Pre-AP Pre Calculus

Name Key

Unit 0 Review: Alg. Review, 1.2, 1.3, 1.5, 1.6

A3, A5 Algebra Review

Perform the operation indicated.

1) $4x - [2x - (x + 4)]$

$4x-(2x-x-4)$

$4x-(x-4) \rightarrow 4x-x+4 = \boxed{3x+4}$

2) $(\sqrt{6}-\sqrt{2})(\sqrt{6}+\sqrt{2})$

$6+\sqrt{12}-\sqrt{12}-2 = \boxed{4}$

3) $(2w+4)^2$

$\boxed{4w^2+16w+16}$

4) $3x(x^2+4x-7)$

$\boxed{3x^3+12x^2-21x}$

Simplify the following:

5) $\frac{3}{x+4}+\frac{2}{x-5}$ $(x-5)(x+4)$

$\frac{3(x-5)}{(x-5)(x+4)}+\frac{2(x+4)}{(x-5)(x+4)}$

$\frac{3x-15+2x+8}{(x-5)(x+4)} = \boxed{\frac{5x-7}{(x-5)(x+4)}}$

Factor Completely

6) x^3-5x^2

$\boxed{x^2(x-5)}$

7) $4y^2-9$

$\boxed{(2y+3)(2y-3)}$

8) r^2-r-6

$\boxed{(r-3)(r+2)}$

9) $25x^2-10x+1$

$5x \quad -1$

$5x \mid 25x^2 \mid -5x$

$-1 \mid -5x \mid +1$

$\cdot 25$, $+-10$, $-5 \quad -5$

$\boxed{(5x-1)^2}$

10) $6x^2-7x-5$

$2x \quad 1$

$3x \mid 6x^2 \mid 3x$

$-5 \mid -10x \mid -5$

$\cdot -30$, $+-7$, $-10 \quad 3$

$\boxed{(3x-5)(2x+1)}$

11) $4x^2-20x+25$

$2x \quad -5$

$2x \mid 4x^2 \mid -10x$

$-5 \mid -10x \mid 25$

$\cdot 100$, $+-20$, $-10 \quad -10$

$\boxed{(2x-5)^2}$

Solve the equation

12) $2x^2-4=3x$

$2x^2-3x-4=0$

$x=\frac{-(-3)\pm\sqrt{(-3)^2-4(2)(-4)}}{2(2)}$

$\boxed{x=\frac{3\pm\sqrt{41}}{4}}$

13) $-6(x-3)+5=-2x+10$

$-6x+18+5=-2x+10$

$\frac{13}{4}=\frac{4x}{4}$

$\boxed{x=13/4}$

14) ~~$x^2-8x+5=(x-4)^2-11$~~

~~$x^2-8x+16=11$~~ -5

$\boxed{\text{All real \#s}}$

15) $\frac{4x^2}{4}=\frac{12}{4}$

$\sqrt{x^2}=\pm\sqrt{3}$

$\boxed{x=\pm\sqrt{3}}$

16) $(x-7)^2=25$

$x^2-14x+49=25$

$x^2-14x+24=0$

$(x-12)(x-2)=0$

$\boxed{x=2,12}$

17) $16x^2+8x-3=0$

$4x \quad -1$

$4x \mid 16x^2 \mid -4x$

$3 \mid 12x \mid -3$

$\cdot -48$, $+8$, $12 \quad -4$

$(4x+3)(4x-1)=0$

$\boxed{x=-3/4,\ 1/4}$

	3x	-4
3x	$9x^2$	-12x
-4	-12x	16

$\cdot \frac{144}{+\ -24}$

$-12 \quad -12$

18) $20x^2 - 125x = 0$

$5x(4x-25)=0$

$x = 0, \ 25/4$

19) $9x^4 - 24x^3 + 16x^2 = 0$

$x^2(9x^2-24x+16)=0$

$x^2(3x-4)^2=0$

$x = 0, \ 4/3$

20) $3x^3 + 5x^2 - 18x - 30 = 0$

	3x	5
x^2	$3x^3$	$5x^2$
-6	$-18x$	-30

$(x^2-6)(3x+5)=0$

$x = \pm\sqrt{6}, \ -5/3$

21) $\frac{2x+3}{5x-9} = \frac{1}{2}$

$2(2x+3) = 5x-9$

$4x+6 = 5x-9$

$-4x+9 \quad -4x+9$

$15 = x$

$x = 15$

Section 1.8 Combinations of Functions

For $f(x) = 2x + 1$, $g(x) = -3x$, and $h(x) = \frac{1}{2}x - 7$ find the following:

22) $(f \circ g)(x)$

$f(g(x)) \rightarrow f(-3x)$

$2(-3x)+1$

$-6x+1$

23) $(f \circ h)(x)$

$f(h(x)) \rightarrow f(\frac{1}{2}x-7)$

$2(\frac{1}{2}x-7)+1$

$x-14+1 \rightarrow x-13$

24) $(g \circ f)(x)$

$g(f(x)) \rightarrow g(2x+1)$

$-3(2x+1)$

$-6x-3$

For $f(x) = x^2 - x + 1$ and $g(x) = x + 5$ find the following:

25) $(f \circ g)(x)$

$f(g(x)) \rightarrow f(x+5)$

$(x+5)^2-(x+5)+1$

$x^2+10x+25-x-5+1$

$x^2+9x+21$

26) $(g \circ f)(x)$

$g(f(x)) \rightarrow g(x^2-x+1)$

$x^2-x+1+5$

x^2-x+6

27) $(f \circ g)(3)$

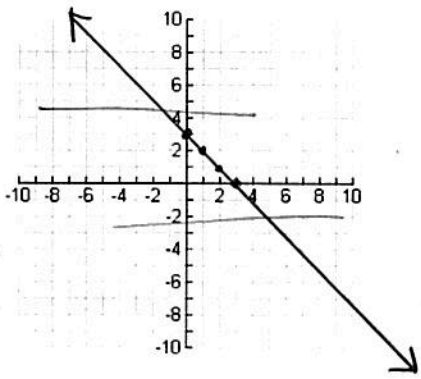
$f(g(3)) \rightarrow f(\overset{8}{3+5})$

$8^2-8+1 = 57$

Section 1.9 Inverse Functions

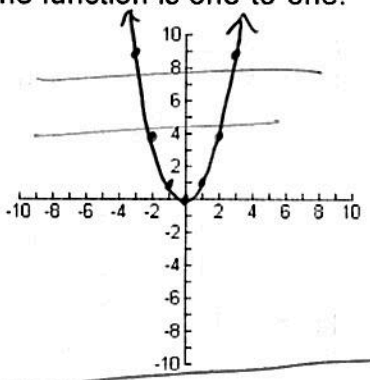
Graph the function, then use the Horizontal Line Test to state whether the function is one-to-one.

28) $f(x) = -x+3$



one-to-one

29) $h(x) = x^2$



not one-to-one

Determine whether or not the function has an inverse function, and if so, find the inverse function.

30) f(x) = x + 10

$x = y + 10$

$f^{-1}(x) = x - 10$

31) $f(x) = (x-4)^2$

Inverse is not a function

32) $f(x) = 3x^3 - 7$

$x = 3y^3 - 7$

$\sqrt[3]{\frac{x+7}{3}} = \sqrt[3]{y^3}$

$f^{-1}(x) = \sqrt[3]{\frac{x+7}{3}}$

33) $f(x) = \sqrt{x+8}$

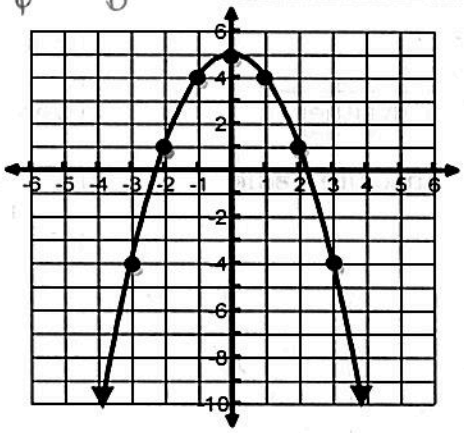
$(x)^2 = (\sqrt{y+8})^2$

$y + 8 = x^2$

$-8 \quad -8$

$f^{-1}(x) = x^2 - 8, \quad x \geq 0$

For the graph f(x) at the right:



34) give the range of f(-x) $y \leq 5$ or $(-\infty, 5]$

35) If g(x) = 2f(x), find g(2) 2

$2f(2) = 2(1) = 2$

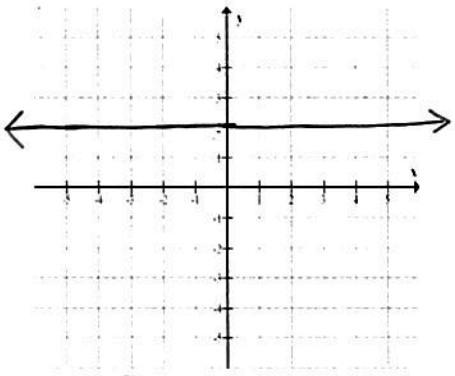
36) If h(x) = f(3x), find h(-1) -4

$f(3(-1)) = f(-3) = -4$

Parent Functions:

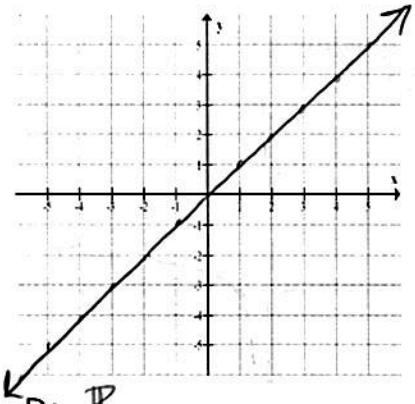
37. Graph the following parent functions. Your graphs must be accurate with at least 2 points clearly marked. Give the domain, range and whether the graph is even, odd, or neither.

a. The Constant
y = 2



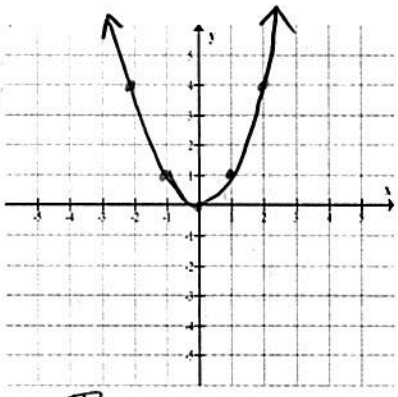
D: $\mathbb{R}$
R: $\{2\}$
Even/Odd/Neither

