

Calculus 201-007-50 C2

Quiz 13

December 10, 2008

Name: SOLUTIONS

Student ID:

1. (3 marks). Find the vertex of the parabola $y = -2x^2 + 6x$.

$$x = \frac{-b}{2a} = \frac{-(6)}{2(-2)} = \frac{-6}{-4} = \frac{3}{2} \quad \left| \quad \begin{aligned} y_v &= -2\left(\frac{3}{2}\right)^2 + 6\left(\frac{3}{2}\right) \\ &= -2\left(\frac{9}{4}\right) + 9 = -\frac{9}{2} + \frac{18}{2} = \frac{9}{2} \end{aligned} \right.$$

$\therefore \left(\frac{3}{2}, \frac{9}{2}\right)$ IS THE VERTEX

2. (7 marks). Graph: $y = -2x^2 + 4x + 3$

y-int: $x=0$

$$y = -2(0)^2 + 4(0) + 3$$

$$y = 3$$

$\therefore (0, 3)$ IS THE y-int

VERTEX:

$$x = \frac{-b}{2a} = \frac{-(4)}{2(-2)} = 1 \quad \therefore (1, 5) \text{ IS THE VERTEX}$$

$$y_v = -2(1)^2 + 4(1) + 3 = 5$$

x-int: $y=0$

$$0 = -2x^2 + 4x + 3, \quad a = -2, b = 4, c = 3$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-(4) \pm \sqrt{(4)^2 - 4(-2)(3)}}{2(-2)}$$

$$= \frac{-4 \pm \sqrt{16 + 24}}{-4} = \frac{-4 \pm \sqrt{40}}{-4}$$

$$= \frac{-4 \pm 2\sqrt{10}}{-4} = \frac{-2(2 \mp \sqrt{10})}{-4}$$

$$= \frac{2 \mp \sqrt{10}}{2} \quad \therefore \left(\frac{2 - \sqrt{10}}{2}, 0\right) \text{ AND } \left(\frac{2 + \sqrt{10}}{2}, 0\right)$$

ARE THE x-ints

NOTE: $\frac{2 - \sqrt{10}}{2} \approx -0.58$ $\frac{2 + \sqrt{10}}{2} \approx 2.58$

GRAPH:

