



Waverley College
Year 10 Level 3 Mathematics Examination
Term 3 2006

TIME ALLOWED: 50 MINUTES

INSTRUCTIONS:

Attempt all questions.

Write your answers in the space provided.

Write in blue or black pen only.

Show all necessary working.

Marks may be deducted for careless or badly arranged work.

~~No lending or borrowing of any equipment during the exam.~~

Name: Jason Lam-Hang

Teacher: Mrs Farrell

SECTION	MARK
1: Literacy	/10
2: Coordinate Geometry	137
TOTAL:	147
PERCENTAGE:	%

Section 1: Literacy

(10 Marks)

Select a word from the list below to fill in each space.
Be Careful! Not all the words in the list will be used.

1. The general equation of a(n) _____ function is $y = a^x$
2. The highest or lowest value of a parabola is called the _____.
3. The point at which the graph of a linear function crosses the y-axis is called the _____ and represented by the pronumeral _____ in the gradient-intercept form.
4. When two lines are perpendicular, one gradient is the _____ of the other.
5. The _____ of an object is its speed with a direction
6. When points lie on the same line they are said to be _____.
7. A _____ is formed when an inequality is graphed.
8. $Ax + By + C = 0$ is the _____ of a linear function.
9. To find the _____ substitute $y=0$ in a given equation.

Half-plane

Turning point

Exponential

Cubic

y-intercept

x-intercept

 m b

Velocity

General Form

Gradient-intercept form

Negative Reciprocal

Collinear

Parallel

Section 2: Coordinate Geometry**Question 1**

(1)

Find the midpoint of the line joining the given points.

 $P(-2, 6)$ and $Q(-2, 4)$

Question 2

(3)

Which point is closer to the origin $O(0, 0)$: the point $Q(5, 11)$ or the point $Y(6, 10)$? How much closer is this point? Answer to 2 decimal places.

Question 3

(2)

The endpoints of a line interval have coordinates $A(1, 10)$ and $B(x, y)$. If the midpoint of AB is the point $M(5, 8)$, find the value of x and y

0

(4)

Question 4

Find the equation in general form for the line with:

gradient = $\frac{2}{5}$, passing through (5, -3)

(2)

Question 5

The equation of a line passing through (3, j) is $4x + 5y - 14 = 0$. Find the value of j .

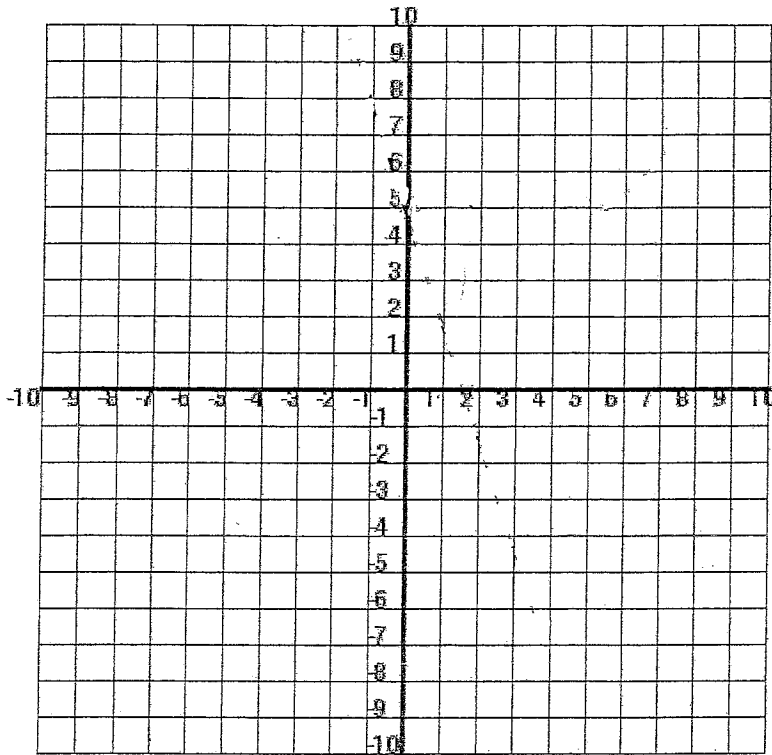
(2)

(3)