b. The Linear
y = x



D: $\mathbb{R}$
R: $\mathbb{R}$
Even/Odd/Neither

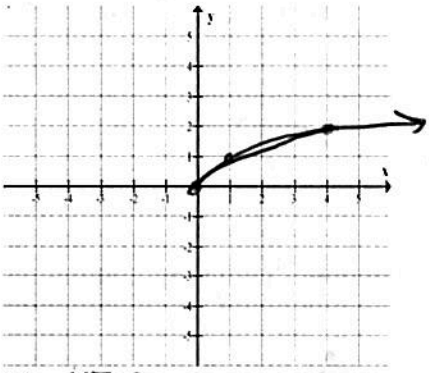
c. The Quadratic
$y = x^2$



D: $\mathbb{R}$
R: $y \geq 0$ or $[0, \infty)$
Even/Odd/Neither

d. The Square Root

$y = \sqrt{x}$



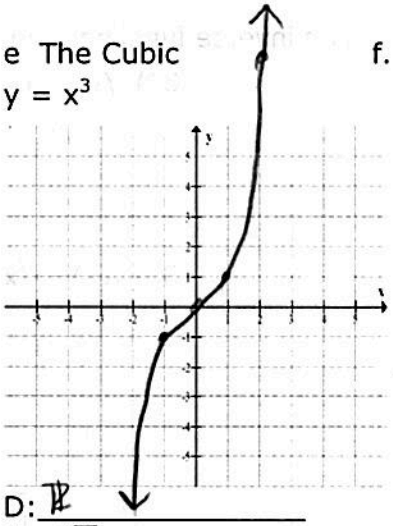
D: $x \geq 0$

R: $y \geq 0$

Even/Odd/Neither

e The Cubic

$y = x^3$



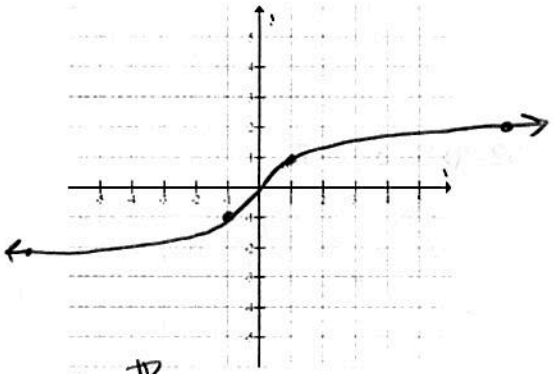
D: $\mathbb{R}$

R: $\mathbb{R}$

Even/Odd/Neither

f. The Cube Root

$y = \sqrt[3]{x}$



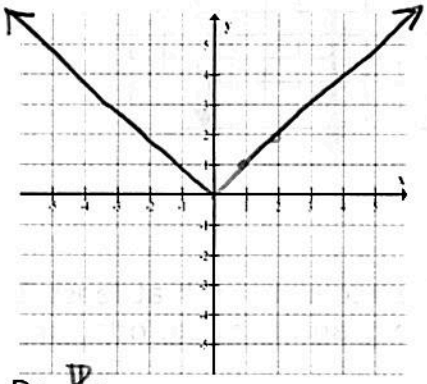
D: $\mathbb{R}$

R: $\mathbb{R}$

Even/Odd/Neither

g. The Absolute Value

$y = |x|$



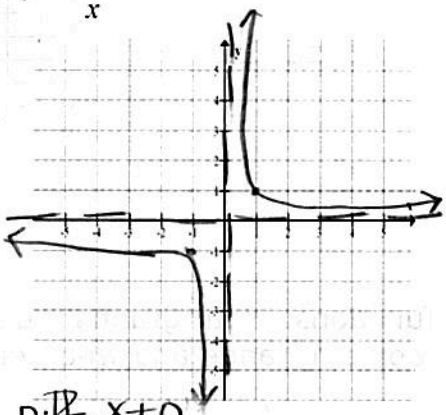
D: $\mathbb{R}$

R: $y \geq 0$

Even/Odd/Neither

h. The Rational

$y = \frac{1}{x}$



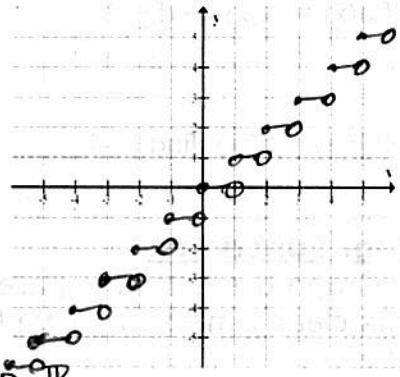
D: $\mathbb{R}, x \neq 0$

R: $\mathbb{R}, y \neq 0$

Even/Odd/Neither

