

Name : ..... ( )

Class : .....

1 Solve the simultaneous equations

$$9x - 5y = 52$$

$$4x - 3y = 27.$$

Answer :  $x = \dots\dots\dots$ ,  $y = \dots\dots\dots$  [3]2 Given that  $b = \frac{5a}{4a-3}$ , express  $a$  in terms of  $b$ .

Answer : ..... [2]

## 3 Factorise completely

(a)  $6x^2 - 9xy,$

(b)  $4ab + cb - 3c^2 - 12ac,$

(c)  $25n^2 - 9m^2,$

(d)  $2x^2 - 7x + 6.$

Answer : (a) ..... [1]

(b) ..... [2]

(c) ..... [1]

(d) ..... [2]

Name : ..... ( )

Class : .....

4 Express the following as a single fraction in its simplest form

(a)  $\frac{m-3}{3} + \frac{7m}{12}$ ,

(b)  $\frac{3}{p} + \frac{7n}{q}$ ,

(c)  $\frac{4x+6}{x^2-25} + \frac{3}{5-x}$ .

Answer : (a) ..... [1]

(b) ..... [1]

(c) ..... [2]

- 5 Given that 4 cm on a map represents 3 km on the ground,
- (a) calculate
- (i) the actual distance, in km, between two towns which are 10 cm apart on the map,
  - (ii) the distance between two schools on the map, in cm, if the actual distance is 5 km apart,
  - (iii) the area of a town on the map, in  $\text{cm}^2$ , if the actual area of the town is  $27 \text{ km}^2$ ,
- (b) find the scale of the map in the form  $1 : n$ .

Answer : (a)(i) ..... km [1]

⋮

(ii) ..... cm [1]

(iii) .....  $\text{cm}^2$  [2]

(b) ..... [1]

Name : ..... ( )

Class : .....

6 Solve the following equations

(a)  $3(q-2) = 4,$

(b)  $(2y-3)(y+1) = -4(2y-3).$

⋮

Answer : (a)  $q = \dots\dots\dots$  [1]

(b)  $y = \dots\dots\dots$  or  $y = \dots\dots\dots$  [3]

7 (a) It is given that  $y$  is directly proportional to  $\frac{1}{2x-1}$  and when  $x = 3, y = 2$ .

Find

- (i) the equation relating  $y$  and  $x$ ,
- (ii) the value of  $x$  when  $y = -4$ .

(b) Five men take nine days to build a house.  
How many days would three men take to build a similar house?

Answer : (a)(i) ..... [2]

(a)(ii)  $x =$  ..... [2]

(b) ..... days [2]

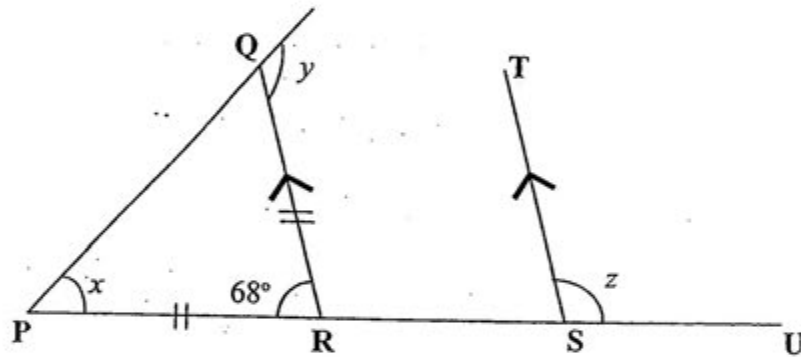
Name : ..... ( )

Class : .....

8 Given that  $ab = 25$  and  $(a - b)^2 = 60$ , find the value of  $a^2 + b^2$ .

Answer : ..... [2]

9 In the diagram,  $PQR$  is a triangle in which  $PR = QR$ .  $PRSU$  is a straight line and  $ST$  is parallel to  $RQ$ . Given that  $\angle PRQ = 68^\circ$ , find the values of  $x$ ,  $y$  and  $z$ .

