Section 4.5 – Final Exam Prep

Answer the following four questions, show as many steps as you need to, write clearly and neatly.

1. Graph the following quadratic. State the vertex, axis of symmetry, $x - intercept(s)$ if possible , $y - intercepts$, domain, range, and max/min values

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

$y\text{-int}: (0,-4)$

$0 = \frac{1}{2}x^2 - x - 4$

$x\text{-int}: (4,0)$
$(-2,0)$

$0 = x^2 - 2x - 8$

$(x-4)(x+2)$

vertex:

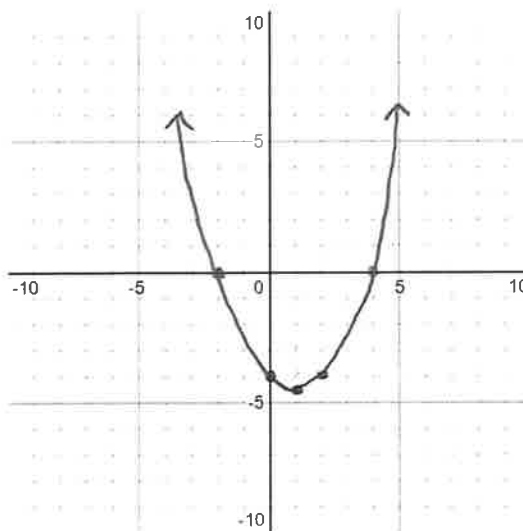$\frac{1}{2}(x^2 - 2x) - 4$

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

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

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

$(1, -4\frac{1}{2}) = vertex$

$A \, of \, S: x = 1$

$D: \mathbb{R}$

$R: y \geqslant -4\frac{1}{2}$

Min

2. Find the Vertex by Completing the Square, the $x - intercepts$ $(if\ possible), y - intercepts,$ and the domain and the range. Graph it.
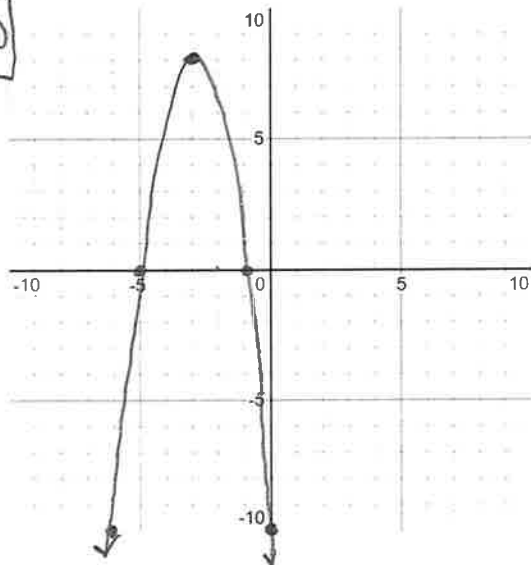
$f(x) = -2x^2 - 12x - 10$

y-int: (0,-10)

$0 = -2x^2 - 12x - 10$ divide by -2

$0 = x^2 + 6x + 5$

x-int: (-5,0)
(-1,0)

$(x+5)(x+1)$

vertex

$-2(x^2 + 6x) - 10$

$-2(x^2 + 6x + 9 - 9) - 10$

$-2(x^2 + 6x + 9) + 18 - 10$

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

vertex: (-3,8)

Max

A of S $x = -3$

D: $\mathbb{R}$

R: $y \le 8$