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聖嬰中學

HOLY INNOCENTS' HIGH SCHOOL

Name of Student

Class

Index Number

60

**MID-YEAR EXAMINATION 2015
SECONDARY 1 EXPRESS
MATHEMATICS PAPER 1**

4048/01

Date: 15 May 2015

Duration: 1 h 30 min

Students answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

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

Write in dark blue or black pen.

You may use an HB pencil for any diagrams or graphs.

Do not use paper clips, glue or correction tape/fluid.

Answer **ALL** questions.

The number of marks is given in brackets [] at the end of each question or part question.

If working is needed for any question it must be shown in the space below the question.

Omission of essential working will result in loss of marks.

The total of the marks for this paper is **60**

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.

Set by: Mdm Hayati

Vetted by: Ms Goh Lay Ching

This document consists of 13 printed pages (including cover page).

41

Answer **all** the questions.

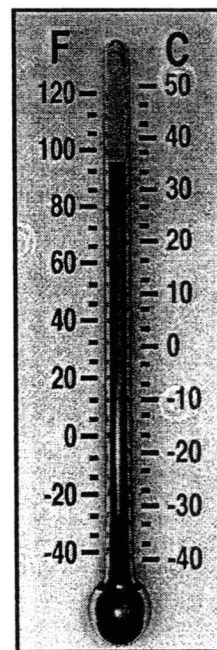
- 1 The diagram shows a mercury thermometer used to measure room temperature.

- (a) The reading shows the room temperature on one afternoon during a dry season in Singapore.

Estimate the temperature shown, giving your answer in degree Celsius.

- (b) The temperature on the same day in Canada is 45°C lower than the temperature in Singapore.

What is the temperature in Canada?
Give your answer in degree Celsius.



Answer (a) $^{\circ}\text{C}$ [1]

(b) $^{\circ}\text{C}$ [1]

- 2 The thickness of a stack of 1500 sheets of coloured paper is 24.6 cm.

Find the thickness of 50 sheets of the coloured paper.
Give your answer in millimetres.

Answer mm [2]

- 3 Given the expression $x^2 + 4xy - x$,
write down

- (a) the coefficient of x ,
(b) the constant term.

Answer (a) [1]

(b) [1]

-
- 4 (a) The perimeter of a square is $16 + 28p$.

Find and simplify an expression, in terms of p , for the length of each side of the square.

- (b) Simplify

(i) $a \div b \times b + a \times 2$,

(ii) $-2s + 3t - 5s - \frac{t}{2}$.

Answer (a) [1]

(b)(i) [1]

(ii) [1]

42

- 5 (a) Solve the inequality $x - 4 \geq 3x + 3$.
- (b) Hence write down the largest integer value of x such that x satisfies $x - 4 \geq 3x + 3$.

Answer (a) [2]

(b) [1]

- 6 Consider the following numbers.

$$-3.333, \frac{\pi}{3}, -3.\dot{3}, \sqrt{3}, \sqrt[3]{4^3}, 3\frac{1}{3}\%.$$

- (a) Write down
- (i) all irrational number(s),
- (ii) all perfect square number(s).
- (b) Arrange all numbers in ascending order.

Answer (a) (i) [1]

(ii) [1]

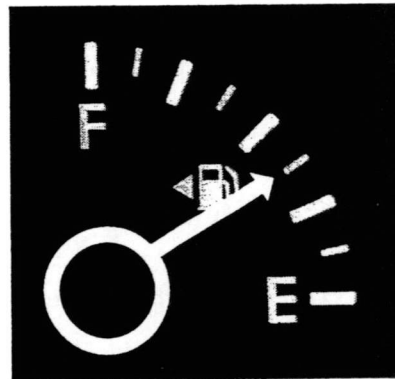
(b) [1]

- 7 Singapore registered motor vehicles are required to have at least three-quarter tank of fuel inside their fuel tank when departing Singapore.

The diagram shows a fuel gauge in a car.

- (a) What fraction does the gauge show?
(b) The fuel tank holds 50 litres when it is full.

Calculate the minimum number of litres of fuel to be added before the car can depart Singapore?



Answer (a) [1]

(b) litres [2]

- 8 Justin and Xavier took part in the game 'Hit on Target'.
Five points were awarded for every target hit and two points were deducted for every target missed.
Justin and Xavier were given 30 attempts each.
Justin scored 101 points in total.

- (a) How many targets did Justin hit?
(b) Xavier hit 25 targets and missed 5 targets.
How many points did Xavier score?

Answer (a) [2]

(b) [1]

43

- 9 (a) Express 2160 as the product of its prime factors.
- (b) Using your answer in part (a), find
- (i) the smallest 3-digit number that is a factor of 2160,
- (ii) the minimum values of k and q , given that
- $$2160 \times 5k = q^3,$$
- where k and q are integers.

Answer (a) $2160 = \dots\dots\dots$ [1]

(b)(i) $\dots\dots\dots$ [1]

(ii) $k = \dots\dots\dots q = \dots\dots\dots$ [2]

- 10 (a) (i) Factorise $mp - mq$,
- (ii) Hence evaluate $145 \times 0.0234 - 45 \times 0.0234$.
- (b) Given that $p = -3$, evaluate $2p^2 - 3p$.
- (c) Given that $a = 3$, $b = -2$ and $c = 1$, find the value of
- $$\frac{-a + \sqrt{a^2 - 4bc}}{2b}.$$

Leave your answer correct to 3 significant figures.

