Calculator Model:

Name:	Class	Index Number

中正中学

CHUNG CHENG HIGH SCHOOL (MAIN)

Parent's Signature

MID – YEAR EXAMINATION 2017
SECONDARY 2

Mathematics — **8 May 2017**

4048 — **2 hours**

Additional Materials: **Writing paper**
Graph Paper (1 sheet)

READ THESE INSTRUCTIONS FIRST

Do not open this booklet until you are told to do so.

Write your name, class and index number on all the work you hand in.
Write in dark blue or black pen on both sides of the paper.
You may use a pencil for any diagrams, graphs or rough working.
Do not use highlighters or correction fluid.

Answer all questions in Sections A and B.

If working is needed for any question it must be shown with the answer.
Omission of essential working will result in loss of marks.
The use of an approved scientific calculator is expected, where appropriate.
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 π, use either your calculator value or 3.142, unless the question requires the answer in terms of π.

At the end of the examination, fasten all your work securely together.
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 80.

Section A : Answer all the questions in the space provided.

Section B : Answer all the questions on the writing paper provided.

For Examiner's Use	
Section A	/ 40
Section B	/ 40
Total	**/ 80**

This document consists of 13 printed pages and 1 blank page.

Section A (40 marks)

Answer **all** questions.

1 Simplify each of the following expressions.

(a) $\dfrac{7a^2}{28ab}$,

Answer .... [1]

(b) $\dfrac{n}{3p} \div \dfrac{4n^3y^2}{9}$.

Answer .... [2]

2 Expand and simplify $2x(x-5)+(3x+4)(x-7)$.

Answer .... [2]

3 **(a)** Simplify $y^2-(y+m)(y-m)$.

Answer .... [2]

(b) Hence, without using a calculator, write down the value of
$123456700^2-123456707\times123456693$.

Answer .... [1]

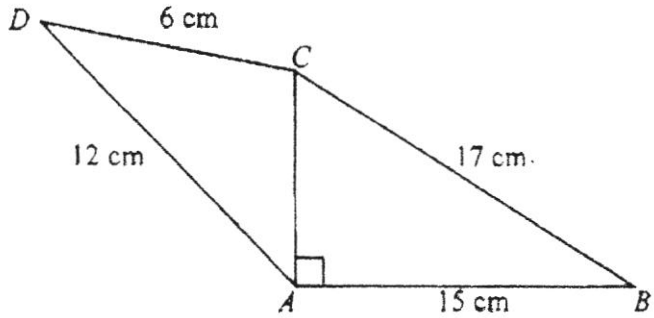
4 **(a)** Solve the inequality $17-3x<5$.

Answer .... [2]

(b) Hence, write down the smallest integer value of x that satisfy the inequality.

Answer .... [1]

5 In the diagram, not drawn to scale, angle $BAC = 90°$, $AB = 15$ cm, $BC = 17$ cm, $AD = 12$ cm and $CD = 6$ cm.



(a) Find the length of AC.

Answer .... cm [2]

(b) Determine if triangle ACD is a right-angled triangle.

Answer : ....

....

....

.... [2]

6 Factorise the following expressions completely.

(a) $16b^2 + \frac{8}{3}bc + \frac{1}{9}c^2$,

Answer .... [1]

(b) $2xy - 8x + 12 - 3y$.

Answer .... [2]

7 Given that $y = \frac{4a-7}{b-a}$, express a in terms of b and y.

Answer .... [3]

8 Andy has x sweets and Bill has y sweets.
If Andy gives 3 sweets to Bill, they will have **equal** number of sweets.
If they divide the total number of sweets equally between themselves, each of them will receive 20 sweets.

(a) Form and simplify **two** equations connecting x and y.

Answer *1st equation:* .... [1]

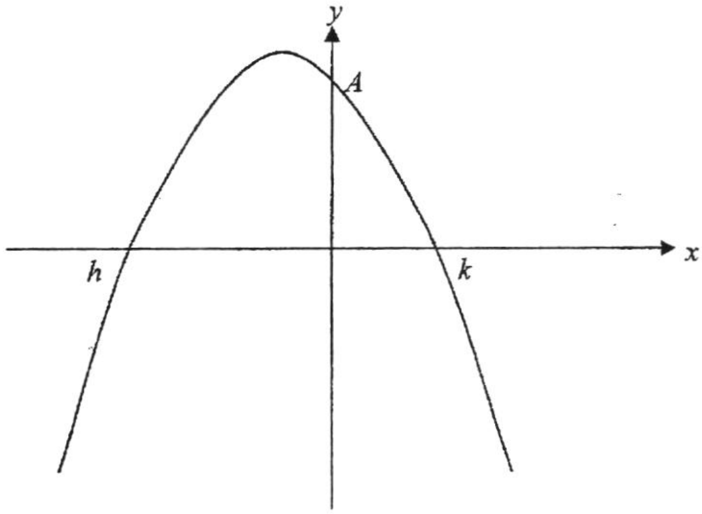
2nd equation: .... [1]

(b) Solve the simultaneous linear equations to find the number of sweets each of them has.