Question 6

Find the x- and y-intercepts and sketch a graph of the following line:

$$y = -3x + 5$$



x - intercept: _____

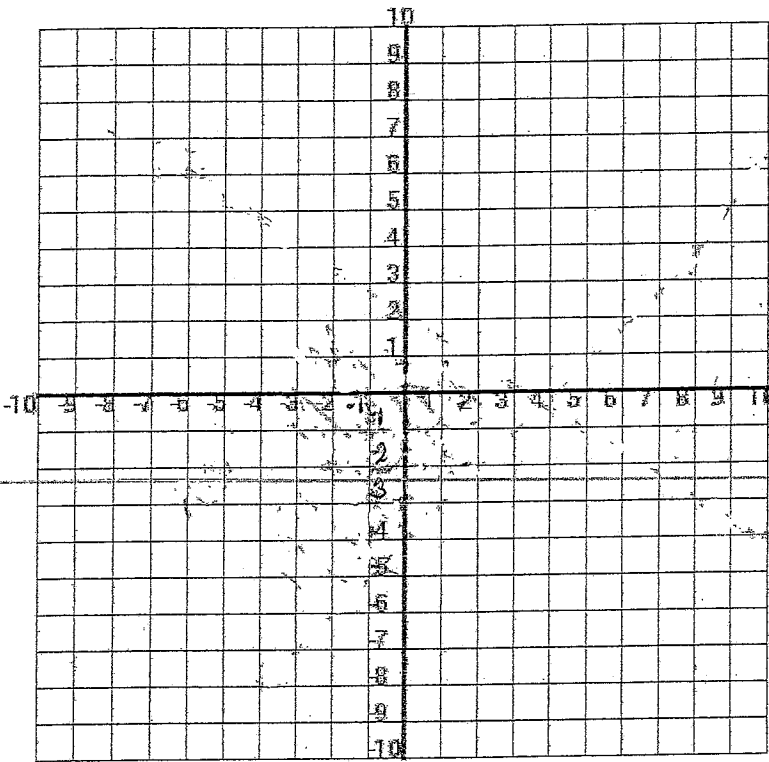
y- intercept: _____

Question 7

Sketch the following shading in the appropriate region:

$$2x + 3y < 6 \cap x - y \geq 4$$

(3)



Question 8

(4)

Find the equation of the line that is:

- (a) parallel to $2x - 4y + 3 = 0$ and goes through $(1, 8)$ and answer in gradient- intercept form.

-
- (b) perpendicular to $2x - 4y + 3 = 0$ and goes through $(2, 4)$ and answer in general form.
-
-

Question 9

(6)

The points $O(0,0)$, $A(9,5)$, $B(18,16)$ and $C(1,17)$ form the vertices of a quadrilateral. The midpoint of OA is G , the midpoint of AB is H , the midpoint of BC is I , and the midpoint of CO is J .

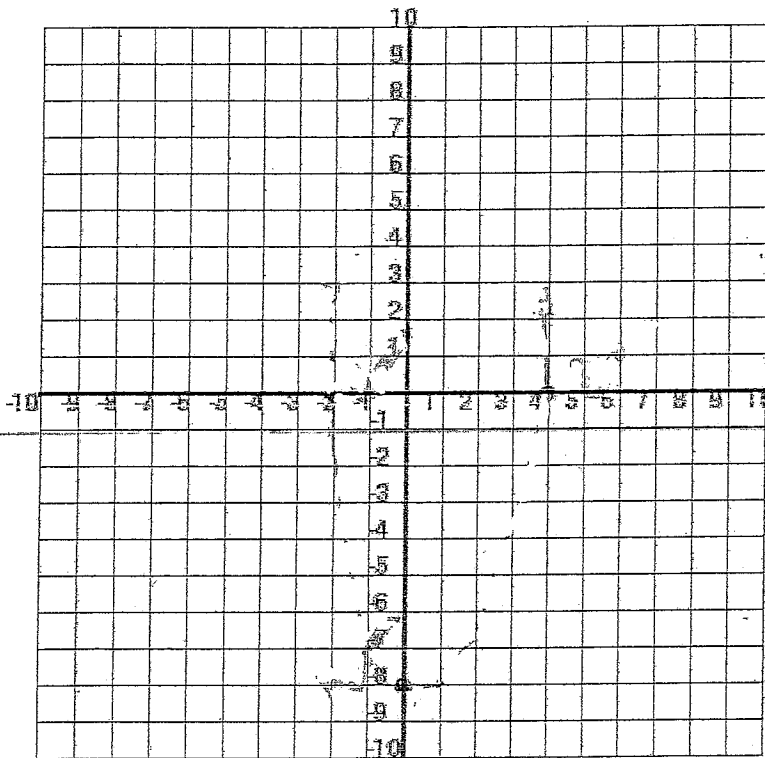
(a) Find the coordinates of G , H , I , and J .

(b) Show that $GHIJ$ is a parallelogram by showing that GH is parallel to IJ and HI is parallel to JG .