Answer (a) (i) [1]

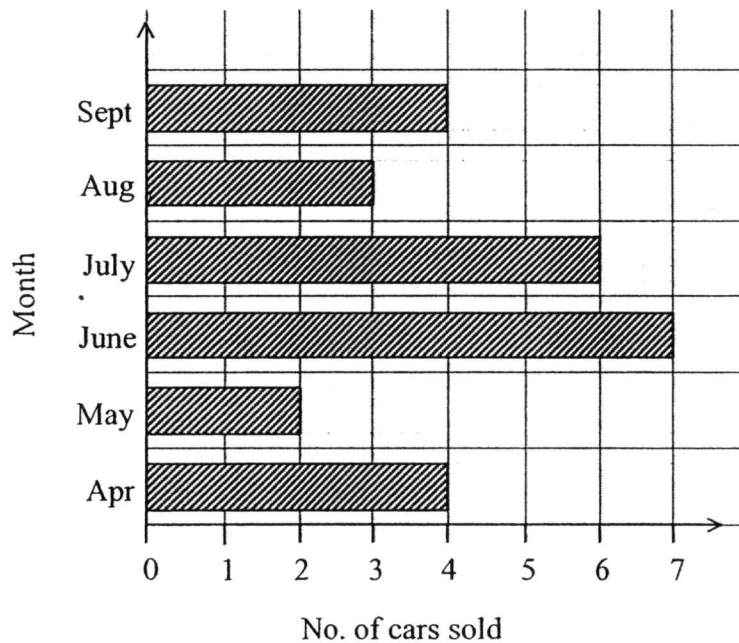
(ii) [1]

(b) [1]

(c) [1]

44

- 11 The bar graph below shows the number of cars sold by Desmond over a period of 6 months.



- (a) In which month did Desmond sell the most number of cars?
- (b) The number of cars sold in April is $\frac{2}{3}$ of the number of cars sold in a particular month.
Which month is this?
- (c) What is the average number of cars sold per month?

Answer (a) [1]

(b) [1]

(c) [2]

- 12 (a) If $A : B = 1 : 4$ and $B : C = 3 : 7$, find the ratio $A : B : C$.
- (b) Mr. Chai withdraws \$18 000 from his saving account.
Half of the money is given to his wife and the rest is divided among his three children Andy, Ben and Charlie in the ratio 3 : 4 : 1 respectively.
- (i) Ben saves $\frac{2}{3}$ of his money.
How much does he save?
- (ii) Charlie receives additional \$1000 from his mother.
Find the ratio of money received by Andy to Charlie now.

Answer (a) : : [1]

(b)(i) \$ [2]

(ii) : [2]

45

13 Solve

(a) $\frac{4}{x+5} = 1,$

(b) $2y - 5 - 2(7 - 4y) = 27,$

(c) $\frac{2m+1}{5} + \frac{1-m}{3} = -1.$

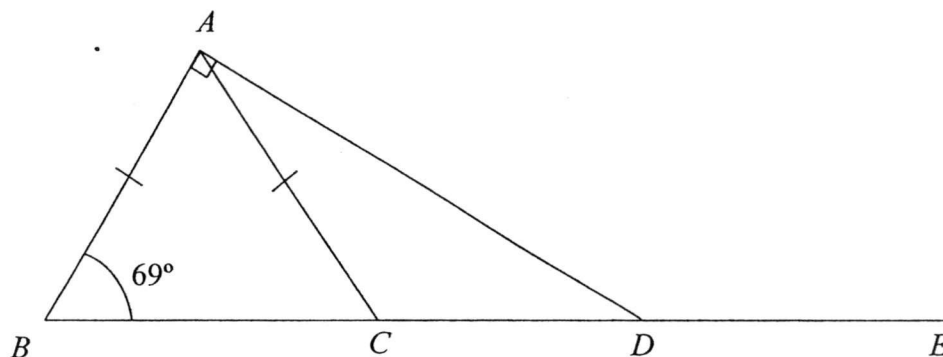
Answer (a) $x = \dots\dots\dots$ [1]

(b) $y = \dots\dots\dots$ [2]

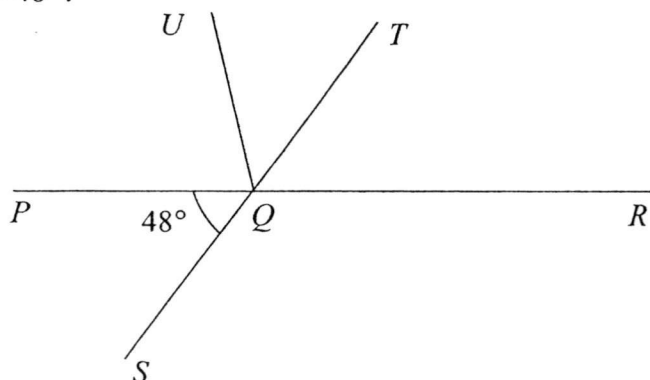
(c) $m = \dots\dots\dots$ [2]

- 14 (a) In the diagram, $BCDE$ is a straight line.
 $AB = AC$, $\angle ABC = 69^\circ$ and $\angle BAD = 90^\circ$.

- (i) Give the name of triangle ABC .
- (ii) Find
- (a) angle BAC ,
- (b) angle ADE .



- (b) In the diagram below, PQR and SQT are straight lines.
Angle $PQS = 48^\circ$.