Answer Andy has .... sweets

Bill has .... sweets [2]

9 The diagram shows the graph of $y = 10 - 3x - x^2$. The graph cuts the y-axis at the point A.



Write down

(a) the coordinates of point A,

Answer A (.............. , ...) [1]

(b) the values of h and k,

Answer h = ... [1]

k = ... [1]

(c) the equation of the line of symmetry,

Answer .... [1]

(d) the coordinates of the turning point.

Answer (.............. , ...) [1]

10 A map is drawn to a scale of 1 : 250 000.

(a) If the distance between two towns on the map is 12 cm, find the actual distance, in metres, between the two towns.

Answer .... m [2]

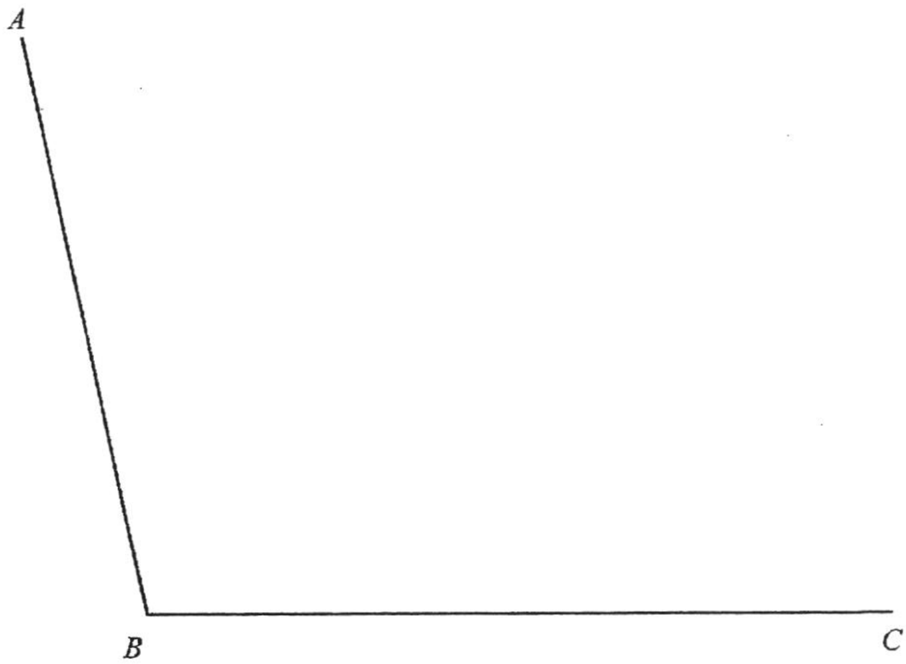
(b) A park has an area of 30 cm^2 on the map. Calculate, in square kilometres, the actual area of the park.

Answer .... km^2 [2]

(c) A path is represented by 3.4 cm on the map. Calculate the length of the path, in cm, when it is represented on another map with a scale of 1 cm : 5 km.

Answer .... cm [2]

11 Three points A, B, and C are shown below. It is drawn to a scale of 1 cm to 20 m.



(a) Construct the perpendicular bisector of BC. [1]

(b) Construct the bisector of angle ABC. [1]

(c) The two bisectors from **(a)** and **(b)** meet at Q.

Complete the statement below:

The point Q is equidistant from the lines .... and ....

and equidistant from the points .... and .... [1]

(d) A box is hidden at point Q. Find the actual distance of the box from point C. Give your answer in metres.

Answer .... m [1]

Section B (40 marks)

Answer **all** the questions in this section on the writing paper provided.

12 **(a)** The line $7x+3y=17$ passes through the point $(h, 1)$. Find the value of h. [1]

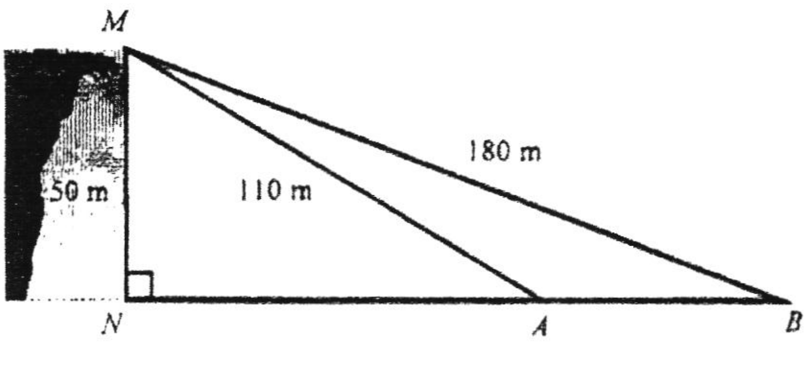
(b) The line $y=3x-5$ is parallel to the line $3y=kx+8$. Find the value of k. [2]

