

DOROTHY KEBING 051PP17F2031

INTENSIVE MATHEMATICS (PBM10315)

Session December 2017

Model Exam Paper (Question 6)

Question 1

(a) Given a function $f(x) = x^3$, find $f(-3)$, $f(-2)$ and $f(0)$.

$$f(3) \quad f(-3) = -3^3$$

$$= -27$$

$$f(-2) \quad f(-2) = x^3$$

$$= -2^3 = -8$$

$$f(0) = x^3$$

$$= 0^3$$

$$= 0$$

b) Draw a graph of $f(x) = \frac{2}{3}x + 1$ for $-6 \leq x \leq 6$.

$$\text{When } x = -6 \quad f(-6) = \frac{2}{3}(-6) + 1$$

$$= -4 + 1$$

$$= -3$$

$$(-6, -3)$$

$$\text{When } x = 6 \quad f(6) = \frac{2}{3}(6) + 1$$

$$= 4 + 1$$

$$= 5$$

$$(6, 5)$$

x-intercept, $y = 0$

$$\frac{2}{3}x + 1 = 0$$

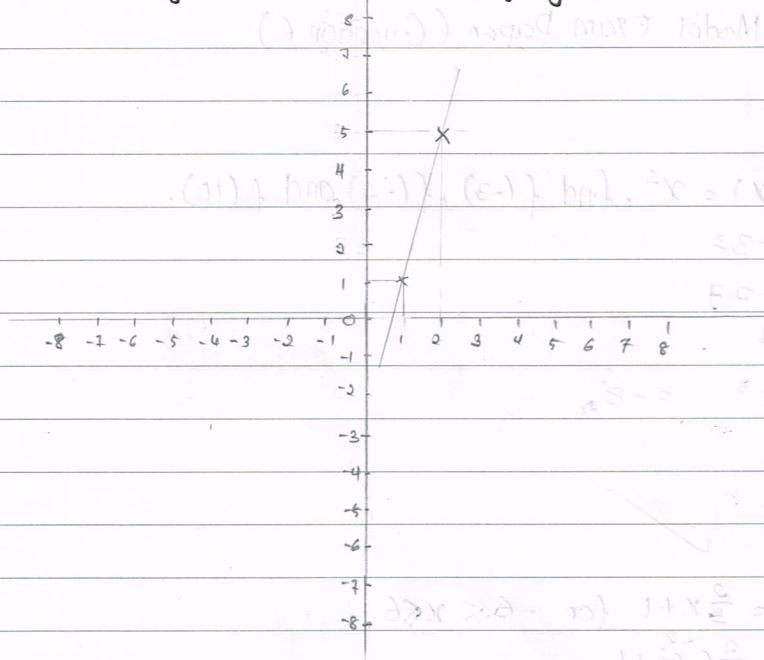
$$\frac{2}{3} \times \frac{3}{2}x = -1 \left(\frac{3}{2} \right)$$

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

$$x = -1.5$$

Question 2.

a) Find the gradient of the following graph



a) A(1, 1), B(2, 5)

Gradient

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

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

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

$$= 4$$

b) Find the equation of the straight line above

$$y = mx + c$$

$$y = 4x + c$$

$$5 = 4(2) + c$$

$$5 = 8 + c$$

$$5 - 8 = 8 - 8 + c$$

$$c = 3$$

$$\therefore y = 4x + 3$$

c) Find the mid point of A and B

$$\begin{aligned}\text{mid point} &= \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) \\ &= \left(\frac{1+2}{2}, \frac{1+5}{2} \right) \\ &= \left(\frac{3}{2}, \frac{3}{1} \right) \\ &= \left(\frac{3}{2}, 3 \right)\end{aligned}$$

d) Find the y-intercept and x-intercept of the straight line given

$$x = \text{intercept}$$

$$y = 4x - 3$$

$$\text{when } y = 0$$

$$0 = 4x - 3 + 3$$

$$0 + 3 = 4x$$

$$\frac{3}{4} = \frac{4x}{4}$$

$$x = \frac{3}{4}$$

$$\therefore x\text{-intercept} = -\frac{3}{4}$$

$$y\text{-intercept} = -3$$

Question 3

a) Find the equation of a line passing through the given point (2,1) and perpendicular to the given equation $y = -6x - 3$

$$m_1 = -6$$

$$m_1 \cdot m_2 = -1$$

$$-6 \cdot m_2 = -1$$

$$\frac{-6}{6} \cdot m_2 = \frac{-1}{-6}$$

$$m_2 = \frac{1}{6}$$

(b) Find the equation of a line passing through the given point (5, 3) and parallel to the given equation $7x + 4y = 16$.

$$7x - 7x + 4y = -7x + 16$$

$$\frac{4y}{4} = \frac{-7x + 16}{4}$$

$$y = \frac{-7x}{4} + \frac{16}{4}$$

$$y = -\frac{7}{4}x + 4$$

$$y = -\frac{7}{4}x + 4$$

$$y = mx + c$$

$$m_1 = -\frac{7}{4}$$

$$m_1 = m_2$$

$$y = -\frac{7}{4}x + c, (5, 3)$$

$$3 = -\frac{7}{4}(5) + c$$

$$3 = -\frac{35}{4} + c$$

$$c = \frac{47}{4}$$

$$\therefore y = -\frac{7}{4}x + 8$$