- (i) Find angle TQR ,
- (ii) Given that angle PQU is twice angle TQU , find angle TQU .

Answer (a) (i) [1]

(ii) (a) $\angle BAC = \dots\dots\dots^\circ$ [1]

(b) $\angle ADE = \dots\dots\dots^\circ$ [1]

(b) (i) $\angle TQR = \dots\dots\dots^\circ$ [1]

(ii) $\angle TQU = \dots\dots\dots^\circ$ [1]

46

- 15 The monthly water charges, \$C, that each household has to pay for x cubic metre of water consumption is given by

$$C = 1.2x + n, \text{ where } n \text{ is a constant.}$$

- (a) The total water consumption for Mr Ong's family in the month of January was 38 cubic metres.

The water charges for the month were \$48.40.

Show that $n = 2.80$ and explain the significance of this value.

- (b) (i) The total water consumption for the family in the month of February was 42 cubic metres.

Using your answer in (a), calculate the water charges for the month of February.

- (ii) An additional of 30% water conservation tax is charged if the total water consumption for the month is more than 40 cubic metres.

Calculate the total amount the family has to pay for the month of February.

Answer (a) [3]

(b)(i) \$ [1]

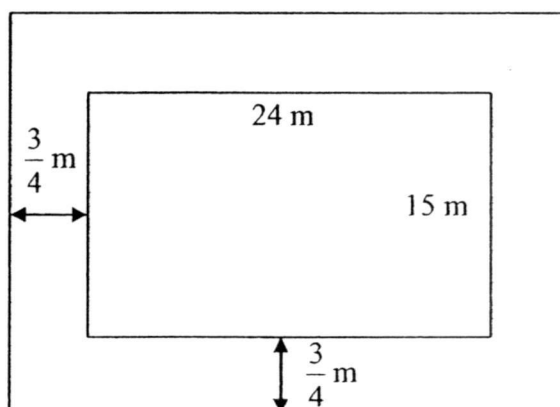
(ii) \$ [2]

- 16 The diagram shows a rectangular garden of length 24 m and width 15 m. A footpath with uniform width of $\frac{3}{4}$ m is constructed all around the rectangular garden. The whole garden is to be planted with roses.

- (a) Calculate
- (i) the area to be planted with roses,
 - (ii) the area of the footpath.
- (b) Square tiles of side 15 cm are used to cover the footpath. The tiles are sold in boxes, each containing 100 tiles. Each box of tiles costs \$94.

Calculate

- (i) the number of tiles used to cover the footpath,
- (ii) the cost of the tiles she bought.



Answer (a) (i) m^2 [1]

(ii) m^2 [2]

(b) (i) [2]

(ii) \$ [1]

END OF PAPER

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Answer Key

1(a)	35 °C	11(a)	June
1(b)	-10 °C	11(b)	July
2	8.2 mm	11(c)	$4\frac{1}{3}$
3(a)	-1	12(a)	3 : 12 : 28
3(b)	0	12(b)(i)	\$3000
4(a)	$4 + 7p$	12(b)(ii)	27 : 17
4(b)(i)	$3a$	13(a)	$x = -1$
4(b)(ii)	$-7s + \frac{5t}{2}$	13(b)	$y = 4.6$
5(a)	$x \leq -3\frac{1}{2}$	13(c)	$m = -23$
5(b)	Largest integer $x = -4$	14(a)(i)	Isosceles triangle
6(a)(i)	$\frac{\pi}{3}, \sqrt{3}$	14(a)(ii)(a)	42°
6(a)(ii)	$\sqrt[3]{4^3}$	14(a)(ii)(b)	159°
6(b)	$-3.\dot{3}, -3.333, 3\frac{1}{3}\%, \frac{\pi}{3}, \sqrt{3}, \sqrt[3]{4^3}$	14(b)(i)	48°
7(a)	$\frac{3}{8}$	14(b)(ii)	44°
7(b)	18.75 litres	15(a)	n represents the fixed amount that has to be paid in addition to the water consumption charges.
8(a)	23 targets	15(b)(i)	\$53.20
8(b)	115 points	15(b)(ii)	\$69.16
9(a)	$2160 = 2^4 \times 3^3 \times 5$	16(a)(i)	360 m ²
9(b)(i)	108	16(a)(ii)	60.75 m ²
9(b)(ii)	$k = 20, q = 60$	16(b)(i)	2700
10(a)(i)	$m(p - q)$	16(b)(ii)	\$2538
10(a)(ii)	2.34		
10(b)	27		
10(c)	-0.281		

Mid-Year Examination 2015 Marking Scheme
Sec 1 Express Mathematics Paper 1

Question No	Marking Point	Marks Awarded	Total Marks	Remarks
1 (a)	Estimated temperature = $35 \pm 1^\circ\text{C}$	B1	1	
(b)	Temperature in Canada = $35 - 45$ = -10°C	B1	1	
2	Thickness of 1 sheet = $\frac{24.6}{1500}\text{ cm}$ Thickness of 50 sheets = $\frac{24.6}{1500} \times 50$ = 0.82 cm = 8.2 mm	M1 A1	 2	<u>Alternative method</u> Thickness of 1 sheet = $\frac{246}{1500}\text{ mm}$ M1 Thickness of 50 sheets = $\frac{246}{1500} \times 50$ = 8.2 mm A1
3 (a)	Coefficient of x is -1	B1	1	
(b)	Constant term is 0	B1	1	
4 (a)	Length of each side of the square = $\frac{16+28p}{4}$ = $4+7p$	B1	1	
(b) (i)	$a \div b \times b + a \times 2$ = $\frac{a}{b} \times b + 2a$ = $3a$	B1	1	
(b) (ii)	$-2s + 3t - 5s - \frac{t}{2}$ = $-2s - 5s + 3t - \frac{t}{2}$ = $-7s + \frac{5t}{2}$	B1	1	
5 (a)	$x - 4 \geq 3x + 3$ $-2x \geq 7$ $x \leq -3\frac{1}{2}$	M1 A1	2	Allow M1 for answer without the inequality sign Accept $-3\frac{1}{2} \geq x$
(b)	Largest integer $x = -4$	B1	1	