13 **(a)** Simplify $\dfrac{2r^2-20r+50}{r^2-25}$. [3]

(b) Express $\dfrac{4}{m-3}+\dfrac{3}{2m^2-5m-3}$ as a single fraction in its simplest form. [3]

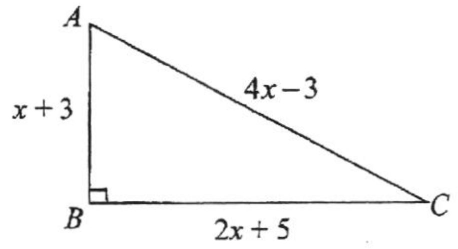
(c) Given $a^2-b^2=12$ and $a+b=4$, calculate the value of ab. [3]

14 A man stood on top of a cliff, MN, that is 50 m high. He observed two ships, A and B, such that the distance $MA = 110$ m and $MB = 180$ m respectively.



Calculate AB, the distance between the two ships. [3]

15 In the figure, triangle ABC is a right-angled triangle. $AB = (x + 3)$ cm, $BC = (2x + 5)$ cm and $AC = (4x - 3)$ cm.



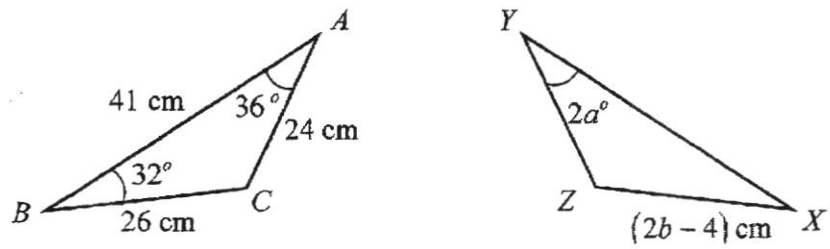
(a) Given that the area of the triangle is 60 cm^2, form an equation in terms of x and show that it can be simplified to $2x^2 + 11x - 105 = 0$. [2]

(b) Solve $2x^2 + 11x - 105 = 0$. [3]

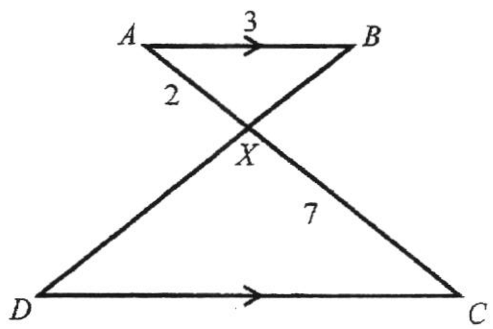
(c) Hence, find the perimeter of triangle ABC. [2]

16 **(a)** In the diagram, not drawn to scale, triangle ABC is congruent to triangle XYZ.

Find the values of a and b. [3]



(b) In the diagram, not drawn to scale, triangle ABX is similar to triangle CDX.



Given that $AB = 3$ cm, $AX = 2$ cm and $CX = 7$ cm, find

(i) the length of CD, [2]

(ii) the ratio of $DX : DB$. [1]

17 **Answer the whole of this question on a sheet of graph paper.**

The variables x and y are connected by the equation

$$y = x^2 - 8x + 7.$$

Some corresponding values of x and y are given in the table below.

x	0	2	3	4	5	6	7	8
y	7	-5	-8	p	-8	-5	0	7

(a) Find the value of p. [1]

(b) Using a scale of 2 cm to represent 1 unit, draw a horizontal x-axis for $0 \le x \le 8$.

Using a scale of 1 cm to represent 1 unit, draw a vertical y-axis for $-10 \le y \le 8$.

On your axes, plot the points given in the table and join them with a smooth curve. [3]

(c) If the point (6.5, h) lies on the curve, use your graph to find the value of h. [1]

(d) Use your graph to find the minimum value of y. [1]

(e) (i) On the same axes, draw and label the line $y = 2$. [1]

(ii) Hence, from your graph, write down the solution(s) of $x^2 - 8x + 7 = 2$ for $0 \le x \le 8$. [2]

18 At Dom's Pizza, customers can order pizzas according to size. The pizzas can be customised with additional toppings, extra cheese or thin crust.

The table below shows the cost of different sizes of pizzas together with the respective additional costs.

