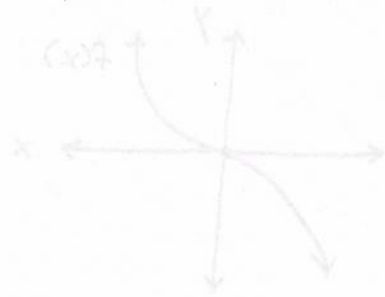


(b) (1 point) Use your answer from part (a) to factor  $x^3 + 8x^2 - 15x - 54$  completely.

$$x^2 + 6x - 27 = (x+9)(x-3)$$

$$\text{So } x^3 + 8x^2 - 15x - 54 = (x+2)(x+9)(x-3).$$

1. (3 points) Sketch the graph of  $f(x) = x^3$ . Use the graph of the parent function  $f(x)$  to sketch the graph of  $g(x) = -(x-2)^3$ .  
 (1) reflect in the x-axis  
 (2) shift right 2 units



2. (3 points) Identify the vertex and axis of symmetry of the quadratic function  $f(x) = 2x^2 + 12x + 6$ .  
 $= 2(x^2 + 6x) + 6$   
 $= 2(x^2 + 6x + 9) + 6$   
 $= 2(x+3)^2 - 18 + 6$   
 $= 2(x+3)^2 - 12$   
 Vertex =  $(-3, -12)$   
 Axis of symmetry:  $x = -3$

3. (a) (3 points) Perform the following division. You may use long division or synthetic division.

$$\frac{x^3 + 8x^2 - 15x - 54}{x+2}$$

$$\begin{array}{r} x^2 + 6x - 27 \\ x+2 \overline{) x^3 + 8x^2 - 15x - 54} \\ \underline{x^3 + 2x^2} \phantom{- 54} \\ 6x^2 - 15x \phantom{- 54} \\ \underline{6x^2 + 12x} \phantom{- 54} \\ -27x - 54 \\ \underline{-27x - 54} \\ 0 \end{array}$$

$$\begin{array}{r|rrrr} -2 & 1 & 8 & -15 & -54 \\ & & 2 & 12 & -27 \\ \hline & 1 & 10 & -3 & -81 \end{array}$$

OR

$$x^3 + 8x^2 - 15x - 54$$