i. The Greatest Integer

$y = [x]$



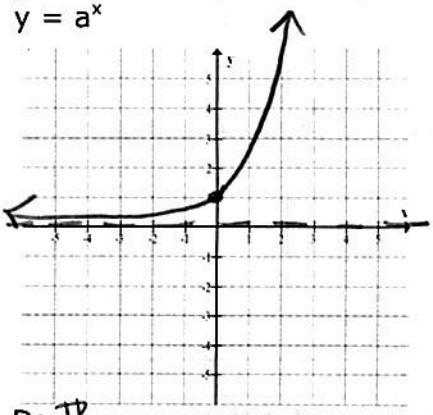
D: $\mathbb{R}$

R: $\mathbb{Z}$

Even/Odd/Neither

j. Exponential

$y = a^x$



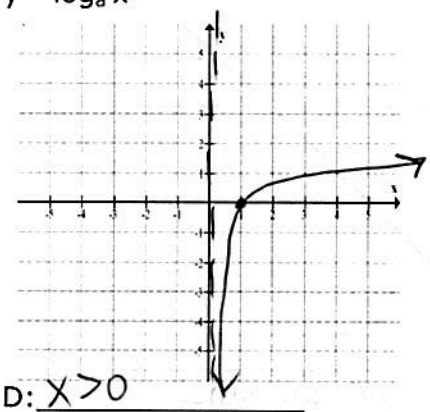
D: $\mathbb{R}$

R: $y > 0$

neither

k. Logarithmic

$y = \log_a x$



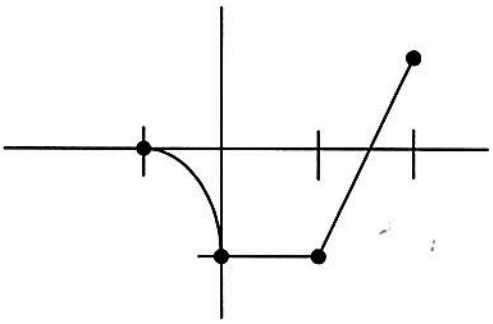
D: $x > 0$

R: $\mathbb{R}$

neither

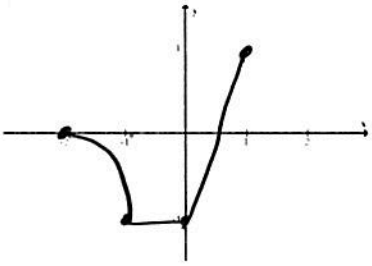
Even/Odd/Neither Even/Odd/Neither

38. The graph of the function y= $f(x)$ is shown.

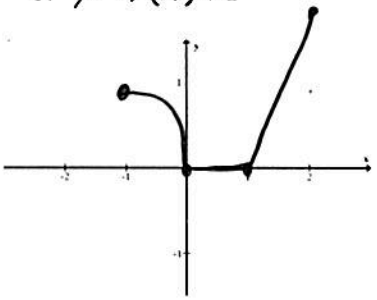


Carefully sketch a graph of each of the following

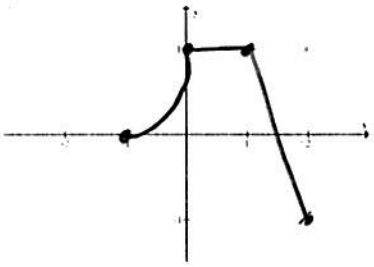
a. $y = f(x+1)$ L1



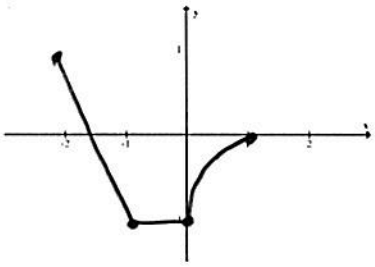
b. $y = f(x)+1$ U1



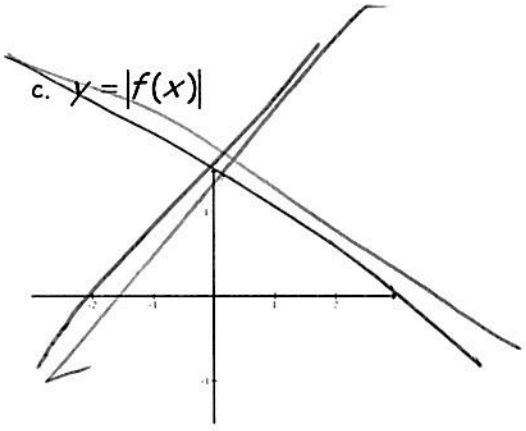
c. $y = -f(x)$ reflect over x-axis



d. $y = f(-x)$ reflect over y axis



c. $y = |f(x)|$



d. $y = f(|x|)$