48

Question No		Marking Point	Marks Awarded	Total Marks	Remarks
6	(a) (i)	$\frac{\pi}{3}, \sqrt{3}$	B1	1	Both answers must correct
	(a) (ii)	$\sqrt[3]{4^3}$	B1	1	
	(b)	Arranged in ascending order $-3.\dot{3}, -3.333, 3\frac{1}{3}\%, \frac{\pi}{3}, \sqrt{3}, \sqrt[3]{4^3}$	B1	1	
7	(a)	$\frac{3}{8}$	B1	1	
	(b)	Fraction to top up = $\frac{3}{4} - \frac{3}{8} = \frac{3}{8}$ Minimum amount of fuel $= \frac{50}{8} \times 3$ $= 18.75$ litres	M1 A1	2	
8	(a)	Let x be the no of targets hit and $30 - x$ be the no of targets missed $5x - 2(30 - x) = 101$ $5x - 60 + 2x = 101$ $7x = 161$ $x = \frac{161}{7}$ $x = 23$ Justin hit 23 targets	M1 A1	2	Accept any other suitable method. Eg. trial and error method
	(b)	Xavier's score $= 25(5) - 5(2)$ $= 115$	B1	1	
9	(a)	$2160 = 2^4 \times 3^3 \times 5$	B1	1	
	(b) (i)	Smallest 3-digit number $= 108$	B1	1	
	(b) (ii)	$2160 \times 5k = q^3$ $2^4 \times 3^3 \times 5 \times 5k = q^3$ $2^4 \times 3^3 \times 5 \times 5 \times 2^2 \times 5 = q^3$ $k = 2^2 \times 5 = 20$ $q = \sqrt[3]{2^6 \times 3^3 \times 5^3}$ $q = 2^2 \times 3 \times 5 = 60$	B1 B1	1 2	

Question No			Marking Point	Marks Awarded	Total Marks	Remarks
10	(a)	(i)	$m(p - q)$	B1	1	Must show $0.0234(145 - 45)$
	(a)	(ii)	$0.0234(145 - 45)$ $= 2.34$	B1	1	
	(b)		$p = -3, \quad 2p^2 - 3p = 2(-3)^2 - 3(-3)$ $= 27$	B1	1	
	(c)		$\frac{-3 + \sqrt{3^2 - 4(-2)(1)}}{2(-2)}$ $= -0.2807 \approx -0.281$	B2	2	B1 for -0.2807 seen
11	(a)		June	B1	1	
	(b)		$\frac{2}{3} \times 6 = 4$	B1		
	(c)		July Average = $\frac{26}{6}$ $= 4\frac{1}{3}$ or 4.33 cars	M1 A1	2	
12	(a)		$A : B : C$ $1 : 4$ $3 : 7$ $= 3 : 12 : 28$	B1	1	
	(b)	(i)	Amount given to 3 children $= \frac{1}{2} \times 18000 = \9000 Amount received by Ben $= \frac{9000}{8} \times 4 = \4500 Amount saved $= \frac{2}{3} \times 4500 = \3000	M1 A1	2	
	(b)	(ii)	Charlie's new amount $= \frac{9000}{8} + 1000 = \2125 Andy's share $= \frac{9000}{8} \times 3 = \3375			

Question No	Marking Point	Marks Awarded	Total Marks	Remarks
	New ratio = 3375 : 2125 = 27 : 17	M1 A1	2	
13 (a)	$\frac{4}{x+5} = 1$ $4 = x+5$ $x = -1$	B1	1	
(b)	$2y - 5 - 14 + 8y = 27$ $10y - 19 = 27$ $10y = 46$ $y = 4.6$	M1 A1	2	
(c)	$\frac{3(2m+1)+5(1-m)}{15} = -1$ $\frac{6m+3+5-5m}{15} = -1$ $m+8 = -15$ $m = -23$	M1 A1	2	
14 (a) (i)	Isosceles triangle	B1	1	
(ia)	angle $BAC = 180^\circ - 69^\circ - 69^\circ$ $= 42^\circ$	B1	1	
(iib)	angle $ADE = 69^\circ + 90^\circ$ $= 159^\circ$	B1	1	<u>Alternative method</u> Angle ADB $= 180^\circ - 69^\circ - 90^\circ$ $= 21^\circ$ Angle ADE $= 180^\circ - 21^\circ = 159^\circ$
(b) (i)	angle $TQR = 48^\circ$	B1	1	
(ii)	angle $TQU = \frac{180^\circ - 48^\circ}{3}$ $= 44^\circ$	B1	1	
15 (a)	$C = 1.2x + n$ $C = 48.40, x = 38,$ $48.40 = 1.2(38) + n$ $n = 48.40 - 45.60$ $= \$2.80$ n represents the fixed amount that has to be paid in addition to the water consumption charges.	M1 A1 B1	3	

