SM3

Name Key

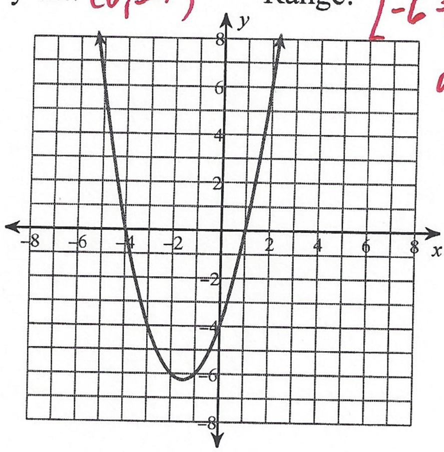
Final Review/Notes A

Date________________ Period____

Identify the characteristics of the function and state the domain and range. Using interval notation.

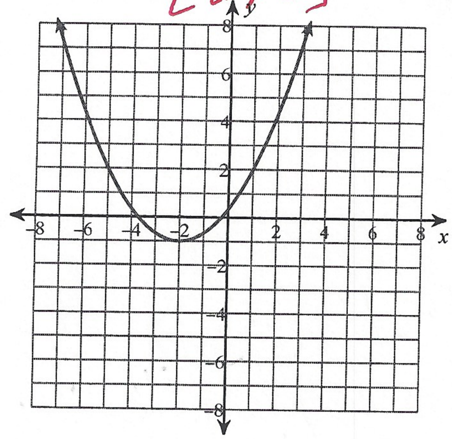
1) Identify the x-and y-intercepts from the function.

x-int: $(-1,0)(-4,0)$ Domain: $(-\infty,\infty)$
y-int: $(0,-4)$ Range: $[-6\frac{3}{4},\infty)$ or $[6,\infty)$



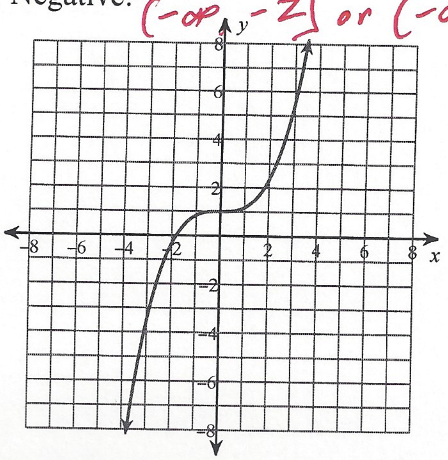
2) Identify where the function is increasing or decreasing.

Increasing: $[-2,\infty)$ Domain: $(-\infty,\infty)$
Decreasing: $[-\infty,-2]$ Range: $[-1,\infty)$



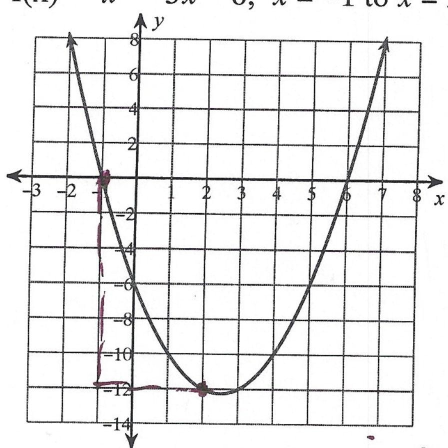
3) Identify where the function is positive or negative. Using interval notation.

Postive: $[2,\infty)$ or $(-2,\infty)$
Negative: $(-\infty,-2]$ or $(-\infty,-2)$



4) Find the average rate of change of the function over the given interval.

$f(x) = x^2 - 5x - 6$; $x = -1$ to $x = 2$



$\frac{-12}{3} = -4$

or find points

$(-1,0)$ $(2,-12)$

$\frac{-12-0}{2--1} = \frac{-12}{3} = -4$

Write the slope-intercept form of the equation of the line described.

