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Class	Register No	Name
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**Bukit Merah Secondary School
Mid-Year Examination 2015
Secondary 1 Express**

E

MATHEMATICS

11 May 2015

Paper 1

1 hour 15 minutes

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

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

Write in dark blue or black pen.

You may use a pencil for any diagrams or graphs.

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

Answer **all** questions.

If working is needed for any question it must be shown with the answer.

Omission of essential working will result in loss of marks.

Calculators should be used when 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.

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**.

Calculator Model:

For Examiner's Use

Setter: Mdm CHOR O.M. Christina
Vetter: Ms Stella TOH Y.M.

21

This document consists of 9 printed pages.

[TURN OVER

Answer **all** the questions

For
Examiner's
use

- 1 Consider the following set of numbers.

$8, \sqrt[3]{5}, 7, 2\pi, \sqrt{25}, 27, 9, 3.\dot{5}$

Write down

- (a) the **largest** prime number,
(b) the **smallest** perfect cube,
(c) all the irrational numbers.

For
Examiner's
use

Answer (a) [1]

(b) [1]

(c) [1]

- 2 (a) Evaluate the following. $(7.854 - 9.5) \div (-3.465 + 2.10)^3$, correct to 2 decimal places.

- (b) Evaluate $\frac{\sqrt[3]{56.32\pi} - \frac{5}{147}}{\sqrt{123.96}}$, correct to 3 significant figures.

Answer (a) [1]

(b) [1]

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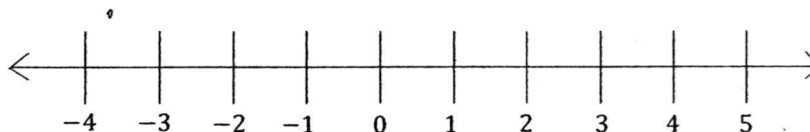
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- 3 (a) Arrange the following six numbers in ascending order.

-0.3 , $3.\dot{3}$, -3 , $0.\dot{3}$, 0.33 , $3.\dot{3}1\dot{3}$

- (b) Use the number line below to illustrate the negative odd integers between -4 and 5 .



Answer (a) [2]

(b) (answer on the given number line) [1]

- 4 During each week, a site engineer checks the water level in the ground as required by the environment authority of a country. The table below shows the daily water level recorded for Week 10.

Day of Week 10	Monday	Tuesday	Wednesday	Thursday	Friday
Water level (in mm)	+5.3	-14.0	-18.1	+12.0	-7.6

- (a) On which day was the lowest water level recorded?
- (b) What is the largest difference in water level between any two days of Week 10?

Answer (a) [1]

(b)mm [1]

For
Examiner's
use

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use

- 5 (a) Find the lowest common multiple of 12, 18 and 63, expressing your answer in index notation.
- (b) Three lights flash at 12 minutes, 18 minutes and 63 minutes respectively. At 06:00 A.M., they flashed at the same time. When will they next flash at the same time?

Answer (a) [1]

(b) [2]

- 6 (i) Express 72.56 and 1.102 correct to 3 significant figures.
- (ii) Use your answer in part (i) to estimate the value of $\sqrt[3]{72.56 \div 1.102}$.

Answer (i) [2]

(ii) [2]

- 7 Write down an algebraic expression for each of the following statements.

- (a) Subtract 7 from the cube of g .
- (b) The product of 3 and b divided by 4 times of a .

Answer (a) [1]

(b) [1]

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use

5

For
Examiner's
use

- 8 A garment factory produces 2100 jeans and 3276 blouses per day. The jeans and blouses are divided equally into as many packs as possible such that the number of packs of jeans and the number of packs of blouses are the same. Find
- (a) the number of packs of jeans,
 - (b) the number of jeans in each pack,
 - (c) the number of blouses in each pack.

Answer (a) [2]
(b) [1]
(c) [1]

- 9 Simplify each of the following expressions.

