

# TEST 3 REVIEW

$$1/ \quad D = \begin{vmatrix} 1 & 1 & 1 & 1 & 1 \\ 1 & -1 & -1 & 1 & -1 \\ 1 & -2 & 1 & 1 & -2 \\ -1 & -1 & 2 & -1 & 2 \end{vmatrix}$$

$$= -1 - 2 - 1 - 1 - 1 + 2$$

$$= -4$$

$$D_x = \begin{vmatrix} 2 & 1 & 1 & 2 & 1 \\ -6 & -1 & -1 & -6 & -1 \\ 0 & -2 & 1 & 0 & -2 \\ -2 & 0 & 2 & -2 & 0 \end{vmatrix}$$

$$= -12$$

$$\therefore X = \frac{D_x}{D} = \frac{-12}{-4} = 3$$

$$2/ \quad \begin{aligned} x + 2y &= 8 \quad \text{--- (1)} \\ x^2 + y^2 &= 16 \quad \text{--- (2)} \end{aligned}$$

From (1):  $x = 8 - 2y$

Plug this in (2)

$$\Rightarrow (8 - 2y)^2 + y^2 = 16$$

$$\Rightarrow 64 - 32y + 4y^2 + y^2 = 16$$

$$\Rightarrow 5y^2 - 32y + 48 = 0$$

$$\Rightarrow (5y - 12)(y - 4) = 0$$

$$\Rightarrow y = 12/5 \quad \text{or} \quad y = 4$$

$$\Rightarrow x = 8 - 2(12/5) \quad \Rightarrow x = 8 - 2(4)$$

$$= 8 - 24/5 \quad = 0$$

$$= 16/5$$

$$\therefore (x, y) = (16/5, 12/5) \quad \text{or} \quad (x, y) = (0, 4)$$

$$3/ \quad \text{Using } (x_1, y_1) = (3, 7) \text{ and } (x_2, y_2) = (6, 3) \text{ and}$$

$$M = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) = \text{midpoint}$$

$$= \left( \frac{3+6}{2}, \frac{7+3}{2} \right)$$

$$= \left( \frac{9}{2}, 5 \right)$$

$$4/ \quad \text{Using } (x_1, y_1) = (3, 7), (x_2, y_2) = (6, 3)$$

$$\text{and } d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} = \text{distance}$$

$$= \sqrt{(6-3)^2 + (3-7)^2}$$

$$= \sqrt{9 + 16}$$

$$= \sqrt{25}$$

$$= 5$$

$$5/ \quad \text{Use center} = M \text{ from above and } r = \frac{d}{2} = \frac{5}{2}$$

$$\text{We get } \left( x - \frac{9}{2} \right)^2 + (y - 5)^2 = \frac{25}{4}$$

$$6/ \quad \begin{aligned} 4x^2 + 8y &= 11 + 4x - 4y^2 \\ \Rightarrow 4x^2 - 4x + 4y^2 + 8y &= 11 \\ \Rightarrow x^2 - x + y^2 + 2y &= 11/4 \end{aligned}$$

Now complete the square for x and y

$$\Rightarrow x^2 - x + \left(-\frac{1}{2}\right)^2 + y^2 + 2y + (1)^2 = \frac{11}{4} + \left(-\frac{1}{2}\right)^2 + (1)^2$$

$$\Rightarrow (x - 1/2)^2 + (y + 1)^2 = 4$$

$$\Rightarrow \text{center} = (1/2, -1)$$

$$\text{radius} = 2$$

## TEST 3 REVIEW cont'd

7/ Using  $(x-h)^2 + (y-k)^2 = r^2$   
with  $(h,k) = (-1,3)$  and  
 $(x,y) = (4,3)$ , we get  
 $(4+1)^2 + (3-3)^2 = r^2$   
 $\Rightarrow 25 = r^2$   
 $\therefore (x+1)^2 + (y-3)^2 = 25$

