

## Quiz 11

**Question 1.** (6 marks) Find the intercepts and vertex of  $y = x^2 - 3x + 2$ . Graph this parabola.

y-int:  $x=0$

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

$\therefore (0, 2)$

x-int:  $y=0$

$$0 = x^2 - 3x + 2$$

$$0 = (x-2)(x-1)$$

$$\begin{array}{l} \swarrow \quad \searrow \\ x-2=0 \quad x-1=0 \\ x=2 \quad \quad x=1 \end{array}$$

$\therefore (1, 0), (2, 0)$

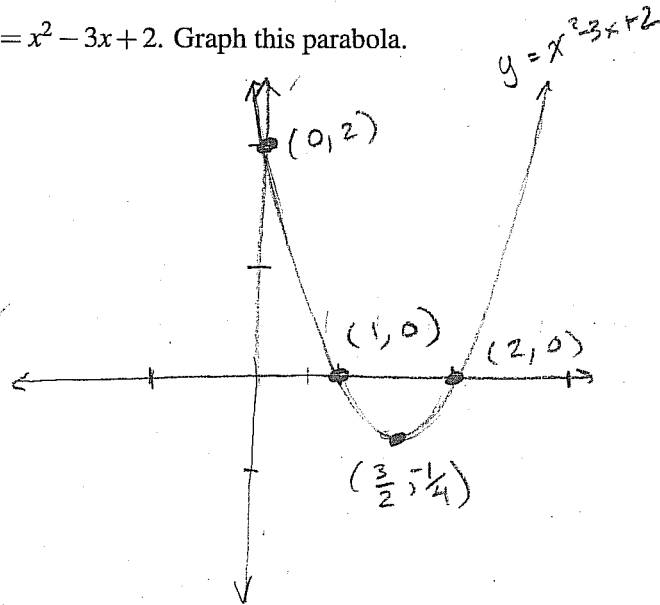
VERTEX:

$$\begin{aligned} x &= \frac{-b}{2a} \\ &= \frac{-(-3)}{2(1)} \\ &= \frac{3}{2} \end{aligned}$$

$$y = \left(\frac{3}{2}\right)^2 - 3\left(\frac{3}{2}\right) + 2$$

$$= \frac{9}{4} - \frac{9}{2} + \frac{8}{4}$$

$$= -\frac{1}{4} \quad \therefore \left(\frac{3}{2}, -\frac{1}{4}\right)$$



**Question 2.** (4 marks) The height,  $h$ , in feet, of a ball,  $x$  seconds after being thrown is given by:

$$h = -8.5x^2 + 25x + 6.5$$

(a) After how many seconds is the ball's height less than when it was released?

(b) When does the ball land?

a)  $h = 6.5$

$$\therefore 6.5 = -8.5x^2 + 25x + 6.5$$

$$0 = -8.5x^2 + 25x$$

$$0 = x(-8.5x + 25)$$

$$\begin{array}{l} \swarrow \quad \searrow \\ x=0 \quad -8.5x + 25 = 0 \\ \text{(WHEN BALL WAS THROWN)} \quad -8.5x = -25 \\ \quad \quad \quad \quad \quad \quad \quad x = \frac{-25}{-8.5} = 2.9 \end{array}$$

$\therefore 2.9$  seconds

b)  $h = 0$

$$0 = -8.5x^2 + 25x + 6.5$$

$$\begin{aligned} x &= \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \\ &= \frac{-25 \pm \sqrt{(25)^2 - 4(-8.5)(6.5)}}{2(-8.5)} \\ &= \frac{-25 \pm \sqrt{846}}{-17} \end{aligned}$$

$$= 3.18, -0.240$$

$\therefore 3.18$  s