Question No			Marking Point	Marks Awarded	Total Marks	Remarks
15	(b) (i)		$C = 1.2x + 2.8$ $x = 42, C = 1.2(42) + 2.8$ $= \$53.20$	B1	1	
		(b) (ii)	Total amount $= 53.20 + \frac{30}{100} \times 53.20$ $= \$69.16$	M1 A1	2	M1 for $\frac{30}{100} \times 53.20$
	(a) (i)		Area to be planted with roses $= 24 \times 15$ $= 360 \text{ m}^2$	B1	1	
16	(a) (ii)		Area of the garden with the footpath $= \left(24 + \frac{3}{4} + \frac{3}{4}\right) \times \left(15 + \frac{3}{4} + \frac{3}{4}\right)$ $= 25.5 \times 16.5$ $= 420.75 \text{ m}^2$ Area of the footpath $= 420.75 - 360$ $= 60.75 \text{ m}^2$	M1 A1	2	Accept $\frac{607500}{15 \times 15} = 2700$ or $\frac{60.75}{0.15 \times 0.15} = 2700$
		(b) (i)	$\frac{3}{4} \text{ m} = 75 \text{ cm}$ $25.5 \text{ m} = 2550 \text{ cm}$ No of tiles $= 2\left(\frac{2550}{15} \times \frac{75}{15}\right) + 2\left(\frac{1500}{15} \times \frac{75}{15}\right)$ $= 2(170 \times 5) + 2(100 \times 5)$ $= 1700 + 1000$ $= 2700$	M1 A1	2	M1 for $\frac{2550}{15} \times \frac{75}{15}$ or $\frac{1500}{15} \times \frac{75}{15}$ seen
	(b) (ii)		$\frac{2700}{100} = 27$ No of boxes required = 27 Cost = $27 \times 94 = \$2538$	B1	1	



聖嬰中學

HOLY INNOCENTS' HIGH SCHOOL

Name of Student

Class

Index Number

**MID-YEAR EXAMINATION 2015
SECONDARY 1 EXPRESS
MATHEMATICS PAPER 2**

4048/01

Date: 13 May 2015

Duration: 1 h 30 min

Additional Materials: 5 sheets of Writing Paper

READ THESE INSTRUCTIONS FIRST

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

Write in dark blue or black pen.

You may use an HB pencil for any diagrams or graphs.

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Answer **ALL** questions.

The number of marks is given in brackets [] at the end of each question or part question.

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The total of the marks for this paper is **60**

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.

Set by: Mr Johnny Hoo / Mdm Hayati

Vetted by: Ms Goh Lay Ching

This document consists of 8 printed pages (including cover page).

Answer **all** the questions.

- 1 (a) The prime factorisation of two numbers are
 $2^4 \times 5 \times 7$ and $2^3 \times 3^5 \times 5^2$.
 Find
 (i) the HCF, [1]
 (ii) the LCM [1]
 of the two numbers, giving your answer in prime factorisation form.
- (b) Ellen and Felicia jogged around a circular track.
 They started at the starting line at the same time.
 Ellen took 64 seconds and Felicia took 80 seconds to complete one round.
- (i) Assuming that the two girls continued running at their respective speed,
 after how long would they meet again at the starting line?
 Give your answer in minutes and seconds. [2]
- (ii) How many rounds would each girl have jogged by then? [1]
-

- 2 (a) 360 participants took part in a camp.
 $\frac{7}{15}$ of the participants are boys.
- (i) Find the number of girls who took part in the camp. [1]
- (ii) Given that $\frac{4}{7}$ of the boys are above 12 years old, find the number of boys
 who are below 12 years old. [2]
- (b) The length of a ribbon is $2\frac{7}{10}$ m.
 Shorter pieces of ribbon of length $\frac{5}{8}$ m are cut from it.
- (i) How many pieces of $\frac{5}{8}$ m ribbon can be obtained altogether? [1]
- (ii) What is the length of the ribbon left?
 Give your answer in centimetres. [2]

3 (a) (i) Evaluate $5000\left(1 + \frac{3.5}{100}\right)^2$.

Write down all the digits on your calculator display. [1]

(ii) Round off your answer to part (a)(i) correct to 2 decimal places. [1]

(b) Best Villa Hotel offers buffet dinner for wedding reception.

(i) The hotel charges \$84.95 per guest for the buffet dinner.

Estimate, correct to the nearest 1 dollar, the cost of the buffet dinner for 200 guests. Show your working clearly. [2]

(ii) The hotel charges \$74.80 per guest if the number of guests is more than 400. Stefanie is willing to pay \$31 600 for the buffet dinner, corrected to the nearest hundred dollars.

What is the maximum number of guest Stefanie can invite for her wedding reception? [2]

4 David is x years old.

David's father is thrice the age of David.

(a) Write down an expression, in terms of x , for the father's age. [1]

(b) In 5 years' time the sum of their ages is equal to 70.