The cost per pizza is the original price before adding any extra items.

Sizes	**Mini Papa**	**Medium**	**Large**	**X-Large**	**Jumbo**	**Dom's**
No. of slices	6	8	10	12	20	30
Cost per pizza ($)	15.50	18.80	25.90	30.80	45.50	75.90
Additional topping cost per pizza ($)	1.80	2.30	3.20	5.50	8.50	9.00
Extra cheese cost per pizza ($)	1.20	1.50	2.00	2.50	3.25	5.00
Thin crust cost per pizza($)	0.70	1.00	1.50	1.80	2.25	3.00

John wants to order **30 slices** of pizzas with additional topping for his party.

Assuming each slice is of the same size, and that John is choosing between buying 5 Mini Papas, 3 Large pizzas or 1 Dom's pizza, which of the three options is the most value-for-money?

Justify your answer by showing your working. [3]

– **End of Paper** –

Answers

1a	$\frac{a}{4b}$	10 a	30 000 m
1b	$\frac{3}{4pn^3y^3}$	10 b	187.5 km^2
2	$5x^2-27x-28$	10 c	1.7 cm
3a	m^2	11c	lines ***AB*** and ***BC*** points ***B*** and ***C***
3b	49	11 d	Acceptable Range : 166 to 170 m
4a	$x>4$	12 a	$h=2$
4b	5	12 b	$k=9$
5a	8 cm	13a	$\frac{2(r-5)}{r+5}$
5b	no	13b	$\frac{8m+7}{(m-3)(2m+1)}$
6a	$\left(4b+\frac{1}{3}c\right)^2$ or $16\left(b+\frac{1}{12}c\right)^2$ or $\frac{1}{9}(12b+c)^2$	13c	$ab=1\frac{3}{4}$ or 1.75
6b	$(y-4)(2x-3)$	14	74.9 m (3 s.f)
7	$a=\frac{by+7}{4+y}$	15b	$x=-10\frac{1}{2}$ or $x=5$
8a	$x=y+6$; $x+y=40$	15c	40 cm
8b	Andy : 23 & Bill : 17	16a	$a=16$ and $b=14$
9a	$(0,10)$	16bi	$10\frac{1}{2}$ cm
9b	$h=-5$ & $k=2$	16bii	7 : 9
9c	$x=-1.5$	17a	$p=-9$
9d	$\left(-1\frac{1}{2},12\frac{1}{4}\right)$ or $(-1.5, 12.25)$	17c	Acceptable range : −2.9 to −2.6
		17d	Min. $y=-9$
		17eii	Acceptable range : 0.65 to 0.75 or 7.25 to 7.35
		18	Must present working with conclusion : Buying 1 Dom's pizza is most value-for-money.

2017 Sec 2 Maths MYE EXAM SOLUTIONS

Section A (40 marks)

Answer **all** questions.

1 Simplify each of the following expressions.

(a) $\frac{7a^2}{28ab}$,

$\frac{7a^2}{28ab}$

$= \frac{a}{4b}$

Answer $\frac{a}{4b}$ [1]

(b) $\frac{n}{3p} \div \frac{4n^3y^2}{9}$.

$\frac{n}{3p} \div \frac{4n^3y^2}{9}$

$= \frac{n}{3p} \times \frac{9}{4n^3y^2}$

$= \frac{1}{p} \times \frac{3}{4n^2y^2}$

$= \frac{3}{4pn^2y^2}$

Answer $\frac{3}{4pn^2y^2}$ [2]

2 Expand and simplify $2x(x-5)+(3x+4)(x-7)$.

$2x(x-5)+(3x+4)(x-7)$

$= 2x^2 - 10x + 3x^2 - 21x + 4x - 28$

$= 5x^2 - 27x - 28$

Answer $5x^2 - 27x - 28$ [2]

3 (a) Simplify $y^2-(y+m)(y-m)$.

$$y^2-(y+m)(y-m)$$
$$=y^2-(y^2-m^2)$$
$$=y^2-y^2+m^2$$
$$=m^2$$

Answer $\underline{m^2}$ [2]

(b) Hence, without using a calculator, write down the value of $123456700^2-123456707\times123456693$.

$$123456700^2-123456707\times123456693$$
$$=123456700^2-(123456700+7)(123456700-7)$$
$$=7^2$$
$$=49$$

Answer $\underline{49}$ [1]

4 (a) Solve the inequality $17-3x<5$.