Question 10

(4)

In the space below, sketch a graph of the function $y = (x + 2)(x - 4)$. Mark the x - and y -intercepts and the turning point. (Hint: expand the brackets and then put into general form to help find the turning point)

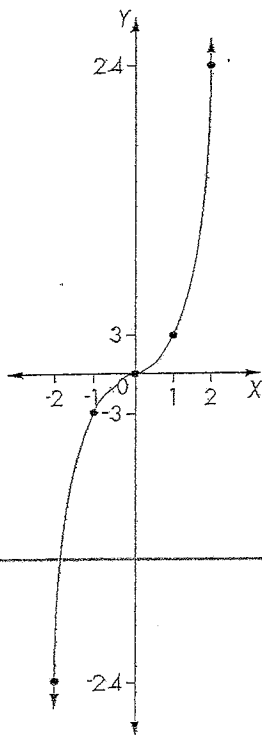


Question 11

(1)

The following graph is an example of a:

- A Exponential function
- B Circle
- C Cubic function
- D Linear function

**Question 12**

(1)

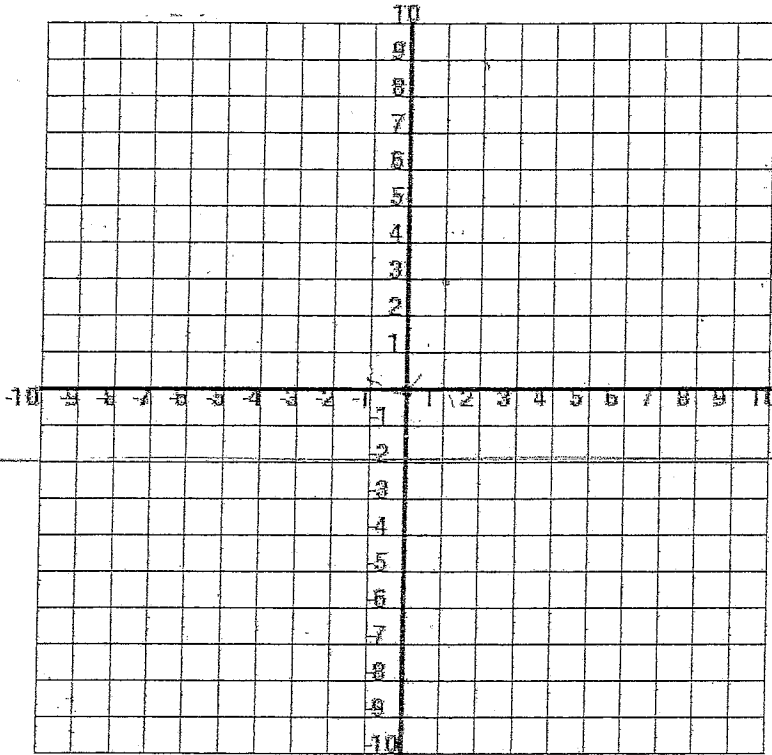
Which of the following is the equation of a circle?

- A $y = 2x^3$
- B $y = 1 + 2x^3$
- C $y = 3^x$
- D $y^2 + x^2 = 4$

Question 13

(2)

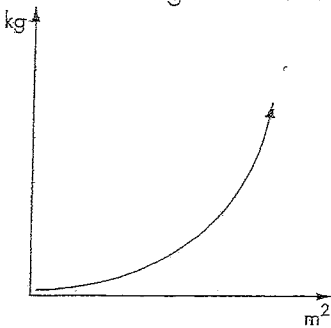
Draw the following graph on a number plane, using a table of values.
 $y = 3^x$



Question 14

(2)

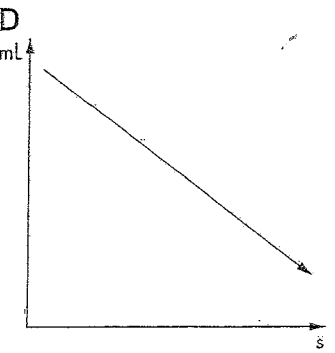
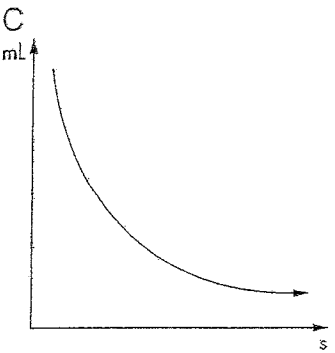
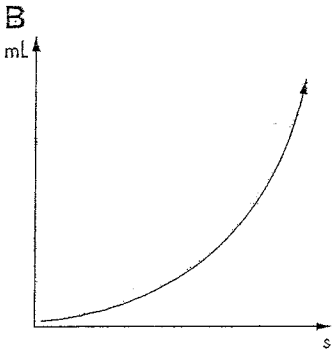
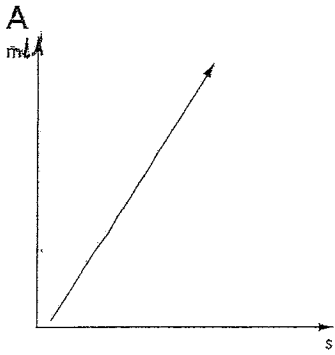
Name the rate that the graph below represents, and state whether the dependent variable is increasing or decreasing at an increasing or decreasing rate.