5) through: $(2, 1)$, perp. to $y = \frac{1}{3}x + 3$

$y = -3x + 7$

$y = mx + b$

$m = -3$

$1 = -3(2) + b$

$7 = b$

6) ~~through: (2, −3)~~ and $(5, -4)$

$y = -\frac{1}{3}x - \frac{7}{3}$

$m = \frac{-4-(-3)}{5-2} = \frac{-1}{3}$

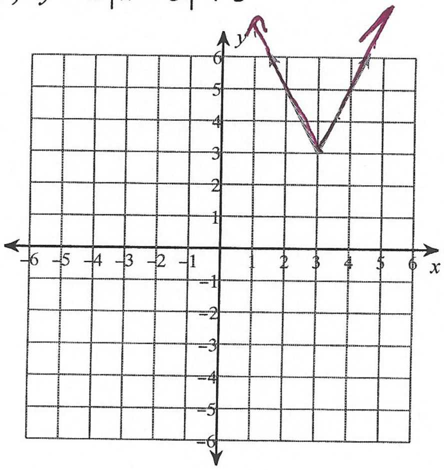
$y = mx + b$

$-3 = -\frac{1}{3}(2) + b$

$b = -\frac{7}{3}$

Sketch the graph of each function and Identify the domain and range using interval notation.

7) $y = 2|x - 3| + 3$

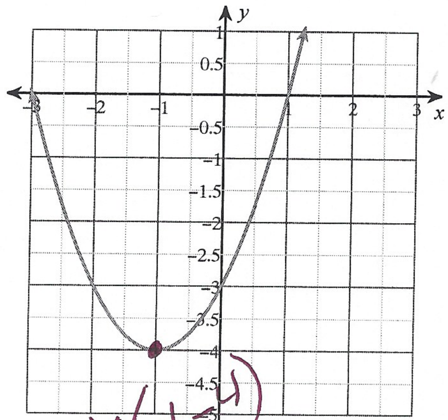


Vertex is $(3, 3)$

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

R: $[3, \infty)$

8) $f(x) = (x + 1)^2 - 4$



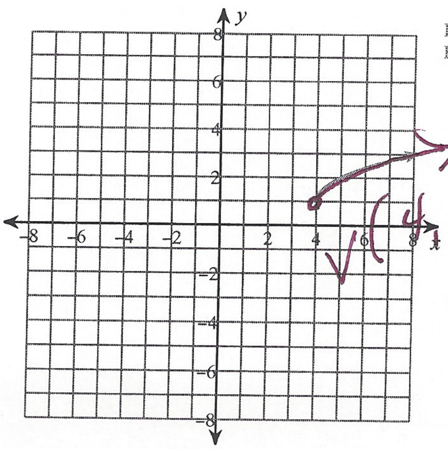
V$(-1, -4)$

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

R: $[-4, \infty)$

Sketch the graph of each equation or **inequality**

9) $y = \sqrt{x - 4} + 1$



Domain: $x \geq 4$
Range: $y \geq 1$

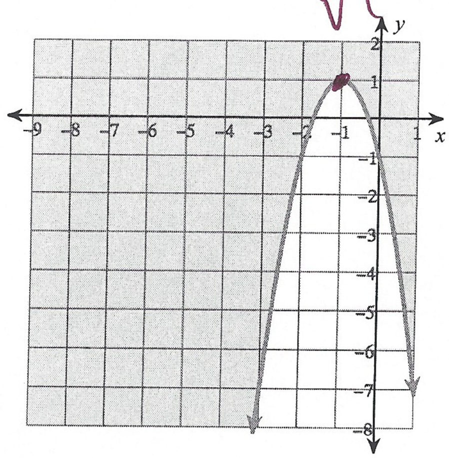
V$(4, 1)$

D: $[4, \infty)$ or $x \geq 4$

R: $[1, \infty)$ or $y \geq 1$

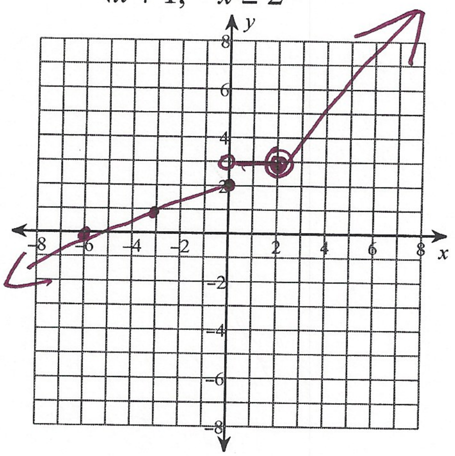
10) $y \geq -2(x + 1)^2 + 1$

V$(-1, 1)$



Graph the piecewise function:

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



Simplify each expression. Write your answer in standard form.