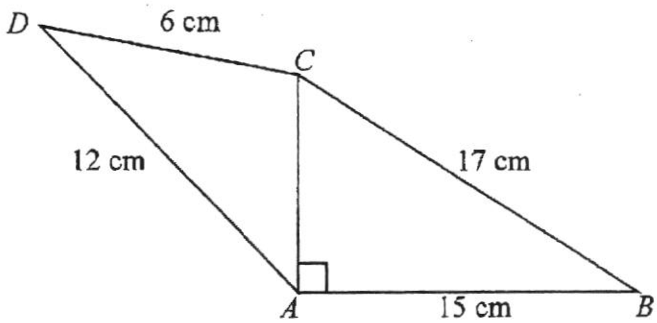
$$17-3x<5$$
$$-3x<5-17$$
$$-3x<-12$$
$$x>4$$

Answer $\underline{x>4}$ [2]

(b) Hence, write down the smallest integer value of x that satisfy the inequality.

Answer $\underline{5}$ [1]

5 In the diagram not drawn to scale, angle $BAC = 90°$, AB = 15 cm, BC = 17 cm, AD = 12 cm and CD = 6 cm.



(a) Find the length of AC.

By Pythagoras' Theorem,

$$BC^2 = AB^2 + AC^2$$
$$AC^2 = BC^2 - AB^2$$

$$AC = \sqrt{17^2 - 15^2}$$
$$= \sqrt{289 - 225}$$
$$= \sqrt{64} \qquad \text{(since } AC > 0\text{)}$$
$$= 8 \text{ cm}$$

Answer 8 cm [2]

(b) Determine if triangle ACD is a right-angled triangle.

$$AC^2 + CD^2 = 8^2 + 6^2$$
$$= 64 + 36$$
$$= 100$$

$$AD^2 = 12^2$$
$$= 144$$

Answer : Since $AD^2 \neq AC^2 + CD^2$, therefore by the **converse** of Pythagoras' Theorem, ΔACD is a NOT right-angled triangle. [2]

6 Factorise the following expressions completely.

(a) $16b^2 + \frac{8}{3}bc + \frac{1}{9}c^2$,

$$16b^2 + \frac{8}{3}bc + \frac{1}{9}c^2$$

$$= (4b)^2 + 2(4b)\left(\frac{1}{3}c\right) + \left(\frac{1}{3}c\right)^2$$

$$= \left(4b + \frac{1}{3}c\right)^2 \quad ---[B1]$$

Answer $\left(4b + \frac{1}{3}c\right)^2$ *or* $16\left(b + \frac{1}{12}c\right)^2$ *or* $\frac{1}{9}(12b + c)^2$ [1]

(b) $2xy - 8x + 12 - 3y$.

$$2xy - 8x + 12 - 3y$$

$$= 2x(y-4) + 3(4-y)$$

$$= 2x(y-4) - 3(y-4)$$

$$= (y-4)(2x-3)$$

Answer $(y-4)(2x-3)$ [2]

7 Given that $y = \frac{4a-7}{b-a}$, express a in terms of b and y.

$$y = \frac{4a-7}{b-a}$$

$$y(b-a) = 4a - 7$$

$$by - ay = 4a - 7$$

$$by + 7 = 4a + ay$$

$$by + 7 = a(4 + y)$$

$$\frac{by+7}{4+y} = a$$

$$a = \frac{by+7}{4+y}$$

Answer $a = \frac{by+7}{4+y}$ [2]

8 Andy has x sweets and Bill has y sweets.
If Andy gives 3 sweets to Bill, they will have **equal** number of sweets.
If they divide the total number of sweets equally between themselves, each of them will receive 20 sweets.

(a) Form and simplify **two** equations connecting x and y.

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

$$0.5(x + y) = 20$$
$$\frac{x + y}{2} = 20$$
$$x + y = 40$$

Answer *1st equation:* $x = y + 6$ [1]

2nd equation: $x + y = 40$ [1]

(b) Solve the simultaneous linear equations to find the number of sweets each of them has.

$x = y + 6$ -----(1)

$x + y = 40$ -----(2)

Sub (1) into (2)

$y + 6 + y = 40$

$2y = 34$

$y = 17$

When $y = 17$, $x = 17 + 6$

$x = 23$

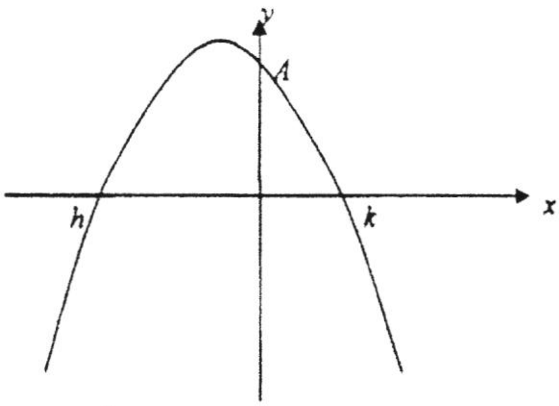
Andy has 23 sweets
Bill has 17 sweets.