- (a) $2p \times 3 \times p$
- (b) $t + 9u \div 54uv$

Answer (a) [1]
(b) [2]

For
Examiner's
use

- 10** Without using a calculator and by showing your working clearly, evaluate each of the following expressions.

(a) $3^3 - 5 \times 4 - (-\sqrt{64})$

(b) $-1\frac{4}{5} \div \left(-\frac{18}{15}\right) + \left(\frac{2}{3}\right)^2$

For
Examiner's
use

Answer (a) [2]

(b) [3]

- 11** Factorise the following completely.

(a) $16a + 24b$

(b) $-3x - 9x^2$

(c) $x(2z - 5) + y(5 - 2z)$

Answer (a) [1]

(b) [1]

(c) [2]

[TURN OVER

For
Examiner's
use

For
Examiner's
use

12 Simplify each of the following expressions.

(a) $28d + 5e - 29d + e^2$

(b) $a - 2a(-3y + 4)$

(c) $\frac{7x+1}{4} - \frac{2-5x}{3}$

Answer (a) [1]
(b) [2]
(c) [3]

For
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13 Solve each of the following equations.

(a) $6w + 12 = 5w - 3$

(b) $\frac{1}{3}(x + 6) = 14$

(c) $\frac{3 + 4x}{5} = \frac{x}{2}$

For
Examiner's
use

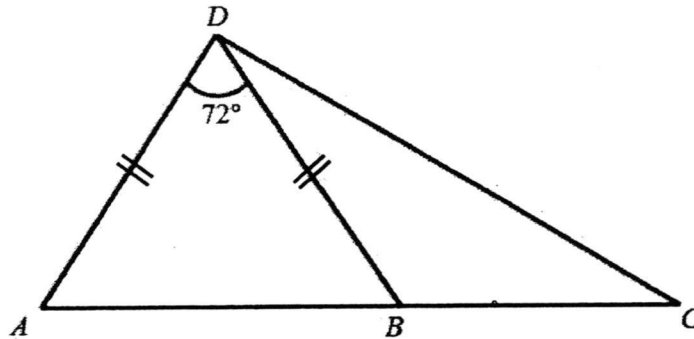
Answer (a) $w = \dots\dots\dots$ [1]

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

(c) $x = \dots\dots\dots$ [3]

[TURN OVER]

- 14 In the following figure, it is given that $\angle ADB = 72^\circ$ and $AD = BD$.



By showing your reason(s) clearly, find

- (a) $\angle CBD$,
 (b) $\angle CDB$ if both $\angle ADB$ and $\angle CDB$ are complementary angles to each other.

Answer (a) $\angle CBD = \dots\dots\dots$ [2]

(b) $\angle CDB = \dots\dots\dots$ [1]

Sec 1 Express MYE Mathematics Paper 1 2015
Solution and Mark Scheme

Question	Solution	Mark
1(a)	7	B1
1(b)	8	B1
1(c)	$\sqrt[3]{5}, 2\pi$	B1
2(a)	0.65	B1
2(b)	0.501	B1
3(a)	$-3, -0.3, 0.33, 0.\dot{3}, 3.\dot{3}1\dot{3}, 3.\dot{3}$	B1 (correct 1 st half) + B1 (correct 2 nd half)
3(b)	Student must draw dots on number line for only numbers, -1 and -3 .	B1
4(a)	Wednesday	B1
4(b)	30.1 mm	B1
5(a)	$2^2 \times 3^2 \times 7$	B1
5(b)	LCM = 252 mins	M1
	10:12 A.M. or 10:12 or 10.12 a.m.	A1
6(i)	72.6, 1.10	B1 + B1
6(ii)	$\sqrt[3]{66}$	
	$\approx \sqrt[3]{64}$	M1
	$= 4$	A1
7(a)	$g^3 - 7$	B1
7(b)	$\frac{3b}{4a}$	B1
8(a)	HCF = $2^2 \times 3 \times 7$	M1
	$= 84$	A1
8(b)	25	B1
8(c)	39	B1
9(a)	$6p^2$	B1
9(b)	$t + \frac{1}{6v}$	B2
10(a)	$27 - 20 + 8$	M1
	$= 15$	A1
10(b)	$-\frac{9}{5} \times \left(-\frac{15}{18}\right) + \frac{4}{9}$	M1 for $\left(-\frac{15}{18}\right)$ AND $\frac{4}{9}$
	$= \frac{3}{2} + \frac{4}{9}$	
	$= \frac{27 + 8}{18}$	M1 (single fraction)
	$= \frac{35}{18}$	
	$= 1\frac{17}{18}$	A1