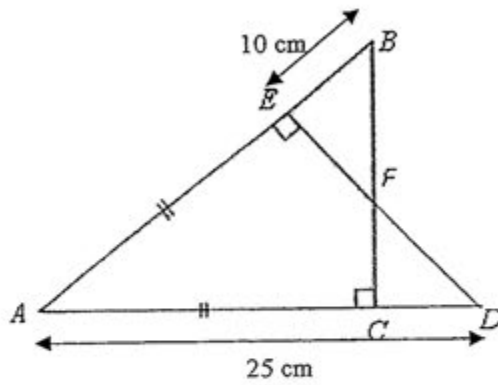


Answer :  $x =$  ..... [1]

$y =$  ..... [1]

$z =$  ..... [1]

- 10 In the diagram,  $AE = AC$  and  $\triangle ACB$  and  $\triangle AED$  are right-angled triangles.  
 (a) Show that  $\triangle ACB$  is congruent to  $\triangle AED$ .  
 (b) Given  $AD = 25$  cm and  $EB = 10$  cm, find the length of  $AE$ ,



Answer : (a) .....

.....

.....

.....

[3]

Answer : (b)  $AE = \dots\dots\dots$  cm [1]



Name : ..... ( )

Class : .....

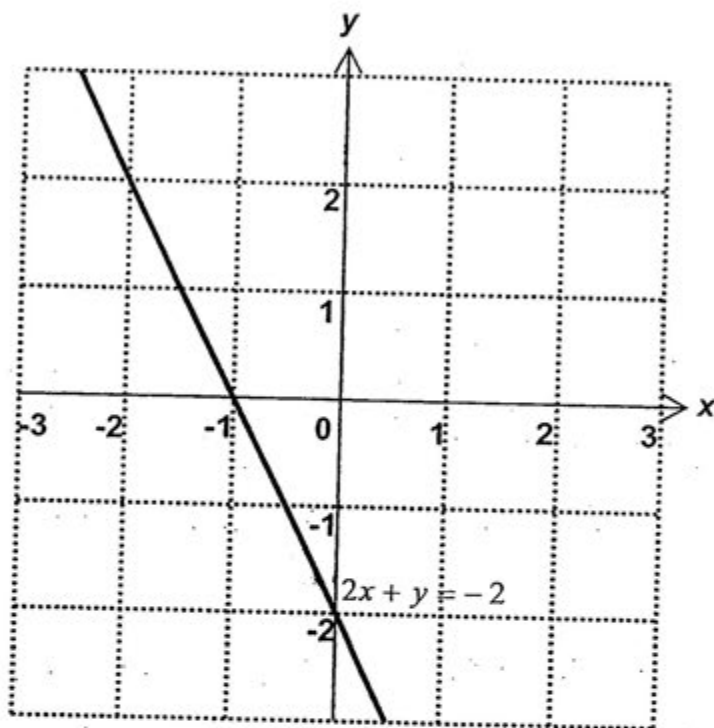
- 11 (a) Complete the table of values for the equation  $y = x + 1$ .

$x$	-2	0	1
$y$		1	2

[1]

- (b) Draw the graph of  $y = x + 1$  on the grid.

[2]



- (c) Hence, solve the simultaneous equations graphically

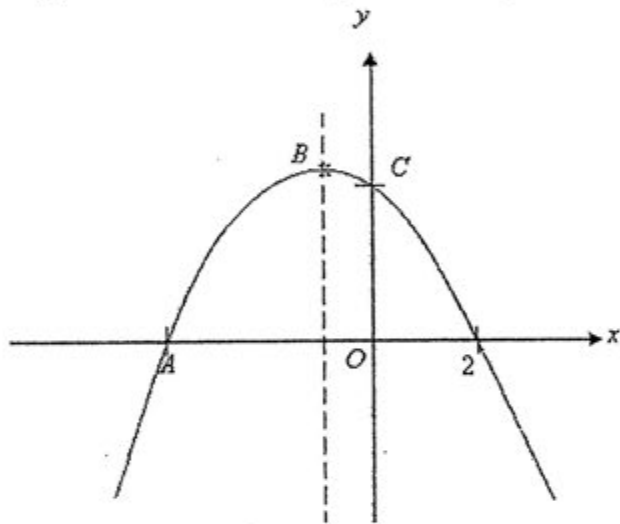
$$2x + y = -2,$$

$$y = x + 1.$$

Answer : (c)  $x = \dots\dots\dots$ ,  $y = \dots\dots\dots$  [2]