Answer Andy has 23 sweets

Bill has 17 sweets [2]

9 The diagram shows the graph of $y = 10 - 3x - x^2$. The graph cuts the y-axis at the point A.
Write down

(a) the coordinates of point A,



At point A, $x = 0$

$y = 10 - 3(0) - (0)^2$
$= 10$

Hence $A(0, 10)$

OR From eqn, $y = 10 - 3x - x^2$,
y – intercept = 10

Answer $\underline{A(0,10)}$ [1]

(b) the values of h and k,

When $y = 0$,

$10 - 3x - x^2 = 0$

$x^2 + 3x - 10 = 0$

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

$x = -5$ or $x = 2$

$h = -5$ $\quad k = 2$

Answer $h = \underline{-5}$ [1]

$k = \underline{2}$ [1]

(c) the equation of the line of symmetry,

$x = \dfrac{-5+2}{2}$

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

$x = -1.5$ *or* $-1\frac{1}{2}$

Answer $\underline{x = -1.5}$ [1]

(d) the coordinates of the turning point.

Turning point occurs at the line of symmetry.

When $x = -1.5$,

$y = 10 - 3(-1.5) - (-1.5)^2$

$y = 10 + 4.5 - 2.25$

$y = 12.25$ *or* $12\frac{1}{4}$

$\left(-1\frac{1}{2}, 12\frac{1}{4}\right)$ *or* $(-1.5, 12.25)$

Answer $\underline{\left(-1\frac{1}{2}, 12\frac{1}{4}\right) \text{ or } (-1.5, 12.25)}$ [1]

10 A map is drawn to a scale of 1 : 250 000.

(a) If the distance between two towns on the map is 12 cm, find the actual distance, in metres, between the two towns.

$$\text{Linear Scale} = 1 \; rep \; 250\ 000$$
$$= 1\ cm \; rep \; 250\ 000\ cm$$
$$= 1\ cm \; rep \; 2\ 500\ m$$
$$= 1\ cm \; rep \; 2.5\ km$$

$$\text{Actual distance} = 12 \times 250\ 000 \text{ cm}$$
$$= 3000\ 000 \text{ cm}$$
$$= 30\ 000 \text{ m}$$

Answer 30 000 m [2]

(b) A park has an area of 30 cm^2 on the map. Calculate, in square kilometres, the actual area of the park.

$$\text{Area scale} = (1\ cm)^2 \; rep \; (2.5\ km)^2$$
$$= 1\ cm^2 \; rep \; 6.25\ km^2$$

Actual area

$$= 30 \times 6.25 \text{ km}^2$$
$$= 187.5 \text{ km}^2$$

Answer 187.5 km^2 [2]

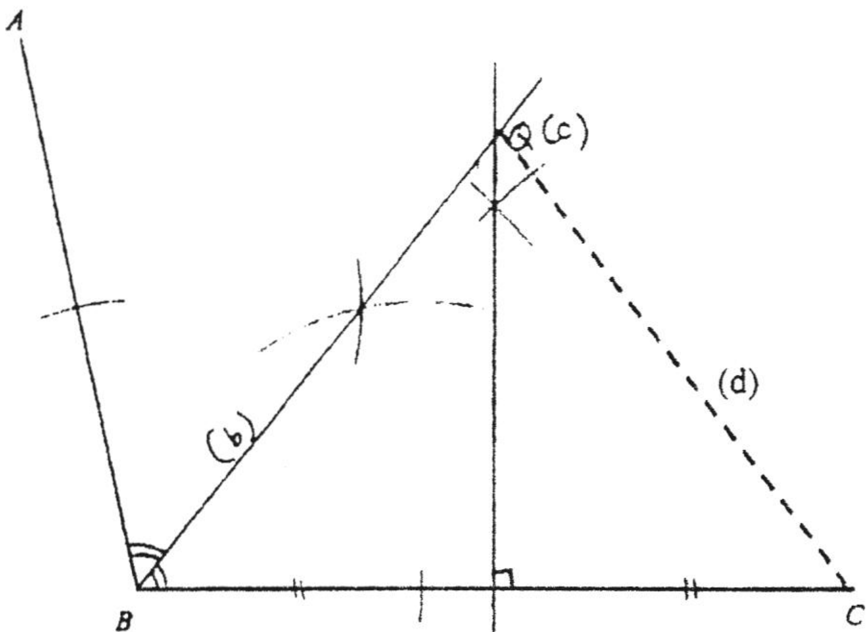
(c) A path is represented by 3.4 cm on the map. Calculate the length of the path, in cm,
when it is represented on another map with a scale of 1 cm : 5 km.

$$\text{Actual length} = 3.4 \times 2.5$$
$$= 8.5\text{km}$$

$$\text{Length on \underline{new} map} = \frac{8.5}{5}$$
$$= 1.7\text{cm}$$

Answer 1.7 cm [2]

11 Three points A, B, and C are shown below. It is drawn to a scale of 1 cm to 20 m.



Must have all 4 arcs shown for each part

Label : ⊥, (a), ॥ (B1)

(a) Construct the perpendicular bisector of BC.