28

11(a)	$8(2a + 3b)$	B1
11(b)	$-3x(1 + 3x)$	B1
11(c)	$x(2z - 5) - y(2z - 5)$	M1 (+ change to -)
	$= (x - y)(2z - 5)$	A1
12(a)	$-d + 5e + e^2$	B1
12(b)	$a + 6ay - 8a$	M1
	$= 6ay - 7a$	A1
12(c)	$\frac{3(7x + 1)}{12} - \frac{4(2 - 5x)}{12}$	M1 (denominator = 12)
	$= \frac{21x + 3 - 8 + 20x}{12}$	M1 (correct expansion)
	$= \frac{41x - 5}{12}$	A1
13(a)	$w = -15$	B1
13(b)	$\frac{1}{3}x + 2 = 14$	M1 (correct expansion)
	$\frac{1}{3}x = 12$	
	$x = 12 \times 3$	
	$x = 36$	A1
	OR	
	$x + 6 = 14 \times 3$	M1 (multiply 3 to both sides)
	$x + 6 = 42$	
	$x = 36$	A1
13(c)	$2(3 + 4x) = 5x$	M1
	$6 + 8x = 5x$	M1 (correct expansion)
	$x = -2$	A1
14(a)	$\angle ABD = \left(\frac{180 - 72}{2}\right)^\circ$ ($\angle$ s of isosceles triangle)	M1 (method to find base angle of isosceles triangle)
	$= 54^\circ$	
	$\angle CBD = (180 - 54)^\circ$ (adj. $\angle$ s on a st. line)	
	$= 126^\circ$	A1
		Deduction of 1 mark for lack of this reason "adj. $\angle$ s on a st. line", provided that the student obtains full marks for 14(a).
14(b)	$\angle CBD = (90 - 72)^\circ$	
	$= 18^\circ$	B1

----- The End -----

Class	Register No	Name
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**Bukit Merah Secondary School
Mid-Year Examination 2015
Secondary 1 Express**

E

MATHEMATICS

18 May 2015

Paper 2

1 hour 30 minutes

Additional Materials: Writing Paper (6 sheets)

READ THESE INSTRUCTIONS FIRST

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

Write in dark blue or black pen.

You may use a pencil for any diagrams or graphs.

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

Answer **all** questions on writing papers.

If working is needed for any question it must be shown with the answer.

Omission of essential working will result in loss of marks.

Calculators should be used when 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.

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 **60**.

Calculator Model:

For Examiner's Use

Setter: Mdm CHOR O.M. Christina

Vetter: Ms Stella TOH Y.M.

This document consists of 4 printed pages.

