

Name \_\_\_\_\_

[9M3 – 2009]

Year 9 – Coordinate Geometry TEST

- Time allowed: 35 minutes.
- Write all answers on the question paper.
- Show all necessary working, including writing formulas.

**Question 1.**

Find the midpoint of the interval with the endpoints  $(-3, -2)$  and  $(5, 1)$ . (3 marks)

**Question 2.**

Find the length of the interval between the points  $(-4, 4)$  and  $(3, -1)$ . (3 marks)

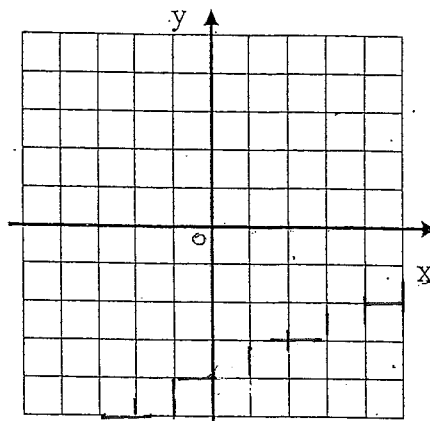
**Question 3.**

Find the gradient of the line which passes through the points  $(-2, 3)$  and  $(4, 12)$ . (3 marks)

**Question 4.**

On the number plane below, draw the line  $x - 2y - 8 = 0$

(2 marks)



**Question 5.**

Find the equation of the straight line which passes through the point  $(-1, 5)$ , with gradient  $m = -3$ .

(3 marks)

**Question 6.**

Find the equation of the straight line which passes through the two points  $(3, 3)$  and  $(2, 5)$

(4 marks)

**Question 7.**

Write each of the following equations in the general form:

(3 marks)

a)  $3y - 2 = 3x$

b)  $y = -\frac{1}{2}x + 2$

**Question 8.**

What is the equation of the line parallel to  $y = 3x - 2$ , which passes through the point  $(5, 6)$ ?

(3 marks)

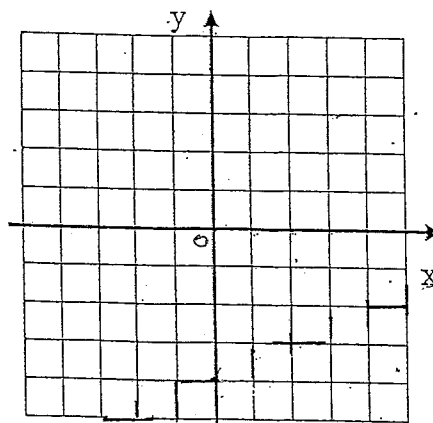
**Question 9**

Line  $p$  has the equation:  $y = 4x + 6$ . Line  $q$  is perpendicular to  $p$ . Line  $q$  passes through the point  $(1, 2)$ . What is the equation of line  $q$ ?

(3 marks)

**Question 10**

On the number plane below, graph the following inequality  $(x, y): x \leq 1 \cap y > x - 3$  (3 marks)



Name \_\_\_\_\_



Excellent Work! [9M3 - 2009]

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28 / 30

93 1/3% (Average: 88%)

#### Question 1.

Find the midpoint of the interval with the endpoints (-3, -2) and (5, 1).

(3 marks)

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

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#### Question 2.

Find the length of the interval between the points (-4, 4) and (3, -1)

(3 marks)

$$\begin{aligned}
 d &= \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2} \\
 &= \sqrt{(-4-3)^2 + (4-(-1))^2} \\
 &= \sqrt{(-7)^2 + (5)^2} \\
 &= \sqrt{49+25} \\
 &= \sqrt{74} \text{ units} \checkmark
 \end{aligned}$$

3

#### Question 3.

Find the gradient of the line which passes through the points (-2, 3) and (4, 12)

(3 marks)

$$\begin{aligned}
 m &= \frac{y_2-y_1}{x_2-x_1} \\
 &= \frac{12-3}{4-(-2)} \\
 &= \frac{9}{6} \\
 &= \frac{3}{2} \checkmark
 \end{aligned}$$

$$\begin{aligned}
 y - y_1 &= m(x - x_1) \\
 \frac{y - y_1}{x - x_1} &= m
 \end{aligned}$$