12 The curve  $y = (x + 4)(2 - x)$  cuts the  $x$ -axis at  $A$  and  $y$ -axis at  $C$  as shown in the diagram.

- (a) Write down the coordinates of  $A$  and  $C$ .
- (b) Write down the equation of the line of symmetry for the curve  $y = (x + 4)(2 - x)$
- (c) Hence, write down the coordinates of the maximum point,  $B$  of the curve.
- (d) Calculate the area of  $\triangle AOC$ .
- (e) Point  $D$  lies on the line  $AC$  and  $OD$  is perpendicular to  $AC$ . Given that the length of  $AC$  is 8.94 units, find the length of  $OD$ .



Answer : (a) A (....., .....), C (....., .....) [2]

⋮ (b) ..... [1]

• (c) B (....., .....) [1]

(d) ..... units<sup>2</sup> [1]

(e) ..... units [1]

**END OF PAPER**

Class

Registration  
Number

--	--

Name : \_\_\_\_\_



**CHIJ KATONG CONVENT**  
**END-OF-YEAR EXAMINATION 2012**  
**MATHEMATICS**  
**PAPER 2**

**SECONDARY TWO (EXPRESS)**

Classes: Sec 203, 204, 205, 206

Duration: 1 hour 15 minutes

**Additional Materials:** Writing paper  
 Graph paper

**INSTRUCTIONS TO CANDIDATES**

Write your name, class and registration number on all the work you hand in.

Answer **all** questions.

Write your answers and working on the writing paper provided.

Write in dark blue or black pen.

Omission of essential working will result in loss of marks.

Do not use staples, paper clips, highlighters, glue or correction fluid.

**INFORMATION FOR CANDIDATES**

The number of marks is given in brackets [] at the end of each question or part question.  
 The total number of marks for this paper is 50.

You are expected to use a scientific calculator to evaluate explicit numerical expressions.  
 If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.  
 For  $\pi$ , use either your calculator value or 3.142.

You should not spend too much time on any one question.

<b>FOR EXAMINER'S USE</b>	
<b>TOTAL MARKS</b>	/ 50

This question paper consists of 4 printed pages (including this cover page).

1. Given that  $6\left(\sqrt{\frac{h+1}{k}}\right) = r$ ,

(a) make  $h$  the subject of the formula. [2]

(b) find the value of  $\frac{k}{1+h}$  if  $r = 3$ . [2]

2. By completing the square, express  $-x^2 + 8x + 15$  in the form of  $-(x+a)^2 + b$  and hence solve  $-x^2 + 8x + 15 = 0$ . [4]

3. A small cylinder is geometrically similar to a large one. The height of the small cylinder is 8 cm. The height of the large cylinder is 20 cm.

(a) The small cylinder has a circumference of 24 cm. Find the circumference of the large cylinder. [1]

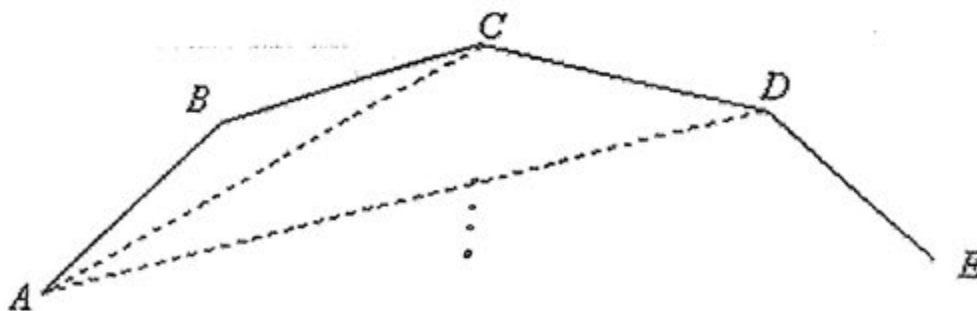
(b) Find the ratio of the volume of the small cylinder to that of the large cylinder. [2]

(c) Both cylinders are filled completely with sand. The mass of the sand in the small cylinder is 250 g. Find the mass of the sand in the large cylinder. [1]

