Name KEY Hour _____

Advanced Algebra: Chapter 5 (Part 2) – Practice Quiz

1.) Divide using polynomial long division.

$(x^4 + x^3 - 8x^2 + 5x + 5) \div (x^2 + 5x - 2)$

$x^2+5x-2 \overline{)\, x^4 + x^3 - 8x^2 + 5x + 5}$

$x^2 - 4x + 14$

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

$-4x^3 - 6x^2 + 5x$

$-(-4x^3 - 20x^2 + 8x)$

$14x^2 - 3x + 5$

$-(14x^2 + 70x - 28)$

$-73x + 33$

1.) $x^2 - 4x + 14 + \frac{-73x+33}{x^2+5x-2}$

2.) Find the other zeros of the function $f(x) = 15x^3 - 119x^2 - 10x + 16$ given that one zero is 8.

8	15	-119	-10	16
	↓	120	8	-6
	15	1	-2	10

$(15x^2 + x - 2)(x - 8) = 0$

$(15x^2 + 6x + 5x - 2)(x - 8) = 0$

$(3x(5x + 2) - 1(5x + 2))(x - 8) = 0$

$(3x - 1)(5x + 2)(x - 8) = 0$

2.) $x = 1/3, -2/5, 8$

For numbers 3 and 4, find all zeros of the polynomial function.

3.) $f(x) = x^4 - 2x^3 - 8x^2 + 8x + 16$

$\pm 1, \pm 2, \pm 4, \pm 8, \pm 16$

2	1	-2	-8	8	16
	↓	2	0	-16	-16
	1	0	-8	-8	0

$x^3 + 0x^2 - 8x - 8$

-2	1	0	-8	-8
	↓	-2	4	8
	1	-2	-4	0

$x^2 - 2x - 4$

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

$x = 2 \quad x = -2$

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

$x = \frac{2 \pm \sqrt{20}}{2}$

$x = \frac{2 \pm 2\sqrt{5}}{2}$

$x = 1 \pm \sqrt{5}$

3.) $x = -2, 2, 1 \pm \sqrt{5}$

4.) $h(x) = x^3 - 11x^2 + 41x - 51$

$\pm 1, \pm 3, \pm 17, \pm 51$

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

3	1	-11	41	-51
	↓	3	-24	51
	1	-8	17	0

$x^2-8x+17$

$x=3$

$x = \frac{-(-8) \pm \sqrt{(-8)^2-4(1)(17)}}{2(1)}$

$x = \frac{8 \pm \sqrt{-4}}{2}$

$x = \frac{8 \pm 2i}{2}$

$x = 4 \pm i$

4.) $x = 3, 4 \pm i$

5.) You are making an ice sculpture for the upcoming winter festival. It is to be shaped like a pyramid with a height that is 1 foot greater than the length of each side of its square base. The volume of the ice sculpture is 4 cubic feet. What are the dimensions of the mold?

$Volume_{Pyramid} = \frac{1}{3}Bh$, where B is the area of the base and h is the height of the pyramid.

$V = \frac{1}{3}(x^2)(x+1)$

$V = \frac{1}{3}(x^3+x^2)$

$4 = \frac{1}{3}(x^3+x^2)$

$12 = x^3+x^2$

$0 = x^3+x^2-12$

$1, 2, 3, 4, 6, 12$

2	1	1	0	-12
	↓	2	6	12
	1	3	6	0

x^2+3x+6

$(x-2)(x^2+3x+6)$

$x=2$

$x = \frac{-3 \pm \sqrt{(3)^2-4(1)(6)}}{2(1)}$

$x = \frac{-3 \pm \sqrt{-15}}{2}$

5.) $l = 2$ ft, $w = 2$ ft, $h = 3$ ft

Write a polynomial function *f* of least degree that has rational coefficients, a leading coefficient of 1, and the given zeros.

6.) zeros: $2, 5+\sqrt{5}$

$f(x) = (x-2)(x-(5+\sqrt{5}))(x-(5-\sqrt{5}))$

$= (x-2)((x-5)-\sqrt{5})((x-5)+\sqrt{5})$

$= (x-2)((x-5)^2-5)$

$= (x-2)(x^2-10x+25-5)$

$= (x-2)(x^2-10x+20)$

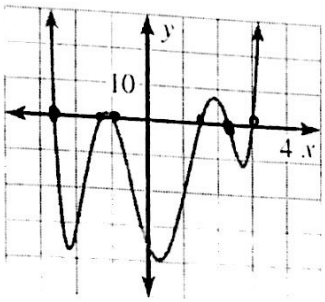
$= x^3-10x^2+20x-2x^2+20x-40$

$= x^3-12x^2+40x-40$

6.) $f(x) = x^3-12x^2+40x-40$

Determine the number of positive real zeros, negative real zeros, and imaginary zeros for the function with the given degree and graph.

7.) Degree: 10

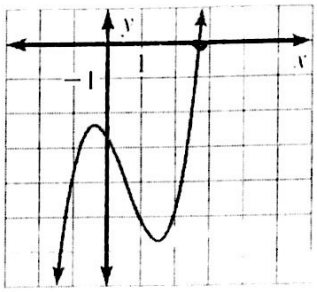


+ real zeros: 3

− real zeros: 3

imaginary zeros: 4

8.) Degree: 7



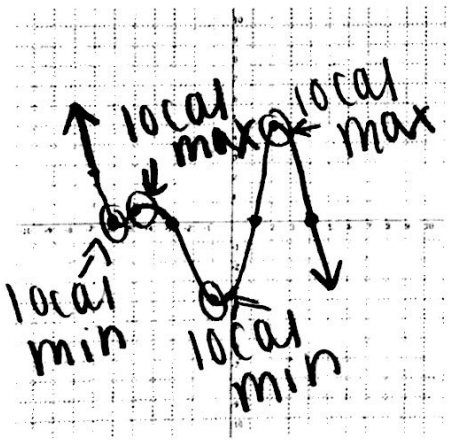
+ real zeros: 1

− real zeros: 0

imaginary zeros: 6

Graph the function. Identify all intercepts. You must plot points between and "beyond" all *x*-intercepts. Use the *x*/*y* table to identify points on your graph.

9.) $f(x) = -\frac{1}{128}(x+6)^2(x-4)(x+3)(x-1)$



x-intercept(s): (−6, 0) (4, 0) (−3, 0) (1, 0)

y-intercept: (0, −3.4)

x	−7	−5	−1	2	5			
y	2.75	0.8	−3.9	5	−303			

10.) In the above graph, draw an arrow to any local maximum(s) and label them "local max."
In the above graph, draw an arrow to any local minimum(s) and label them "local min."