(i) Write down an expression, in terms of x , for the father's age in 5 years' time. [1]

(ii) Form an equation in terms of x . [1]

(iii) Solve the equation and find the father's present age, [3]

5 (a) What must be subtracted from $(4p - 9q + 2)$ to give $(-p + 5q + 6)$? [2]

(b) Simplify $\frac{1}{2}(6a) - [5a - (8b + a)]$. [2]

(c) Simplify $\frac{3x}{4} + \frac{2(x+2)}{6}$. [2]

6 Jenny saw the following recipe from an online website.

★★★★★ (96 ratings)

Prep: 15 mins
Cook 10 mins

Easy

Makes 30

Ingredients

100 g brown sugar
 160 g unsalted block butter
 225 g self-raising flour
 1 cup chocolate chips
 1 egg
 1 ½ tsp vanilla essence
 ½ tsp salt

Nutrition per cookie

calories	protein	carbs	fat	saturates	fibre	sugar	salt
121	1.3 g	14.7g	6.3 g	3.8g	0.5g	9.5g	0.2g

Save
 Print

The above recipe can make a batch of 30 cookies.
 Jenny is inviting 20 friends for her birthday party.
 She wants to prepare at least 4 pieces of cookies for each friend.

- (a) Show that she needs to bake a minimum of 3 batches of cookies. [1]

Use your answer in (a) to answer the following questions.

- (b) Calculate the total amount of self-raising flour needed. [1]

- (c) Jenny has only 1 block of unsalted butter which has a mass of 220 g.

If 1 block of butter costs \$3.20, how much does she need to pay for the remaining amount of butter that she needs? [2]

- (d) Jenny realised that she did not have a kitchen scale to measure the mass of the ingredients.
 She saw the following conversion table online and used it to guide her measurement.

Mass of common ingredients in grams			
Ingredients	1 cup	$\frac{2}{3}$ cup	$\frac{1}{4}$ cup
Flour	120 g	80 g	30 g
Brown Sugar	180 g	120 g	45 g
Butter	240 g	160 g	60 g

Find the number of cups of brown sugar needed in total. [1]

- (e) Jenny's friend, Salina is on a strict meal plan that requires her to consume at most 1200 calories per day.

Salina claims that she can only eat at most 2 pieces of cookie as she has already consumed 860 calories for the day.

Determine if Salina's statement is true.

Show all necessary working clearly.

[2]

7 Kelly earns a monthly income of \$4000.

- (a) Kelly saves 15% of her monthly income.
Calculate how much of her salary left after saving.

[2]

- (b) The table below shows her expenditures for the month of April.

Food	\$500
Mobile phone bill	\$55
Utility bills	\$210
Transport	\$175
Clothing	\$230

If her mobile phone bill increased to \$65.50 in the month of May, express the increase as a percentage of her phone bill in April.

[2]

- (c) In the month of May, her monthly income was increased by 7%.

What was her monthly income in May?

[2]

- (d) Express her total expenditures in April as a percentage of her income for the month of May.

[2]

- 8 (a) Part of a pattern of numbers known as the Pascal's Triangle is shown below.

Row 1				1			
Row 2			1		1		
Row 3			1		2		1
Row 4		1		3		3	1
Row 5	1		4		6		4
⋮					⋮		
⋮					⋮		
Row n							

- (i) Write down the pattern of numbers in Row 6. [1]
- (ii) The table below shows the sum of the numbers in each row. Write down the pattern for the sum of numbers in Row 5. [1]

Row	Sum
1	$1 = 2^0$
2	$1 + 1 = 2 = 2^1$
3	$1 + 2 + 1 = 4 = 2^2$
4	$1 + 3 + 3 + 1 = 8 = 2^3$
5	
⋮	⋮
n	$1 + \dots = S$

- (iii) Write down an expression, in terms of n , for S . [1]
- (iv) Hence or otherwise find the sum of numbers in Row 20. [1]
- (b) (i) The n^{th} term of a sequence is given by $3n^2 - 2$. Write down the first 4 terms of the sequence. [2]
- (ii) The first 4 terms of another sequence are 1, 19, 49, 91.
- (a) Write down the next term. [1]
- (b) By comparing this sequence with your answer to (b)(i), write down the n^{th} term. [1]

- 9 **Diagram I** shows a box of dimensions 100 cm by 64 cm by 75 cm.