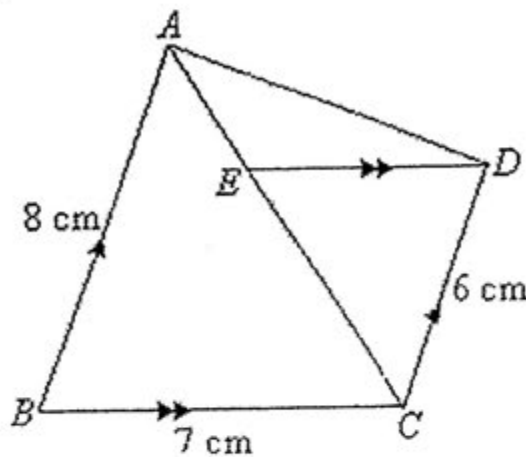
4.  $AB, BC, CD$  and  $DE$  are adjacent sides of a regular polygon. Given that the exterior angle of the polygon is  $24^\circ$ , calculate

(a) the number of sides of the polygon, [1]

(b)  $\angle BAC$ . [1]



5. In the diagram,  $BA$  is parallel to  $CD$  and  $BC$  is parallel to  $ED$ .



- (a) Explain with reasons, why triangle  $ABC$  is similar to triangle  $CDE$ . [2]
- (b) Find [1]
  - (i) the length of  $DE$ ,
  - (ii) the ratio of  $\frac{\text{area of } \triangle ABC}{\text{area of } \triangle CDE}$ . [2]

7. Given the points  $A(4, 2)$  and  $B(-4, -6)$ , find

- (a) the equation of the line  $AB$ , [2]
- (b) the value of  $k$  if the point  $\left(k, -2\frac{1}{2}\right)$  lies on the line  $AB$ , [2]
- (c) the length of  $AB$ , [2]
- (d) the value of  $a$  if the line  $3y = 2ax + 6$  is parallel to the  $AB$ . [2]

8. A man buys a certain number of articles for \$24.50.

- (a) If the price of each article is \$ $x$ , write down an expression in terms of  $x$  for the number of articles bought. [1]
- (b) Write down an expression in terms of  $x$  for the number of articles that can be bought for the same amount of money if the price of each article is reduced by \$4. [1]
- (c) If 4 more articles can be bought at the reduced price, form an equation in  $x$  and show that it reduces to  $2x^2 - 8x - 49 = 0$ . [3]
- (d) Solve the equation  $2x^2 - 8x - 49 = 0$ , giving each of your answers correct to 2 decimal places. Hence find the reduced price of each article. [3]

9. Answer the whole of this question on a single sheet of graph paper.

Two towns A and B are 50 km apart. Cyclist X starts cycling at 9 a.m. from Town A towards Town B at 20 km/h for 1 hour. Then he rests for 30 minutes and completes his journey at 11.30 a.m.

- (a) Draw a distance-time graph to show cyclist X's journey. Use a scale of 2 cm to represent 30 minutes on the horizontal axes and 2cm to 5km on the vertical axis. [3]
- (b) From the graph, find the speed of the cyclist X after he rested for 30 minutes. [1]
- (c) Another cyclist Y, starts his journey from Town B, 30 minutes later than Cyclist X and cycles to Town A at constant speed of 40km/h.
  - (i) Draw the distance-time graph for cyclist Y using the same axes. [1]
  - (ii) At what time will both the cyclists cross each other? [1]
  - (iii) How far is cyclist Y from Town B at that time? [1]

10. Answer the whole of this question on a single sheet of graph paper.

The variables of  $x$  and  $y$  are connected by the equation  $y = 2x^2 + 3x - 4$ .

$x$	-3	-2	-1	0	1	2	3
$y$	5	$p$	-5	-4	1	$q$	23

- (a) Calculate the values of  $p$  and  $q$ . [2]
- (b) Using 2 cm to represent 1 unit on the  $x$ -axis and 2 cm to represent 5 units on the  $y$ -axis, draw the graph of  $y = 2x^2 + 3x - 4$  for  $-3 \leq x \leq 3$ . [3]
- (c) Use your graph to find
  - (i) the values of  $x$  when  $y = 3$ , [1]
  - (ii) the value of  $y$  when  $x = 1.5$ , [1]
  - (iii) the coordinates of the minimum point. [1]

- End of Paper -