3

#### Question 4.

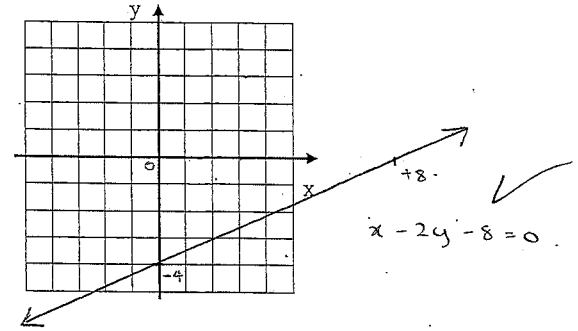
On the number plane below, draw the line  $x - 2y - 8 = 0$

$$\begin{aligned}
 \frac{0}{2} &= 0 \\
 x - 8 &= 0 \quad (2 \text{ marks})
 \end{aligned}$$

$$\begin{aligned}
 x - 2y - 8 &= 0 \\
 x - 8 &= 2y \\
 \frac{x-8}{2} &= y
 \end{aligned}$$

when:

$$\begin{aligned}
 2 \quad x &= 0, \quad y = -4 \\
 y &= 0, \quad x = 8
 \end{aligned}$$



#### Question 5.

Find the equation of the straight line which passes through the point (-1, 5), with gradient  $m = -3$ . (3 marks)

$$\begin{aligned}
 y - y_1 &= m(x - x_1) \\
 y - 5 &= -3(x - (-1)) \\
 y - 5 &= -3x - 3 \\
 y &= -3x - 3 + 5
 \end{aligned}$$

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$\therefore$  equation  $\approx y = -3x + 2$  ✓

#### Question 6.

Find the equation of the straight line which passes through the two points (3, 3) and (2, 5) ( $y = mx + b$ ) (4 marks)

$$\begin{aligned}
 m &= \frac{y_2 - y_1}{x_2 - x_1} \\
 4 &= \frac{5 - 3}{2 - 3} \\
 &= \frac{2}{-1} \\
 &= -2
 \end{aligned}$$

$$\begin{aligned}
 y - y_1 &= m(x - x_1) \\
 y - 3 &= -2(x - 3) \\
 y - 3 &= -2x + 6 \\
 y &= -2x + 6 + 3
 \end{aligned}$$

$\therefore$  gradient = -2

$\therefore$  equation of line  $\approx y = -2x + 9$  ✓

#### Question 7.

Write each of the following equations in the general form:  $ax + by + c = 0$  (3 marks)

a)  $3y - 2 = 3x$

b)  $y = -\frac{1}{2}x + 2$

$3x - 3y + 2 = 0$  ✓

$\frac{1}{2}x + y - 2 = 0 \times$

$\Rightarrow ? \quad x + 2y - 4 = 0$

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Question 8.

What is the equation of the line parallel to  $y=3x-2$ , which passes through the point (5, 6)?

parallel =  $(m_1 = m_2)$

(3 marks)

$$y - y_1 = m(x - x_1)$$

$$y - 6 = 3(x - 5)$$

$$y - 6 = 3x - 15$$

$$y = 3x - 15 + 6$$

3

∴ equation:  $y = 3x - 9$

Question 9

Line  $p$  has the equation:  $y=4x+6$ . Line  $q$  is perpendicular to  $p$ . Line  $q$  passes through the point (1, 2). What is the equation of line  $q$ ?

(3 marks)

perpendicular =  $(m_1 = -\frac{1}{m_2})$

∴  $m_1 = -4$

$m_2 = \frac{1}{4}$

$$y - y_1 = m(x - x_1)$$

$$y - 2 = \frac{1}{4}(x - 1)$$

$$y - 2 = \frac{x}{4} - \frac{1}{4}$$

$$y = \frac{x}{4} - \frac{1}{4} + 2$$

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∴ gradient of 'q' =  $\frac{1}{4}$

∴ equation of 'q':  $y = \frac{x}{4} + \frac{7}{4}$

Question 10

On the number plane below, graph the following inequality  $(x,y): x \leq 1 \cap y > x - 3$  (3 marks)

$x \leq 1$

$y = x - 3$

( $x=1$ )

when: (Test 0, 0)

$x=0, y=-3$

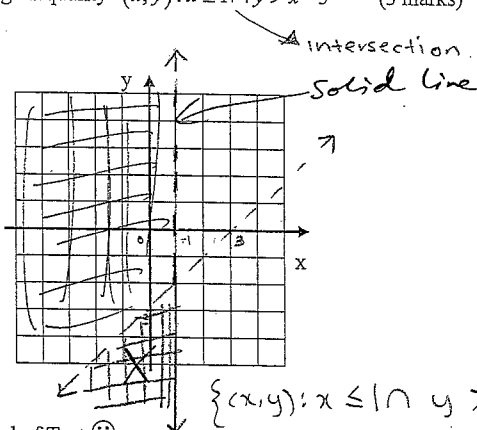
$x=3, y=0$

$y > x - 3$

$0 > 0 - 3$

$0 > -3$

True: ~~FALSE~~ (0, 0) doesn't lie in the region.



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End of Test ☺

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