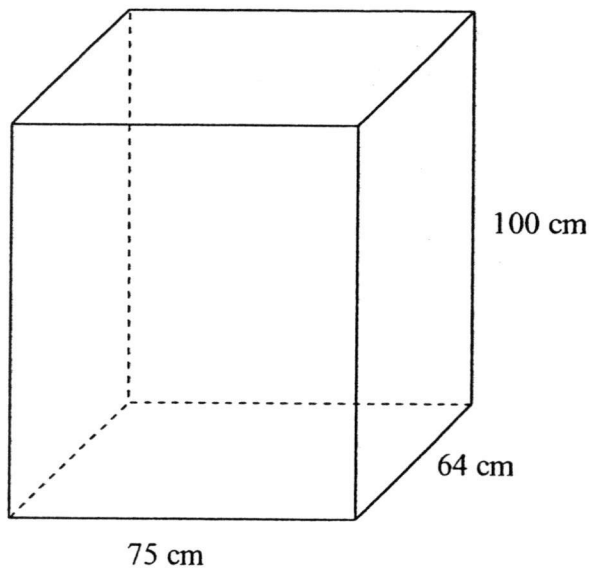


Diagram I

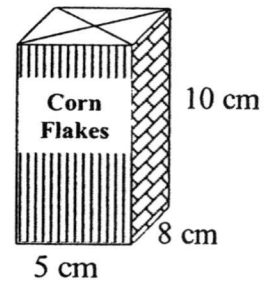


Diagram II

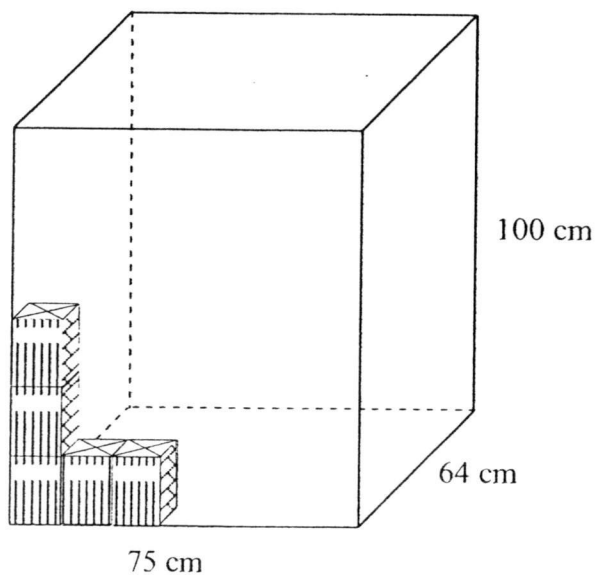
- (a) Find the volume of the box. [1]

- (b) **Diagram II** shows a rectangular packet of cornflakes of dimensions 10 cm by 8 cm by 5 cm.
The packet is to have a label wrapped round it which exactly covers the vertical surface area.

Calculate the area of the label. [2]

- (c) Mr Wong packed the rectangular packets of cornflakes into the box, as shown in the diagram below.

How many packets of cornflakes are required to fill the box completely? [2]



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- (d) Mr Wong planned to sell the packets of cornflakes in the box at \$0.75 per packet. He managed to sell half of them at this price. The rest were sold at 12% discount. Calculate the total amount he received from selling all the cornflakes. [3]

END OF PAPER

Answer Key

1(a)(i)	$2^3 \times 5$	6(b)	675 g
1(a)(ii)	$2^4 \times 3^5 \times 5^2 \times 7$	6(c)	\$6.40
1(b)(i)	5 mins 20 s	6(d)	$1\frac{2}{3}$ cups
1(b)(ii)	Ellen 5, Felicia 4	6(e)	Salina's statement is true
2(a)(i)	192	7(a)	\$3400
2(a)(ii)	72	7(b)	19.1%
2(b)(i)	4	7(c)	\$4280
2(b)(ii)	20 cm	7(d)	27.3%
3(a)(i)	5356.125	8(a)(i)	1 5 10 10 5 1
3(a)(ii)	5356.13	8(a)(ii)	$1 + 4 + 6 + 4 + 1 = 16 = 2^4$
3(b)(i)	\$17000	8(a)(iii)	$S = 2^{n-1}$
3(b)(ii)	423	8(a)(iv)	524 288
4(a)	$3x$	8(b)(i)	1, 10, 25, 46
4(b)(i)	$3x + 5$	8(b)(ii)(a)	145
4(b)(ii)	$3x + 5 + x + 5 = 70$	8(b)(ii)(b)	$2(3n^2 - 2) - 1$
4(b)(iii)	$x = 15$, Father's age = 45	9(a)	480000 cm^3
5(a)	$5p - 14q - 4$	9(b)	260 cm^2
5(b)	$-a + 8b$	9(c)	1200
5(c)	$\frac{13x + 8}{12}$	9(d)	\$846

Mid-Year Examination 2015 Marking Scheme
Sec 1 Express Mathematics Paper 2

Question No	Marking Point	Marks Awarded	Total Marks	Remarks
1	(a) (i) $2^4 \times 5 \times 7$ $2^3 \times 3^5 \times 5^2$ $\text{HCF} = 2^3 \times 5$ (a) (ii) $\text{LCM} = 2^4 \times 3^5 \times 5^2 \times 7$ (b) (i) $64 = 2^6$ $80 = 2^4 \times 5$ $\text{LCM} = 2^6 \times 5$ $= 320 \text{ sec}$ $= 5 \text{ mins } 20 \text{ s}$ (b) (ii) No of rounds (Ellen) = $\frac{320}{64} = 5$ No of rounds (Felicia) = $\frac{320}{80} = 4$	B1 B1 M1 A1 B1	1 1 2 1	
2	(a) (i) No of girls = $\frac{8}{15} \times 360$ $= 192$ (a) (ii) No of boys = $360 - 192$ $= 168$ Fraction of boys below 12 years old $= 1 - \frac{4}{7}$ $= \frac{3}{7}$ No of boys below 12 years old $= \frac{3}{7} \times 168$ $= 72$ (b) (i) $2\frac{7}{10} \div \frac{5}{8} = 4\frac{8}{25}$ No of shorter pieces = 4 (b) (ii) $\frac{8}{25} \times \frac{5}{8} = \frac{1}{5} \text{ m}$ Remaining length = $\frac{1}{5} \times 100 = 20 \text{ cm}$	B1 M1 A1 B1 M1 A1	1 2 1 2	<u>Alternative method</u> $\frac{4}{7} \times 168 = 96$ M1 No of boys below 12 years old $= 168 - 96 = 72$ A1 <u>Alternative method</u> $4 \times \frac{5}{8} = 2.5 \text{ m}$ M1 Remaining length $= 2.7 - 2.5 = 0.2 \text{ m}$ $= 20 \text{ cm}$ A1