27

[TURN OVER

Answer all the questions

- 1 (a) Using prime factorisation, find the largest whole number which is a factor of both 462 and 594. [2]
- (b) If q is a whole number such that $q \times (q + 22)$ is a prime number, find the prime number. Explain your answer. [2]
- 2 (a) If one side of a square measures $\sqrt{2^{30} \times 3^{66}}$ cm, what is the area of the square in cm^2 , expressed in index notation? [1]
- (b) If the area of a square is given as $(49x^4) \text{ m}^2$,
- (i) find the length of one side of the square in m. [1]
- (ii) find the perimeter of the square in m by using your answer from part (i). [2]
- 3 During a Chemistry lesson, Mr Singh recorded the temperature of a substance immediately after it was taken out of a freezer. Its temperature was -4°C .
- (a) It is known that the temperature of the substance increases by 3°C every 15 minutes.
- (i) Find the new temperature of the substance if it is heated for 90 minutes? [2]
- (ii) How long will it take in minutes for the temperature of the substance to rise -4°C to 32°C ? [2]
- (b) If the substance cooled rapidly from 50°C to -2°C in 16 minutes, find the temperature decrease per minute? [2]
- 4 During a district performing arts competition in a particular year, $\frac{3}{16}$ of participants were dancers and there were 4 times more musicians than dancers. The remaining participants were actors and $\frac{3}{5}$ of the actors were adults.
- (a) Find the fraction of participants that were actors. [2]
- (b) Given that there were 48 adult actors, find the total number of participants. [3]

- 5 Elenna is in a shop now and has a budget of \$30 to purchase three birthday gifts. She wants to maximise her budget by receiving as little change as possible from the cashier. Below is a list of items that she finds in the shop.

Item A: \$5.49	Item B: \$6.95	Item C: \$25.98
Item D: \$8.45	Item E: \$1.95	Item F: \$13.98

Find out which 3 items she can buy by **estimation** without the use of a calculator. Show all working clearly. [3]

- 6 (a) Expand and simplify $2(3 - x) - (-4xy + 5x + 1)$. [2]
- (b) Expand $-4h + 2(6h + 10hk)$ and factorise it completely. [2]
- (c) Simplify $1 + \frac{x-1}{8} - \frac{3x+2}{12}$. [4]

- 7 Given the formula $p = qr + \frac{s}{r}$, find
- (a) the value of p when $q = -2$, $r = -13$ and $s = 39$, [2]
- (b) the value of s when $p = 48$, $q = \frac{1}{5}$ and $r = 15$. [2]

- 8 Solve each of the following equations.

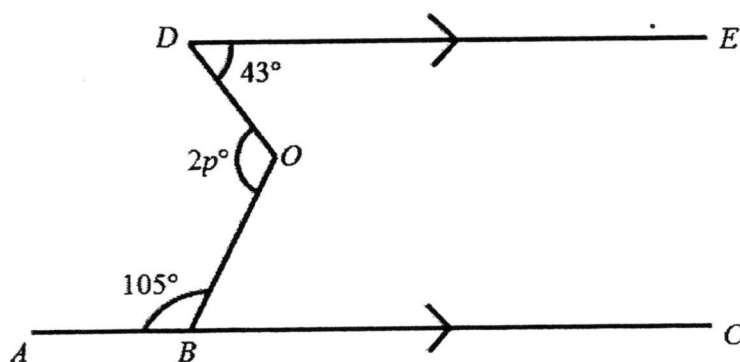
- (a) $2(-7x + 3) = 4(-8x)$ [2]
- (b) $\frac{y}{4} - \frac{y+2}{3} = \frac{5-3y}{6}$ [3]
- (c) $\frac{7}{z+4} = \frac{3}{2z-1}$ [3]

- 9 Amy is 4 years younger than Belle and Carina is twice as old as Belle. It is given that Belle's age is y and the sum of their ages is 68.

- (a) Express the ages of Amy and Carina in terms of y . [1]
- (b) Form an algebraic equation in y and solve it to find their ages. [3]

- 10 The denominator of a fraction is 4 less than three times of its numerator. If 6 is added to the both the numerator and the denominator, the new fraction is equivalent to $\frac{5}{7}$. Find the original fraction. [4]

