**LT6.1 Graphing Cubic Functions**

**Problems 1-6: Make a graph and make a table below the graph. Find the x-intercepts.**

**1.** $y=x^{3}$ **2.** $y=x^{3}+2$ **3.** $y=-x^{3}-4$



x-intercepts: \_\_\_\_\_\_\_\_\_\_\_ x-intercepts: \_\_\_\_\_\_\_\_\_\_\_\_\_ x-intercepts:\_\_\_\_\_\_\_\_\_\_

**4.** Identify the following significant features of the graph of a cubic function.



Domain \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Range \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Relative Maximum (estimate) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Relative Minimum (estimate) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Increasing Interval(s) (estimate) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Decreasing Interval(s) (estimate) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

x-intercept \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

y-intercept \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

End Behavior: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**LT 6.2 Operations with Polynomials**

**Problems 5-7: Simplify the Expression.**

**5.**$ x^{3}∙\left(x^{2}\right)^{3}$ **6.**$ \left(\frac{6a^{3}b^{5}}{2a^{2}b^{4}}\right)^{3}$

**7.** $\left(4m^{0}n\right)^{2}$

**Problems 8-13: Add, Subtract, Multiply, or Divide the Polynomials**

**8**. $\left(2x^{3}+6x^{2}-x+6\right)+(-4x^{3}+6x^{2}+x+18)$

**9.** $\left(x^{4}-3x^{3}+x-7\right)-(-3x^{4}+2x^{2}-x+15)$

**10.** $(x+1)(3x+7)(x-7)$ **11.** $(4x^{3}+x^{2}+8x)(x^{2}-8x+13)$

**12**. $\frac{2x^{3} + 3x^{2} - 29x - 60}{x^{2}-4}$ **13.** $\frac{x^{4} + 7x^{3} - 5x^{2} - 4x + 8}{x+3}$

**LT 6.3 Solving for Cubic Functions and Polynomial Equations**

**Problems 14-19: Solve by graphing in a graphing calculator. Round to the nearest tenth.**

**14.** $x^{3}-8x^{2}+7x+9=0$ **15.** $6x^{3}+18x^{2}-2x+3=7$

**16.** $-2x^{3}+2x+5=0$ **17.** $4x^{3}+4x^{2}-39x+36=0$

**Problems 5-6: Find all zeros. Divide the function by the given factor, then solve for x.**

**18.** $x^{3}+7x^{2}-6x-72=0, x+6$ **19.** $2x^{3}+13x^{2}-70x-225=0, 2x+5$

**20.** A construction company is building new homes. The median cost of building these homes can be modeled by the function $\left(x\right)=0.6199x^{4}-55.9808x^{3}+1518.304x^{2}-8252.987x+301070.846$ , where x is the number of years since 1970. In what year was their cost at $120,000?