Question15

(1)

Which graph best shows the fluid level in a straight-sided jug if it is filled at a constant rate?

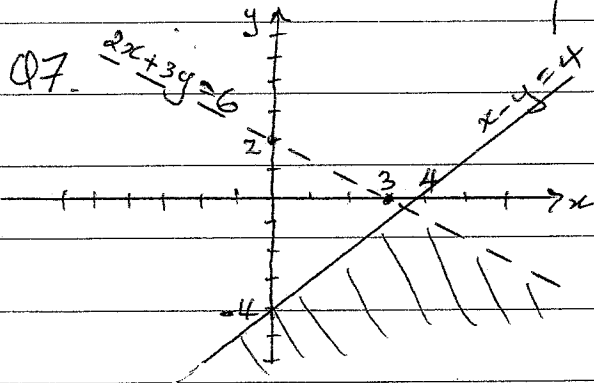
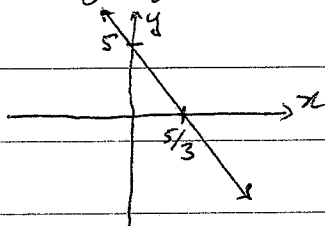


Section 1.

- 1. Exponential
- 2. Turning Point
- 3. y-intercept, b
- 4. Negative reciprocal
- 5. Velocity
- 6. Collinear
- 7. Half-plane (region)
- 8. general form
- 9. x-intercept.

Section 2.

- Q1. (-2, 5)
- Q2. $\sqrt{146} > \sqrt{136} \therefore (5, 11)$ is closer.
- Q3. (9, 6)
- Q4. $y + 3 = \frac{2}{5}(x - 5) \Rightarrow 2x - 5y - 25 = 0$
- Q5. Subs. $x = 3$ in equ. $\Rightarrow y = j = \frac{2}{5}$
- Q6. $(\frac{5}{3}, 0)$ & $(0, 5)$



- Q8. $m = \frac{1}{2}$ $y - 8 = \frac{1}{2}(x - 1)$
 (a) $\therefore y = \frac{1}{2}x + \frac{15}{2}$
- $m_1 = -2$ $y - 4 = -2(x - 2)$
 (b) $\therefore y = -2x + 8$

- Q9. G $(4\frac{1}{2}, 2\frac{1}{2})$ H $(13\frac{1}{2}, 10\frac{1}{2})$ I $(9\frac{1}{2}, 16\frac{1}{2})$ J $(\frac{1}{2}, 8\frac{1}{2})$
- $M_{GH} = \frac{8}{9}$, $M_{IJ} = \frac{-8}{-9} = \frac{8}{9}$
- $M_{HI} = \frac{6}{-4} = -\frac{3}{2}$, $M_{JG} = \frac{6}{-4} = -\frac{3}{2}$
- \therefore GHIJ is a parallelogram.

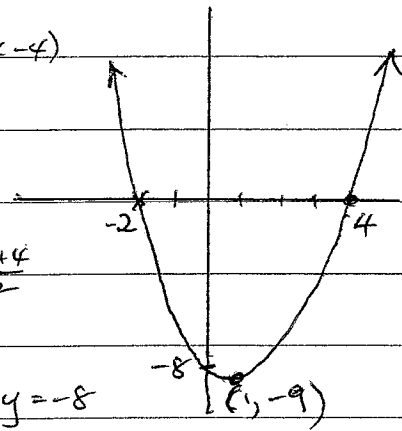
Q10. $g = (x+2)(x-4)$

x-int. at $x = -2, x = 4$

Vertex at $x = \frac{-2+4}{2}$

$\therefore V = (1, -9)$

y-int. at $x = 0, y = -8$



Q11. A (cubic fn.)

Q12. D ($x^2 + y^2 = 4$)

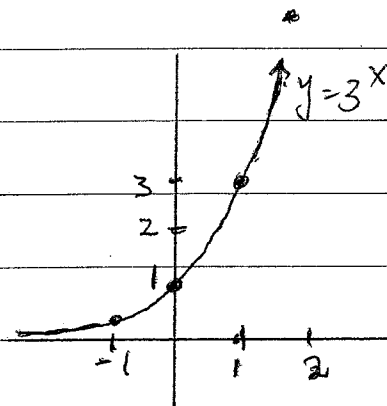
Q13.

at $x = 0, y = 1$

$x = 1, y = 3$

$x = -1, y = \frac{1}{3}$

$x = -2, y = \frac{1}{9}$



Q14

a) Rate is kg/m^2 .

b) Increasing at an increasing rate

Q15

A

Constant rate = fixed gradient

(filling \Rightarrow positive gradient)