12. $f(x) = \sqrt{3x-5}$

$3x - 5 \ge 0$

$3x \ge 5$

$x \ge 5/3$

$[5/3, \infty)$

13. $f(x) = \frac{x-2}{\sqrt{x+4}}$

$x > -4$

$(-4, \infty)$

14. $f(x) = \frac{3}{x^2-36}$

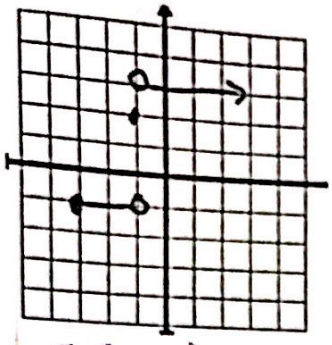
$(x+6)(x-6)$

$x \neq -6, 6$

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

Determine the domain and range in interval notation:

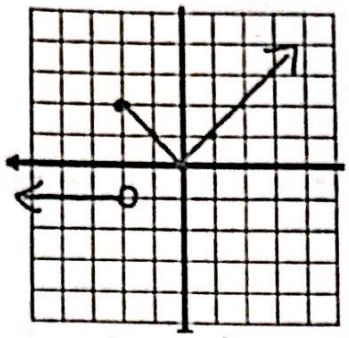
15.



Domain: $[-3,\infty)$

Range: $[-1]\cup[2]\cup[3]$ or $\{-1,2,3\}$

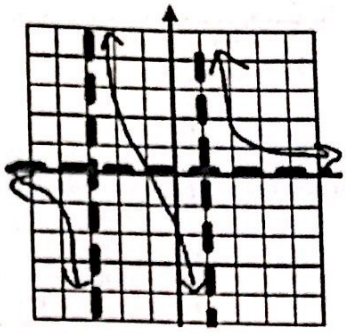
16.



Domain: $(-3,\infty)$

Range: $[-1]\cup[0,\infty)$

17.



Domain: $(-\infty,-3)\cup(-3,1)\cup(1,\infty)$

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

18. How does the graph of $y = -3f\left(\frac{1}{2}x\right)$ compare to f(x)?

- Reflect x-axis
- V. Stretch by 3
- H. Stretch by 2

19. Name the x intercepts for $y = \frac{x^2-x-6}{x+1}$ $\frac{(x-3)(x+2)}{x+1}$

$(3,0)$

$(-2,0)$

20. What is the equation of the slant asymptote for #19?

-1 | 1 −1 −6

↓ −1

1 −2

$y = x-2$

21. What is the y intercept for $y = \frac{2x-6}{x+2}$?

$(0,-3)$

22. Find the equation of the slant asymptote of $y = \frac{8x^2-4x+11}{x+5}$.

-5 | 8 −4 11

↓ −40

8 −44

$y = 8x-44$

23. Determine ALL asymptotes for the graph of $y = \frac{x}{x^2-9}$

VA: $x=3, x=-3$

HA: $y=0$

24. Determine any holes for the graph of $y = \frac{x^2-x-2}{x^3-x^2-2x}$

$\frac{(x-2)(x+1)}{x(x-2)(x+1)}$

$(-1,-1)$

$(2,\frac{1}{2})$

25. Determine the equation of a rational function with vertical asymptotes x=-4 and x=2, horizontal asymptote at y =0 and an x-intercept of (-1,0).

$y = \frac{x+1}{(x+4)(x-2)}$

26. Determine the equation of a rational function with holes at (-4,-1) and (6,9), x-intercept at (-3,0) and no horizontal asymptote.

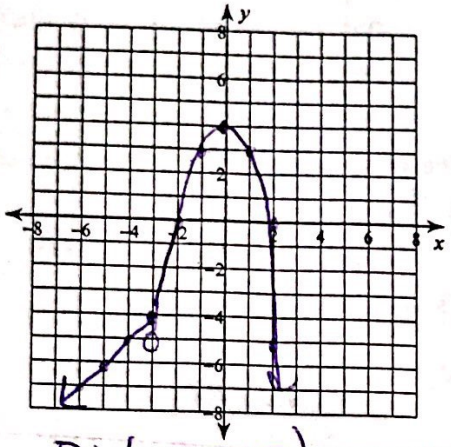
$y = \frac{(x+4)(x-6)(x+3)}{(x+4)(x-6)}$

27. What is the horizontal asymptote of $y = \frac{4x-2x^2}{3x^2-5x+2}$?

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

Graph the following piecewise functions. State the domain and range for each.

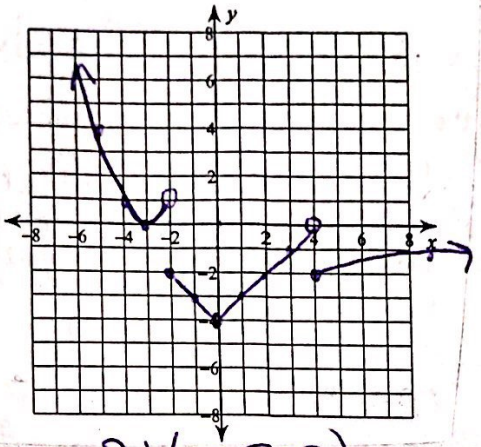
28. $f(x) = \begin{cases} x-1, & x \le -3 \\ 4-x^2, & x > -3 \end{cases}$



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

R: $(-\infty, 4]$

29. $f(x) = \begin{cases} (x+3)^2, & x < -2 \\ |x| - 4, & -2 \le x < 4 \\ -4 + \sqrt{x}, & x \ge 4 \end{cases}$



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

R: $[-4, \infty)$

30. Given $f(x) = [\![2x]\!] - 1$ and $g(x) = 3|x-4|$, find the following.

a. g(5)

$= 3|5-4|$

$= 3|1|$

$= 3$

b. f(2.3)

$= [2(2.3)] - 1$

$= [4.6] - 1$

$= 4 - 1$

$= 3$

c. f(-3.6)

$= [2(-3.6)] - 1$

$= [-7.2] - 1$

$= -8 - 1$

$= -9$

d. g(-2)

$= 3|-2-4|$

$= 3|-6|$

$= 18$