12) $(2x - 6x^3 + 2x^2) + (-5x^3 - 2x - 5x^4)$

$\boxed{-5x^4 - 11x^3 + 2x^2}$

Simplify. Your answer should contain only positive exponents.

13) $xy^4z^2 \cdot 4x^{-2}y^2z^{-1} \cdot zx^3$

$\boxed{4y^6z^2x^2}$

14) $\left(\dfrac{2yx^2}{2x^2y^4y^{-3}}\right)^4$

$\boxed{1}$

Find each product.

15) $(7u + 8v)(8u^2 + 3uv + 7v^2)$

$\boxed{56u^3 + 85u^2v + 73uv^2 + 56v^3}$

Use synthetic division to divide

16) $(x^5 + 4x^4 - 37x^3 - 36x^2 - 13x - 35) \div (x - 5)$

$\boxed{x^4 + 9x^3 + 8x^2 + 4x + 7}$

5	1	4	−37	−36	−13	−35
		5	45	40	20	35
	1	9	8	4	7	0

State the degree and leading coefficient and describe the end behavior of each function.

17) $f(x) = 4x^5 + 3x^3 - 2x + 1$

D: 5 end behavior $x \to +\infty$ $f(x) \to +\infty$

LC: 4 $x \to -\infty$ $f(x) \to -\infty$

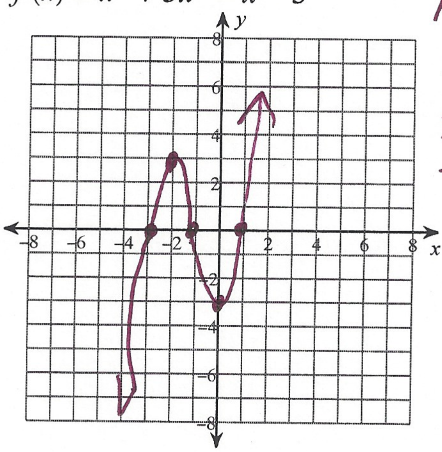
Evaluate each function.

18) $k(x) = x^2 + 5x$; Find $k(-4y)$ $= (-4y)^2 + 5(-4y)$

$16y^2 - 20y$

State the number of real zeros. Approximate each zero to the nearest tenth. Approximate the relative minima and relative maxima to the nearest tenth. Describe the end behavior. Graph using synthetic division if necessary.

19) $f(x) = x^3 + 3x^2 - x - 3$



zeros: -1, 1, -3

y-int: 0, -3

x	y
-2	3

$$\begin{array}{r|rrrr} 1 & 1 & 3 & -1 & -3 \\ & & 1 & 4 & 3 \\ \hline & 1 & 4 & 3 & 0 \end{array}$$

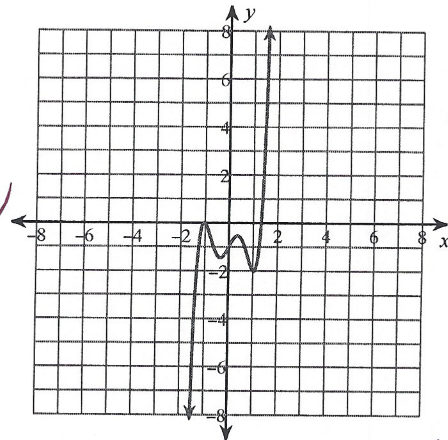
$x^2 + 4x + 3$

$(x+3)(x+1)$

max is 3 when $x = -2$

min is -3 when $x = 0$

20)



x-int: $(-1, 0)(1.1, 0)$

zeros: -1, 1.3

$x \to +\infty$ $f(x) \to +\infty$

$x \to -\infty$ $f(x) \to -\infty$