Question No			Marking Point	Marks Awarded	Total Marks	Remarks
3	(a)	(i)	5356.125	B1	1	
	(a)	(ii)	5356.13	B1	1	
	(b)	(i)	Estimated cost = 85×200 = \$17000 (nearest dollar)	M1 A1	2	M1 – for ‘85’ seen
	(b)	(ii)	Estimated no of guests = $\frac{31600}{74.80}$ = 422.45 $74.80 \times 422 = 31565.6$ $74.80 \times 423 = 31640.4$ $74.80 \times 424 = 31715.2$ $\therefore$ Largest possible no of guest = 423	M1 A1	 2	Accept also $\frac{31600}{75} = 421.33$ M1 – for ‘422 / 421’ seen
4	(a)		Father’s age = $3x$	B1	1	
	(b)	(i)	$3x + 5$	B1	1	
	(b)	(ii)	$3x + 5 + x + 5 = 70$	B1	1	
	(b)	(ii)	$4x + 10 = 70$ $4x = 60$ $x = 15$	M1 M1		
			Father present age = 45	A1	3	
5	(a)		$(4p - 9q + 2) - (-p + 5q + 6)$ = $4p - 9q + 2 + p - 5q - 6$ = $4p + p - 9q - 5q + 2 - 6$ = $5p - 14q - 4$	M1 A1	2	M1 – correct sign after expanding
	(b)		$\frac{1}{2}(6a) - [5a - (8b + a)]$ = $3a - [5a - 8b - a]$ = $3a - [4a - 8b]$ = $-a + 8b$	M1 A1	2	
	(c)		$\frac{3x}{4} + \frac{2(x+2)}{6}$ = $\frac{9x + 4(x+2)}{12}$ = $\frac{9x + 4x + 8}{12}$ = $\frac{13x + 8}{12}$	M1 A1	2	

Question No	Marking Point	Marks Awarded	Total Marks	Remarks
6 (a)	Total no of cookies need to be prepared $= 20 \times 4 = 80$ $30 \times 3 = 90$ Minimum no of batches is 3	B1	1	<u>Alternative method</u> $\frac{80}{30} = 2.67 \approx 3$ B1
(b)	Total amount of flour $= 225 \times 3 = 675 \text{ g}$	B1	1	
(c)	Amount of butter needed $= 160 \times 3 = 480 \text{ g}$ Amount of butter needed $= 480 - 220$ $= 260 \text{ g}$ Total cost $= 2 \times 3.20 = \$6.40$	M1 A1	2	<u>Alternative method</u> $480 - 160 = 320 \text{ g}$ $\frac{320}{220} = 1.45 \approx 2$ M1
(d)	180 g = 1 cup $120 \text{ g} = \frac{2}{3} \text{ cup}$ 300 g of brown sugar $= 1\frac{2}{3} \text{ cups}$	B1	1	<u>Alternative method</u> 180 g = 1 cup $300 \text{ g} = \frac{300}{180}$ $= 1\frac{2}{3} \text{ cups}$ B1
(e)	No of calories $= 1200 - 860 = 340$ $\frac{340}{121} = 2.8$ Max no of cookies is 2 The statement is true.	M1 A1	2	
7 (a)	Amount of saving $= 15\% \times 4000$ $= \$600$ Amount after saving $= \$4000 - \600 $= \$3400$	M1 A1	2	<u>Alternative method</u> $100 - 15 = 85\%$ $\frac{85}{100} \times 4000 = \3400
(b)	Increase in expense $= \$65.50 - 55.00$ $= \$10.50$ Percentage inc $= \frac{10.5}{55} \times 100\%$ $= 19.1\%$	M1 A1	2	
(c)	Monthly income in May $= 1.07 \times 4000$ $= \$4280$	M1 A1	2	
(d)	Total expense $= \$1170$ Percentage $= \frac{1170}{4280} \times 100\%$ $= 27.3\%$	M1 A1	2	

Question No			Marking Point	Marks Awarded	Total Marks	Remarks
8	(a)	(i)	1 5 10 10 5 1	B1	1	B1 for 2 correct terms
		(ii)	$1+4+6+4+1=16=2^4$	B1	1	
		(iii)	$S = 2^{n-1}$	B1	1	
		(iv)	$n = 20, S = 2^{19} = 524\,288$	B1	1	
	(b)	(i)	$3n^2 - 2$			
			$n = 1, 3(1)^2 - 2 = 1$			
			$n = 2, 3(2)^2 - 2 = 10$		.	
			$n = 3, 3(3)^2 - 2 = 25$			
			$n = 4, 3(4)^2 - 2 = 46$			
			The first 4 terms are 1, 10, 25, 46	B2	2	
	(b)	(ia)	$6(5^2) - 5 = 145$	B1	1	
		(ib)	$2(3n^2 - 2) - 1$	B1	1	
9	(a)		Volume of box $= 100 \times 75 \times 64$ $= 480\,000 \text{ cm}^3$	B1	1	M1: 5×10 or 8×10 seen <u>Alternative method</u> $\frac{75 \times 64 \times 100}{5 \times 8 \times 10} = 1200$
	(b)		Area $= (5 + 8 + 5 + 8) \times 10$ $= 260 \text{ cm}^2$	M1 A1	2	
	(c)		No of packets it can hold $= \frac{75}{5} \times \frac{64}{8} \times \frac{100}{10}$ $= 1200$	M1 A1	2	
	(d)		Total sales $= 600 \times 0.75 + \frac{88}{100} \times 0.75 \times 600$ $= 450 + 396$ $= \$846$	M2 A1	3	