Part II Exercises (Five Points Each)

16. Very carefully graph the function $f(x) = -3x^2 + 30x - 63$. Label the vertex and x-intercepts. Show your calculations in the space provided. Label your axes and indicate your scales.

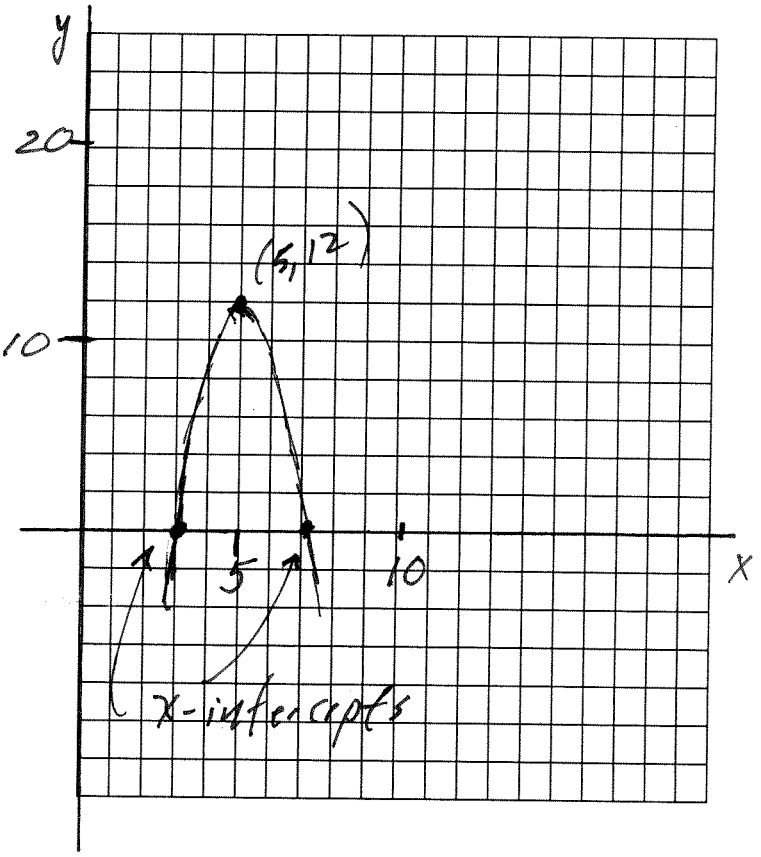
Vertex when $x = \frac{-b}{2a} = \frac{-30}{-6} = 5$

$f(5) = -3(5)^2 + 30(5) - 63$
$= -75 + 150 - 63$
$= 12$

Vertex: $(5, 12)$

x-intercepts when
$-3x^2 + 30x - 63 = 0$
$x^2 - 10x + 21 = 0$
$x = \frac{10 \pm \sqrt{10^2 - 4(21)}}{2}$
$= \frac{10 \pm \sqrt{16}}{2} = \frac{10 \pm 4}{2}$

$x = 3$ or $x = 7$



17. The International Whaling Commission adopted the formula $W = 3.51L - 192$ to relate the length L in feet of adult blue whales to their weight W in British tons (2240 pounds). (a) Interpret the meaning of the slope of the graph of the equation in terms of the relationship defined. (b) If the lengths of two whales differ by 10 feet, by about how much do their weights differ? An average blue whale is between 75 and 80 feet long, and weighs about 110 tons. Females are larger than males of the same age, the largest perhaps weighing as much as 150 tons. (Show your calculations below, and clearly express your answers in English sentences.)

(a) If a whale's length increases by 1 foot, its weight increases by 3.51 tons.

(b) If the lengths of two whales differ by 10 feet, then their weights differ by 35.1 tons.

Slope $= \frac{3.51}{1} = \frac{35.1}{10}$