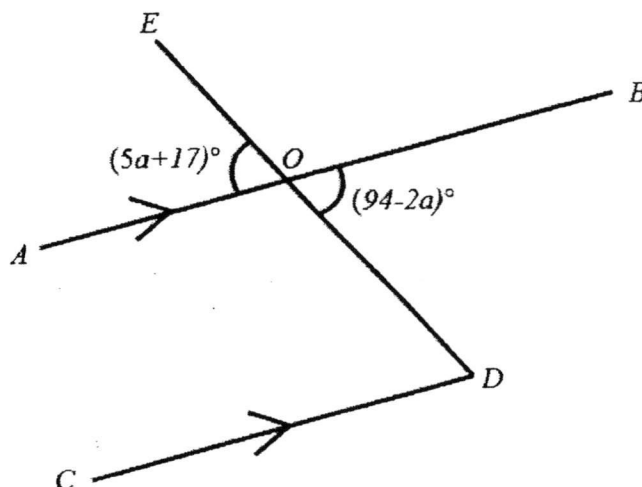
- 11 In the following figure, ABC and DE are parallel lines.
 $\angle ABO = 105^\circ$, $\angle BOD = 2p^\circ$ and $\angle ODE = 43^\circ$.



Find the unknown value of p , showing your reason(s) clearly.

[4]

- 12 In the following figure, AB and DE are straight lines that intersect each other at point O and AB is parallel to CD . $\angle AOE = (5a + 17)^\circ$ and $\angle BOD = (94 - 2a)^\circ$.



By showing your reason(s) clearly, find

- (a) the value of a ,
- (b) $\angle CDE$,
- (c) reflex $\angle BOE$.

[2]

[1]

[3]

Secondary 1 Express MYE 2015 Maths Paper 2
Solution & Mark Scheme

1	(a)	HCF = $2 \times 3 \times 11$	M1
		= 66	A1
	(b)	Answer: 23	B1
		Reason: 23 is a prime number that has factors 1 and itself.	B1
2	(a)	Area of the square = $(2^{30} \times 3^{66}) \text{ cm}^2$	B1
	(b)(i)	$7x^2$	B1
	(ii)	$4(7x^2)$	M1 (allow e.c.f.)
		= $28x^2$	A1
3	(a)(i)	Temperature increase = $\left(\frac{90}{15} \times 3\right) = 18^\circ\text{C}$	B1
		New temperature = $(-4 + 18)^\circ\text{C} = 14^\circ\text{C}$	B1
	(ii)	Temperature increase = $32 - (-4) = 36^\circ\text{C}$	B1
		Time taken for the temperature increase = $\left(\frac{36}{3} \times 15\right) \text{ mins} = 180 \text{ mins}$	B1
	(b)	Temperature decrease = $50 - (-2) = 52^\circ\text{C}$	B1
		Rate of decrease in temperature = $\frac{52}{16}^\circ\text{C} / \text{min} = 3.25^\circ\text{C} / \text{min}$	B1
4	(a)	Fraction of musicians = $4 \times \frac{3}{16} = \frac{12}{16}$ or $\frac{3}{4}$	B1
		Fraction of actors = $1 - \frac{3}{16} - \frac{3}{4} = \frac{1}{16}$	B1
	(b)	Fraction of adult actors = $\frac{3}{5} \times \frac{1}{16} = \frac{3}{80}$	M1 (allow e.c.f.)
		3 units – 48 participants 1 unit – 16 participants	M1
		80 units – $80 \times 16 = 1280$ participants	A1
		Accept also : 3 units – 48 participants 1 unit – 16 participants 5 units – $16 \times 5 = 80$ participants Total number of participants = $80 \times 16 = 1280$	M1 M1 A1