Label : ⦻, (b) (B)

(b) Construct the bisector of angle ABC.

(c) The two bisectors from **(a)** and **(b)** meet at Q.

Complete the statement below:

The point Q is equidistant from the lines **AB** and **BC** (due to angle bisector)

and equidistant from the points **B** and **C**. (due to perpendicular bisector) [1]

(d) A box is hidden at point Q. Find the actual distance of the box from point C. Give your answer in metres.

$$\text{Actual distance} = 8.4 \times 20$$
$$= 168 \text{ m}$$

Answer 168 ± 2 m [1]

Section B (40 marks)

Answer **all** the questions in this section on the writing paper provided.

12 **(a)** The line $7x+3y=17$ passes through the point $(h, 1)$. Find the value of h. [1]

When $y=1, \quad x=h$

$$7h+3(1)=17$$
$$7h=17-3$$
$$7h=14$$
$$h=2$$

(b) The line $y=3x-5$ is parallel to the line $3y=kx+8$. Find the value of k. [2]

When 2 lines are parallel, their gradient are equal.

$$3y=\underline{k}x+8 \qquad \text{OR} \qquad 3y=\underline{9}x-15$$

$$y=\frac{k}{\underline{3}}x+\frac{8}{3} \qquad\qquad y=\underline{3}x-5$$

By comparing the gradient,

$$\frac{k}{3}=3$$
$$k=9$$

13 (a) Simplify $\frac{2r^2 - 20r + 50}{r^2 - 25}$. [3]

$$\frac{2r^2 - 20r + 50}{r^2 - 25}$$

$$= \frac{2(r^2 - 10r + 25)}{r^2 - 5^2}$$

$$= \frac{2(r-5)^2}{(r+5)(r-5)}$$

$$= \frac{2(r-5)}{r+5} \quad \text{or} \quad \frac{2r-10}{r+5}$$

13 (b) Express $\frac{4}{m-3} + \frac{3}{2m^2 - 5m - 3}$ as a single fraction in its simplest form. [3]

$$\frac{4}{m-3} + \frac{3}{2m^2 - 5m - 3}$$

$$= \frac{4}{m-3} + \frac{3}{\underline{\underline{(2m+1)(m-3)}}}$$

$$= \frac{4(2m+1) + 3}{(m-3)(2m+1)}$$

$$= \frac{8m+7}{(m-3)(2m+1)}$$

13 **(c)** Given $a^2 - b^2 = 12$ and $a + b = 4$, calculate the value of ab. [3]

$$a + b = 4$$
$$(a+b)^2 = 4^2$$
$$a^2 + 2ab + b^2 = 16 \quad ---(1)$$

$$a^2 - b^2 = 12$$
$$(a+b)(a-b) = 12$$
$$4(a-b) = 12$$
$$(a-b) = 3$$
$$(a-b)^2 = 9$$
$$a^2 - 2ab + b^2 = 9 ---(2)$$

$(1) - (2)$:

$$2ab - (-2ab) = 16 - 9$$
$$4ab = 7$$
$$ab = \frac{7}{4}$$
$$ab = 1\frac{3}{4}$$

Alternate Mtd :

$$a + b = 4 ---(1)$$
$$a - b = 3 ---(2)$$

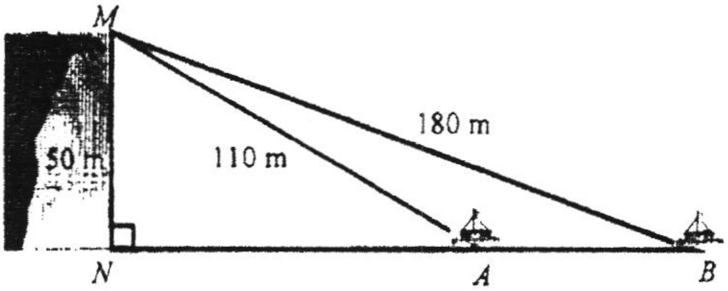
$(1) - (2)$:

$$2b = 1$$
$$b = \frac{1}{2}$$

$$a = 4 - \frac{1}{2}$$
$$a = 3\frac{1}{2}$$

$$ab = 3\frac{1}{2} \times \frac{1}{2}$$
$$ab = 1\frac{3}{4} \text{ or } 1.75$$

14 A man stood on top of a cliff, MN, that is 50 m high. He observed two ships, A and B, such that the distance $MA = 110$ m and $MB = 180$ m respectively.



