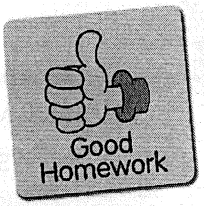
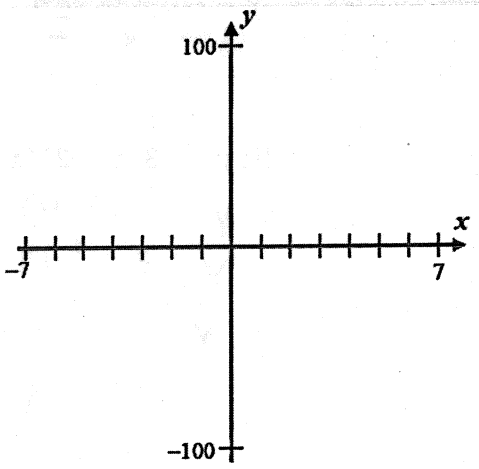
Polynomial and Rational Functions
A2RCC U8D3 Homework

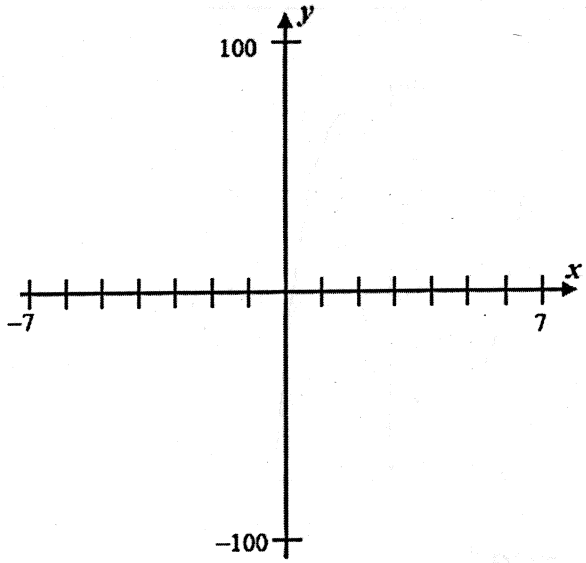
Name _____




***Exercise #1:*** **Determine the equation of a quadratic function whose roots are $-3$ and $4$ and which passes through the point $(2,-50)$. Express your answer in standard form ($y=ax^2+bx+c$). Verify your answer by creating a sketch of the function on the axes below.**




***Exercise #2:*** **Create the equation of the cubic, in standard form, that has $x$-intercepts of $-4$, $2$, and $5$ and passes through the point $(6, 20)$. Verify your answer by sketching the cubic's graph on the axes below.**




**Review:**

3. Circle the polynomial functions. Put them in standard form and state a) the degree, b) # of terms, c) leading term, d) leading coefficient, e) end behavior, and e) constant term.

(A) $y = 3x^2 + 5$
a) 2 e) ↑ ↑
b) 2
c) $3x^2$ f) 5
d) 3

B) $y = 4x^2 - 7\sqrt{x^9} + 10$
fractional exponent
not poly

(C) $y = -5x^7 - 2$
a) 7 e) ↑ ↓
b) 2
c) $-5x^7$ f) $-2$
d) $-5$

(D) $y = -7x^4 - 8x + \sqrt{6}$
a) 4 e) ↓ ↓
b) 3
c) $-7x^4$ f) $\sqrt{6}$
d) $-7$

(E) $y = 3.1 - 8x^2 + 5x^5 - 12.3x^4$
$y = 5x^5 - 12.3x^4 - 8x^2 + 3.1$
a) 5 e) ↓ ↑
b) 4
c) $5x^5$ f) 3.1
d) 5

F) $y = -x^{-2} + 5x$
negative exponent
not poly

4. Determine whether each of the following functions is a power function. If it is, identify $a$ and $b$. If it isn't, then tell why.

A) $y = 5x^2 + 3$

no

2 terms

B) $2y = 6x^2$ yes

$y = 3x^2$

$a=3$ $b=2$

C) $y = \sqrt{(3)} * 5x$ yes

$y = 5\sqrt{3}\,x$

$a = 5\sqrt{3}$ $b = 1$

D) $y = 3(x+2)^2$

no

too many terms

E) $y = 3(x-2)(x+2) + 12$

$y = 3(x^2-4) + 12$ yes

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

$y = 3x^2$

$a = 3$ $b = 2$

F) $y = 3.2\sqrt{x^5}$

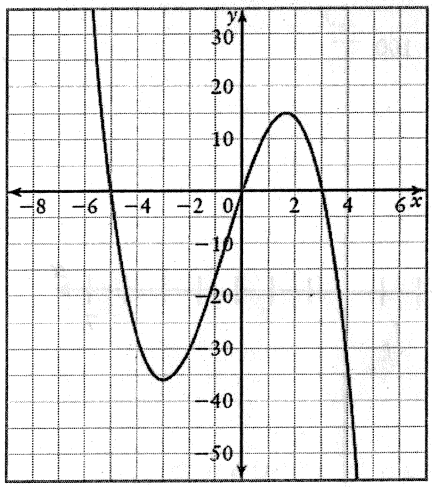
yes

$y = 3.2x^{\frac{5}{2}}$

$a = 3.2$ $b = \frac{5}{2}$

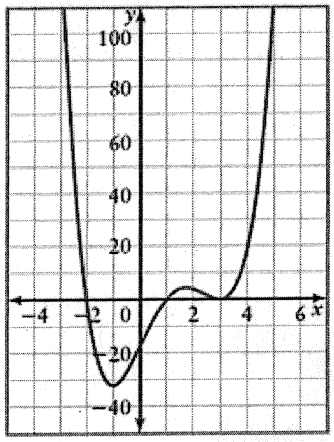
5. For each graph of a polynomial function, determine a) whether the exponent of the controlling term is odd or even, b) the sign of the leading coefficient, c) the x-intercepts, and d) the factors of the function

a)




a) odd exponent
b) negative
c) $-5, 0, 3$
d) $x(x+5)(x-3)$

b)




a) even exponent
b) positive
c) $-2, 1, 3$ (double root)
d) $(x+2)(x-1)(x-3)^2$

6. Solve the following polynomial functions algebraically.

**a)** $2x^3 + 24x^2 - 56x = 0$

$2x(x^2+12x-28) = 0$

$2x(x+14)(x-2) = 0$

$x=0$ $x=-14$ $x=2$

$\{0, -14, 2\}$

**b)** $3x^4 - 2x^2 - 5 = 0$

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

$3x^2 = 5$ $x^2 = -1$

$\sqrt{x^2} = \sqrt{\frac{5}{3}}$ $x = \pm i$

$x = \pm\frac{\sqrt{5}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \pm\frac{\sqrt{15}}{3}$

$\left\{\pm\frac{\sqrt{15}}{3}, \pm i\right\}$