8/  $y = x^2 + 5x + 6$

For y-intercept,  $x=0$

$$\Rightarrow y = 6$$

For x-intercept,  $y=0$

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

$$\Rightarrow (x+2)(x+3) = 0$$

$$\Rightarrow x = -2, x = -3$$

For vertex,  $x = \frac{-b}{2a}$

$$\Rightarrow x = -\frac{5}{2}$$

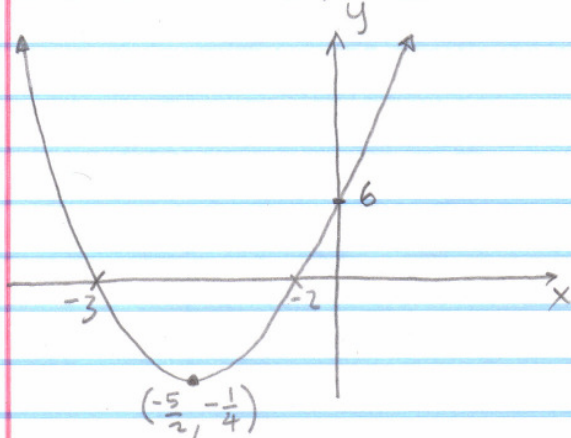
when  $x = -\frac{5}{2}$

$$y = \left(-\frac{5}{2}\right)^2 + 5\left(-\frac{5}{2}\right) + 6$$

$$\text{OR } \left(-\frac{5}{2} + 2\right)\left(-\frac{5}{2} + 3\right)$$

$$= -\frac{1}{4}$$

$$\Rightarrow \text{vertex} = \left(-\frac{5}{2}, -\frac{1}{4}\right)$$



9/  $y = 6 - 5x - x^2$

For y-intercept,  $x=0$

$$\Rightarrow y = 6$$

For x-intercept,  $y=0$

$$\Rightarrow 6 - 5x - x^2 = 0$$

$$\Rightarrow x^2 + 5x - 6 = 0$$

$$\Rightarrow (x+6)(x-1) = 0$$

$$\Rightarrow x = -6, x = 1$$

For vertex,  $x = \frac{-b}{2a}$

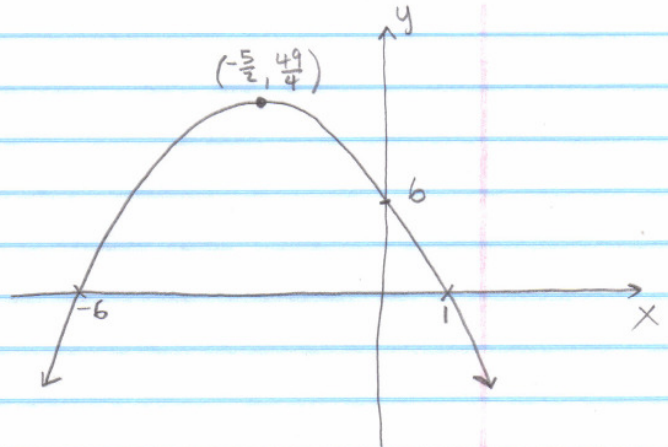
$$= \frac{-(-5)}{2(-1)}$$

$$= -\frac{5}{2}$$

When  $x = -\frac{5}{2}$ ,  $y = 6 - 5\left(-\frac{5}{2}\right) - \left(-\frac{5}{2}\right)^2$

$$= \frac{49}{4}$$

$$\Rightarrow \text{vertex} = \left(-\frac{5}{2}, \frac{49}{4}\right)$$



## TEST 3 REVIEW cont'd

10/  $y = 30x^2 + 40x$

For y-intercept,  $x=0$

$$\Rightarrow y=0$$

For x-intercept,  $y=0$

$$\Rightarrow 30x^2 + 40x = 0$$

$$\Rightarrow 10x(3x+4) = 0$$

$$\Rightarrow x=0, x = -\frac{4}{3}$$

For vertex,  $x = -\frac{b}{2a}$

$$= \frac{-40}{2(30)}$$

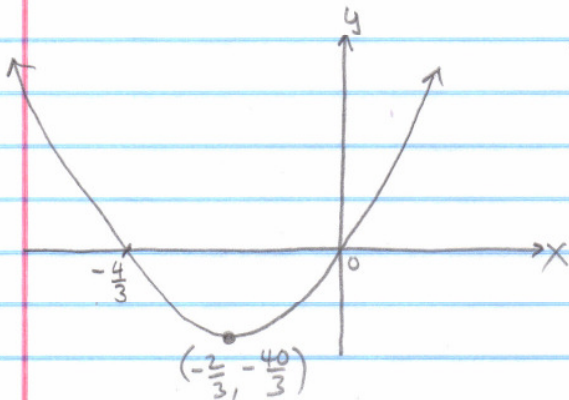
$$= -\frac{2}{3}$$

When  $x = -\frac{2}{3}$

$$y = 30\left(-\frac{2}{3}\right)^2 + 40\left(-\frac{2}{3}\right)$$

$$= \frac{-40}{3}$$

$$\Rightarrow \text{vertex} = \left(-\frac{2}{3}, -\frac{40}{3}\right)$$



11/  $x^2 - 4x + 1 = 0$

$$\text{Use } x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\Rightarrow x = \frac{4 \pm \sqrt{4^2 - 4(1)(1)}}{2}$$

$$\Rightarrow \boxed{x = 2 \pm \sqrt{3}}$$

12/  $\frac{1}{6}x^2 + x = \frac{4}{3} \rightarrow \text{LCD} = 6$

$$\Rightarrow x^2 + 6x = 8$$

$$\Rightarrow x^2 + 6x - 8 = 0$$

$$\text{Use } x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\Rightarrow x = \frac{-6 \pm \sqrt{6^2 - 4(1)(-8)}}{2}$$

$$\Rightarrow \boxed{x = -3 \pm \sqrt{17}}$$

13/  $2x^3 + 2x^2 - 3x = 0$

$$\Rightarrow x(2x^2 + 2x - 3) = 0$$

$$\Rightarrow \boxed{x=0} \text{ or } 2x^2 + 2x - 3 = 0$$

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

$$\Rightarrow \boxed{x = \frac{-1 \pm \sqrt{7}}{2}}$$

14/  $2x^2 = 5x$

$$\Rightarrow 2x^2 - 5x = 0$$

$$x(2x - 5) = 0$$

$$\boxed{x=0 \text{ or } x = \frac{5}{2}}$$