Calculate AB, the distance between the two ships. [3]

By Pythagoras' Theorem,

Distance between the two ships , AB

$= BN - AN$

$= \sqrt{180^2 - 50^2} - \sqrt{110^2 - 50^2}$

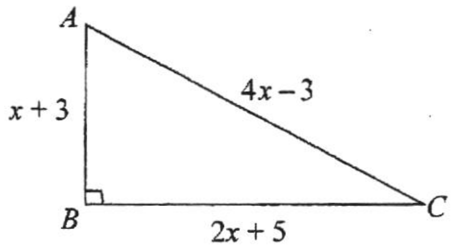
$= \sqrt{29\,900} - \sqrt{9\,600}$

$= 74.936...$

$= 74.9 \text{ m} (3\text{sf})$

Always use RAW VALUE in working.

15 In the figure, triangle ABC is a right-angled triangle. $AB = (x+3)$ cm, $BC = (2x+5)$ cm and $AC = (4x-3)$ cm.



(a) Given that the area of the triangle is 60 cm^2, form an equation in terms of x and show that it can be simplified to $2x^2 + 11x - 105 = 0$. [2]

(b) Solve $2x^2 + 11x - 105 = 0$. [3]

(c) Hence, find the perimeter of triangle ABC. [2]

(a) Since area of triangle ABC = 60 cm^2,

$$\frac{1}{2}(x+3)(2x+5) = 60$$
$$(x+3)(2x+5) = 120$$
$$2x^2 + 5x + 6x + 15 = 120$$
$$2x^2 + 11x + 15 - 120 = 0$$
$$2x^2 + 11x - 105 = 0 \quad \text{[Shown]}$$

(b) $2x^2 + 11x - 105 = 0$

$(2x+21)(x-5) = 0$

$$x = -\frac{21}{2} \quad \text{or} \quad x = 5$$
$$x = -10\frac{1}{2} \quad \text{or} \quad x = 5$$

$2x$	21	$21x$
x	-5	$-10x$
$2x^2$	-105	$+11x$

(Cannot reject $x = -10\frac{1}{2}$ in this part, as question only say **solve the equation.)

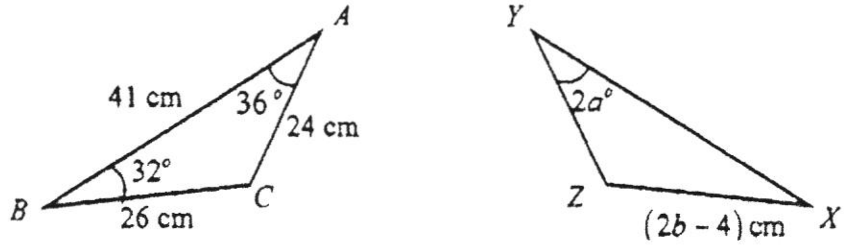
(c) Since length cannot be negative, $x = 5$.

Perimeter of ΔABC

$= (5+3) + [4(5) - 3] + [2(5) + 5]$

$= 40$ cm

16 **(a)** In the diagram, not drawn to scale, triangle ABC is congruent to triangle XYZ. Find the values of a and b. [3]



$\angle XYZ = \angle ABC$ (corr. angles are equal)

$2a = 32^\circ$

$a = 16$

***a* should not have units.**

$XZ = AC$ (corr. sides are equal)

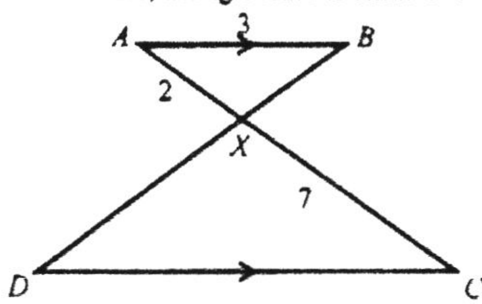
$2b - 4 = 24$

$2b = 28$

$b = 14$

***b* should not have units.**

(b) In the diagram, not drawn to scale, triangle ABX is similar to triangle CDX.



Given that $AB = 3$ cm, $AX = 2$ cm and $CX = 7$ cm, find

(i) the length of CD, [2]

$\frac{CD}{AB} = \frac{7}{2}$ (Ratio of corr. sides are equal)

$2CD = 7AB$

$2CD = 7(3)$

$2CD = 21$

$CD = \frac{21}{2}$

$CD = 10\frac{1}{2}$ cm

(ii) the ratio of $DX : DB$. [1]

$DX : DB = 7 : 9$