Standard 1 Review: Name: _____

1. **Indicate which is the most specific number set each of the following values is in.** (Complex, Imaginary, Real, Rational, Irrational, Integers, Whole, or Natural)

   a. -5 **b.** $\sqrt{2}$

   c. $3 + 4i$ **d.** $8.\overline{3}$

   e. $\sqrt{-16}$ **f.** 0

2. **Write the following inequalities in interval notation <u>and</u> state whether they are bounded or unbounded.**

   a. $x \geq -2$ **b.** $1 < x \leq 6$

3. **Write the following intervals as inequalities <u>and</u> graph them on a number line.**

   a. $(-\infty, 4]$ **b.** $[-1, 5)$

4. **Identify which of the following is a polynomial.**

   a. $-116x^2y^3x^4$ **b.** $x^3 + 4x^{-2} - 2x$ **c.** $x^2 + \sqrt{x} - 7$ **d.** $x + 1$

5. **Identify the <u>degree</u>, <u>leading term</u>, <u>leading coefficient</u> and <u>constants</u> of each polynomial.**

   a. $2x^3 + 7x^2 - 5x + 4$ **b.** $9x^2 + 8x^4 - 6x^5 + 4x + 1$

6. **<u>Add/Subtract</u> the following polynomials.**

   a. $(2x^3 - 7x + 2) + (6x^2 + 6x - 9)$ **b.** $(11x^4 + 2x^2 - 5) - (4x^3 - 8x + 7)$

7. **<u>Multiply</u> the following polynomials.**

   a. $3x(2x^2 - 4x + 1)$ **b.** $(3x + 2)(3x - 2)$

   c. $(5x + 4)^2$ **d.** $(x + 2)(x^2 + 3x - 6)$

8. Simplify using <u>Polynomial long division</u>.

a. $\dfrac{x^4+2x^3-3x^2-8x-4}{x^3+x^2-4x-4}$

b. $\dfrac{x^4+3x^3-7x^2-27x-18}{x^2-9}$

9. Solve (find the zeros) of the following equations Algebraically.

a. $3x+4=17$

b. $3x^2+18x=0$

c. $x^2+11x=-30$

d. $4x^2+9x+5=0$

e. $49x^2-28x+4=0$

f. $9x^2-64=0$

g. $5(x+4)^2-720=0$

h. $6x^2+2x-3=0$

i. $x^4+3x^3-36x^2=0$

j. $x^4-41x^2+400=0$

k. $x+6\sqrt{x}+27=0$

l. $x^3+2x^2-11x-12=0$

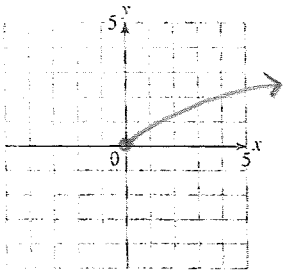
10. Simplify using <u>Synthetic division</u>.

a. $\dfrac{x^3 - 7x - 6}{x - 3}$

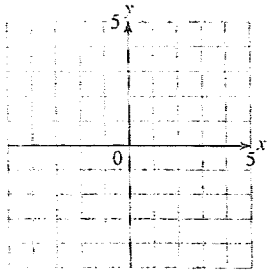
b. $\dfrac{x^4 + 3x^3 - 7x^2 - 27x - 18}{x + 1}$

11. The graph of $f(x) = \sqrt{x}$ is below. <u>Sketch</u> the following related graphs.

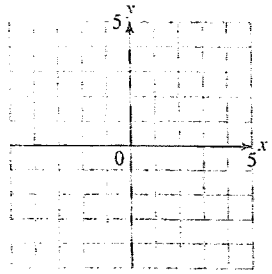
$f(x) = \sqrt{x}$



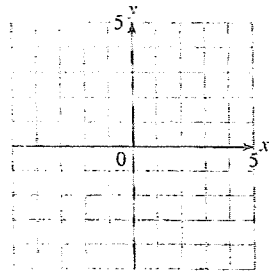
a. $f(x) = \sqrt{x} - 3$



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

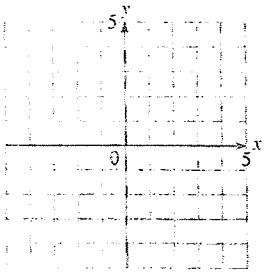


c. $f(x) = {}^1/_2\sqrt{-x-1} + 2$

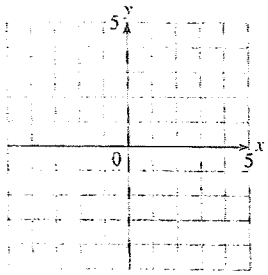


12. <u>Sketch</u> the following polynomial graphs.

a. $f(x) = -x^3 + 4$

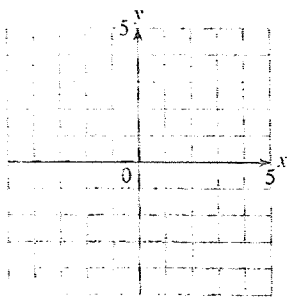


b. $f(x) = 2x^4 - 3x^3 + 7x^2 + 8x - 4$



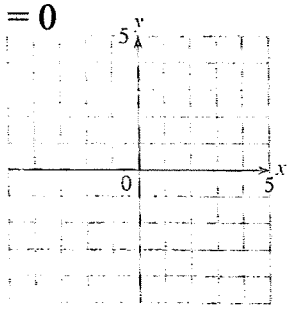
13. <u>Solve</u> the following polynomials graphically. Sketch the graphs.

a. $x^2 - 3x - 10 = 0$



Zeros:

b. $2x^3 - 3x^2 - 18x + 27 = 0$



Zeros:

14. Solve (find the zeros) Algebraically.

a. $x^2 + 14x + 45 = 0$

b. $x^3 - 6x^2 - 16x = 0$

15. Find a polynomial with the following zeros.

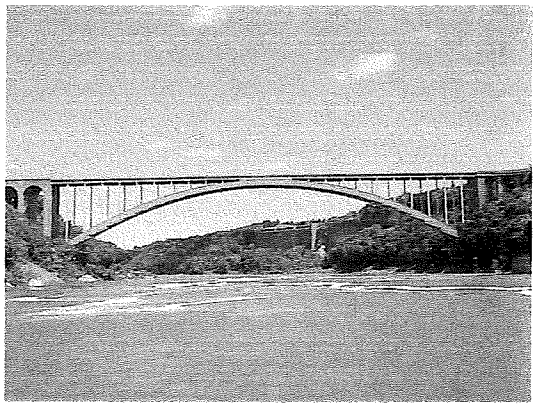
a. $x = 8, -3$

b. $x = 0, 0, 2, -4$

c. $x = 2, -2, 3$

d. $x = \pm 1, \pm 4$

16. A new bridge across the Willamette Channel will use a parabolic support system. If the supports must each be 20 feet from the center of the river ($x = 0$), find an equation for the parabolic supports.



What will the max height of the bridge be from the river bottom ($y = 0$), according to your equation?