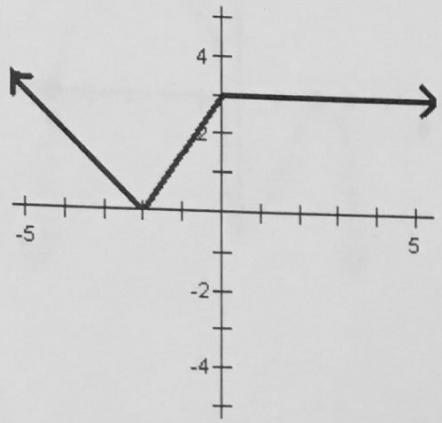
Accel. Alg. II
Unit 6 Test Review

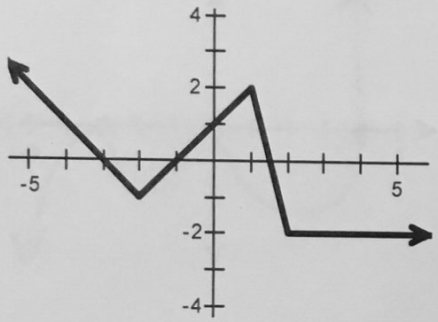
Name Key
Date _____

1.



Domain? $(-\infty, \infty)$
Range? $[0, \infty)$
Interval(s) of increase? $(-2, 0)$
Interval(s) of decrease? $(-\infty, -2)$
Maximum(s)? local max: None
abs. max: None
Minimum(s)? local min: $(-2, 0)$
abs. min: $(-2, 0)$
End behavior: $f(x) \to \infty$ as $x \to -\infty$
$f(x) \to 3$ as $x \to +\infty$

2.

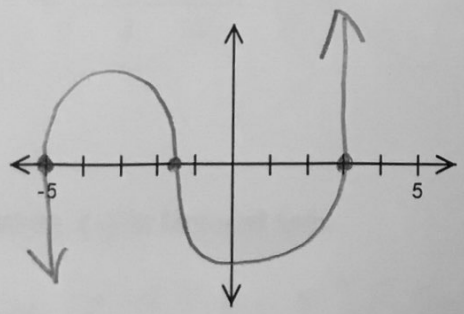


Domain? $(-\infty, \infty)$
Range? $[-2, \infty)$
Interval(s) of increase? $(-2, 1)$
Interval(s) of decrease? $(-\infty, -2) \cup (1, 2)$
Maximum(s)? local max: $(1, 2)$
abs. max: None
Minimum(s)? local min: $(-2, -1)$
abs. min: None
End behavior: $f(x) \to \infty$ as $x \to -\infty$
$f(x) \to -2$ as $x \to +\infty$

3. Polynomial Functions. Find each polynomial's roots, including each root's multiplicity. Find the degree, leading coefficient, and y-intercept. Use this information to sketch a graph of the polynomial.

a. $y = (x-3)(2x+3)(x+5)$

ALL roots (including multiplicity): $x = 3$ (m1), $x = -\frac{3}{2}$ (m1), $x = -5$ (m1)



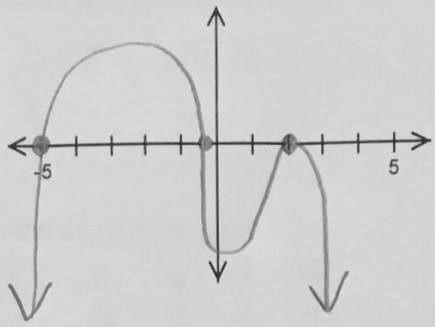
Degree (#): 3

Leading Coeff. (+ or -): positive

y-intercept (+ or -): -45

Max # of turning points: 2

b. $y = -3(x-2)^2(3x+1)(x+5)$



ALL roots: (including multiplicity) $x=2$ (m2), $x=-\frac{1}{3}$ (m1), $x=-5$ (m1)