5		Total cost of 3 items B, D and F = \$ (7 + 8.50 + 14)	M1 (estimation method)
		= \$ 29.50	B1
		Ans : Items B, D and F	A1
6	(a)	$2(3 - x) - (-4xy + 5x + 1)$	
		$= 6 - 2x + 4xy - 5x - 1$	M1
		$= 5 - 7x + 4xy$	A1
	(b)	$-4h + 2(6h + 10hk)$	
		$= -4h + 12h + 20hk$	M1
		$= 8h + 20hk$	
		$= 4h(2 + 5k)$	A1
	(c)	$1 + \frac{x-1}{8} - \frac{3x+2}{12}$	
		$= \frac{24}{24} + \frac{3(x-1)}{24} - \frac{2(3x+2)}{24}$	M1 ($1 = \frac{24}{24}$) M1 (common denominator)
		$= \frac{24+3x-3-6x-4}{24}$	M1 (expansion)
		$= \frac{17-3x}{24}$	A1
7	(a)	$p = 23$	B2
	(b)	$48 = 3 + \frac{s}{15}$	M1
		$\frac{s}{15} = 45$	
		$s = 675$	A1
8	(a)	$2(-7x + 3) = 4(-8x)$	
		$-14x + 6 = -32x$	M1
		$18x = -6$	
		$x = -\frac{1}{3}$	A1
	(b)	$\frac{y}{4} - \frac{y+2}{3} = \frac{5-3y}{6}$ $\frac{3y - 4(y+2)}{12} = \frac{2(5-3y)}{12}$	M1 (change to common denominator) Accept also: $\frac{12y}{4} - \frac{12(y+2)}{3} = \frac{12(5-3y)}{6}$ or $\frac{18y}{(4)(3)(6)} - \frac{24(y+2)}{(4)(3)(6)} = \frac{12(5-3y)}{(4)(3)(6)}$

			$\frac{3y - 4y - 8}{12} = \frac{10 - 6y}{12}$	
			$3y - 4y - 8 = 10 - 6y$	
			$-y - 8 = 10 - 6y$	
			$5y = 18$	M1
			$y = 3.6 \text{ or } 3\frac{3}{5}$	A1
		(c)	$\frac{7}{z+4} = \frac{3}{2z-1}$	
			$7(2z-1) = 3(z+4)$	M1
			$14z - 7 = 3z + 12$	M1
			$11z = 19$	
			$z = 1\frac{8}{11}$	A1
9	(a)		Amy: $(y-4)$ years old Carina: $2y$ years old	B1 (both correct)
	(b)		$y + (y-4) + 2y = 68$ $4y - 4 = 68$ $4y = 72$ $y = 18$	M1 (allow e.c.f.) M1
			Belle: 18 years old Amy: 14 years old Carina: 36 years old	A1 (all correct)
10			Let the numerator be x . Denominator = $3x - 4$	
			$\frac{x+6}{3x-4+6} = \frac{5}{7}$	B1 (show denominator of original fraction = $3x - 4$) M1 (LHS is an algebraic fraction of 1 variable and RHS is the equivalent fraction $\frac{5}{7}$)
			[After solving the equation for x] $x = 4$	M1
			Original fraction = $\frac{4}{3(4)-4} = \frac{4}{8} \text{ or } \frac{1}{2}$	A1

	11		$180^\circ - 105^\circ = 75^\circ$ (int. $\angle$ s)	B1
			$2p^\circ = 43^\circ + 75^\circ$ (alt. $\angle$ s) $= 118^\circ$ $p^\circ = (118 \div 2)^\circ$ $= 59^\circ$ $\therefore p = 59$	M1 B1 A1 Accept also: other methods using other reasons like adj. $\angle$ s on st. line and sum of $\angle$ s in a Δ . *Maximum deduction of 1 mark for wrong / incomplete / missing reason(s).
	12	(a)	$5a + 17 = 94 - 2a$ (vert. opp. $\angle$ s) $a = 11$	M1 A1
		(b)	$\angle CDE = \angle AOE$ (corr. $\angle$ s, $AB \parallel CD$) $= [5(11) + 17]^\circ$ $= 72^\circ$	B1 *Only for 12(a) and 12(b) : maximum deduction of 1 mark for wrong / incomplete / missing reason(s).
		(c)	$\angle BOE = 180^\circ - 72^\circ$ (adj. $\angle$ s on st. line) $= 108^\circ$ Reflex $\angle BOE = 360^\circ - 108^\circ$ ($\angle$ s at a point) $= 252^\circ$	B1 M1 A1 Accept also: other methods *For 12(c), no deduction of marks for wrong / incomplete / missing reason(s).

--- The End ---