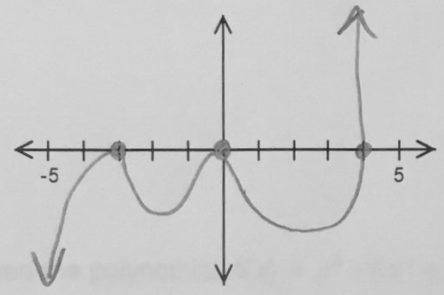
Degree (#): 4

Leading Coeff. (+ or -): negative

y-intercept (+ or -): -60

Max # of turning points: 3

c. $y = x^2(x-4)(x+3)^2$



ALL roots: (including multiplicity) $x=0$ (m2), $x=4$ (m1), $x=-3$ (m2)

Degree (#): 5

Leading Coeff. (+ or -): Positive

y-intercept (+ or -): 0

Max # of turning points: 4

4. $(x-4)$ is a factor of $f(x) = x^3 + 3x^2 - 18x - 40$.

a. Find all roots (real / non-real). Don't forget to use the given information!

4	1	3	-18	-40
		4	28	40
	1	7	10	0

$x^2 + 7x + 10 = 0$

$(x+5)(x+2) = 0$

$x+5=0$ $\quad$ $x+2=0$

$x=-5$ $\quad$ $x=-2$

b. Write $f(x)$ in factored form.

$f(x) = (x-4)(x+5)(x+2)$

5. $x = 5$ is a root of $g(x) = x^4 - 4x^3 - 8x^2 + 12x + 15$.

a. Write $g(x)$ in factored form.

$g(x) = (x-5)(x^2-3)(x+1)$

b. Find all roots of g.

5	1	-4	-8	12	15
		5	5	-15	-15
	1	1	-3	-3	0

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

$x^2(x+1) - 3(x+1) = 0$

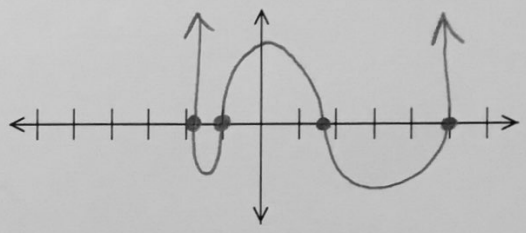
$(x^2-3)(x+1) = 0$

$x^2 - 3 = 0$ $\quad$ $x+1 = 0$

$x^2 = 3$ $\quad$ $x = -1$

$x = \pm\sqrt{3}$

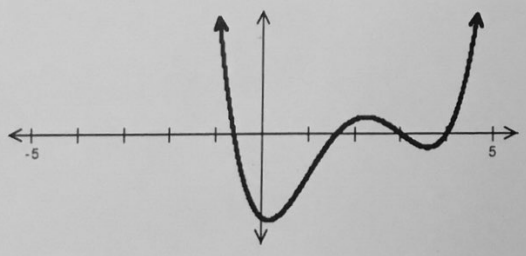
c. Sketch a graph of g.



6. Given the polynomial $h(x) = x^4 - 8x^3 + 18x^2 - 5x - 12$

a. List all possible rational roots. $\dfrac{\pm1, \pm12, \pm2, \pm6, \pm3, \pm4}{\pm1} = \pm1, \pm12, \pm2, \pm6, \pm3, \pm4$

b. Find all roots of the polynomial above. Here's the graph to get you started:



3	1	-8	18	-5	-12
		3	-15	9	12
	1	-5	3	4	0

$x^2 - x - 1 = 0$

$x = \dfrac{1 \pm \sqrt{(-1)^2 - 4(1)(-1)}}{2(1)} = \dfrac{1 \pm \sqrt{5}}{2}$

4	1	-5	3	4
		4	-4	-4
	1	-1	-1	0

7. Write a polynomial function that has a leading coefficient of 1 and the following zeros: -5, 0, 2i (Hint: there is a 4th zero not listed.)

$$f(x) = x(x+5)(x+2i)(x-2i)$$
$$= x(x+5)(x^2+4)$$

8. Write a polynomial function that has a y-intercept of -24 and the following zeros: 2, -4, ½

$$f(x) = a(x-2)(x+4)(2x-1)$$

$$-24 = a(0-2)(0+4)(2(0)-1)$$
$$-24 = a(-2)(4)(-1)$$
$$-24 = 8a$$
$$-3 = a$$

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