GeylangMethodistSchool (Secondary)
Mid - Year Examination 2014

MARKING SCHEME

MATHEMATICS

Paper 2 **1 Express**

Additional materials :Writing Paper **1 hour 30 minutes**
1 Graph Paper

Setter : Ms Ng Siew Lee **14 May 2014**

READ THESE INSTRUCTIONS FIRST

Write your name, index number and class 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 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 the loss of marks.
Calculators should be used 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 50.

This document consists of 4 printed pages.

[Turn over

Total Score: **[50 marks]**

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1 A sum of money was divided between these people.

Angela received $\frac{1}{2}$ of the money.

Ben received $\frac{1}{3}$ of the money.

Charles received the remainder.

(a) Ben received \$10. Find the amount of money Angela received. [2]

1 unit —— \$10 M1
3 units ----- \$30
Angela received $\$\left(\frac{1}{2}\times 30\right)=\$15$ A1

(b) Find the fraction of money Charles received. [1]

Fraction of money Charles received $= 1-\left(\frac{1}{2}+\frac{1}{3}\right)=\frac{1}{6}$ A1

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2 **(a)** If p and q are factors of a number m, then the number pq is also a factor of the number m.
Give an example to show that the above statement is false. [2]

Suppose $p = 2$ and $q = 4$ and $m = 4$, then p and q are factors of 4 but 8 is not a factor of 4.*[Any example that can refute the statement]*
Able to give correct values of p, q and m [1M].
Able to explain [1M]

(b) If m is the LCM of p and q, then m is divisible by the factors of both p and q.
Determine whether the above statement is always true or false. If it is true, explain your resoning. If it is false, give a counterexample. [2]

The statement is true. A1
This is because LCM of the numbers is divisible by each number, hence it must be divisble by the factors of each number. A1

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3 In 2010, a train travelling from City A to City B made two trips a day. The average number of passengers on each trip was 400.

(a) How many passengers did the train carry in one week? [1]

No. of passengers per day = 400 x 2 = 800

No. of passengers per week = 800 x 7 = 5600 A1

(b) In 2011, the number of passengers per week was 5% higher than in 2010.
In 2012, the number of passengers per week was 10% higher than in 2011.
Find the percentage increase in the number of passengersper week from 2010 to 2012. [3]

Number of passengers in 2011 = 105% of 5600 = 5880
Number of passengers in 2012 = 110% of 5880 = 6468 M1
Increase of passengers from 2010 to 2012 = 6468 – 5600 = 868 M1
Percentage increase $= \frac{868}{5600} \times 100\% = 15\frac{1}{2}\%$ A1

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4 MrSen has a rectangular piece of wood with dimensions 150 cm by 280 cm.
He wants to cut small squares of equal size from the piece of wood.

(a) Find the largest possible length of the side of a square that he can cut without any wastage. [2]

5	150, 280
2	30, 56
	15, 28

M1

Largest possible length of the side of a square = 5 x 2 = 10 A1

(b) Hence, find the number of squares he can cut from the wood. [2]

The number of squares can be cut = 15 x 28 M1
= 420 A1

5 Three lightships flash at the same time at 3.50 a.m. The first lightship flashes every 12 seconds, the second lightship every 14 seconds and the third lightship every 20 seconds.
At what time will the three lightships next flash together?
[3]

$12 = 2^2 \times 3$, $14 = 2 \times 7$, $20 = 2^2 \times 5$

LCM = 2^2 x 3 x 7x 5 = 420 seconds M1
420 sec = 7 min M1
They will leave the room again at 3.57 a.m. A1

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6 A company manufactures biscuits.

(a) One batch of biscuits contains 300 grams of dried fruit. This consists of almonds and raisins, with masses in the ratio 2 : 3resepctively.Find the mass of the almonds. [2]

5 units ------- 300 g

M1

1 unit ------ 60 g

2 units ----- 120 g

Mass of almonds = 120 g A1

(b) The mixture used to make one batch of biscuits has a mass of 20 kg. The mixture loses 15% of its mass when it is cooked to make the biscuits.

(i) Calculate the mass of one batch of biscuits. [1]

Mass of one batch of biscuits = 85% of 20 kg = 17 kg A1

(ii) Each biscuit has a mass of 17 grams.One batch of biscuits is put into packets.
Each packet contains 15 biscuits.Find the number of packets that can be filled, and the number of biscuitsremaining. [2]

17 kg = 17000 g
Mass of 1 packets of biscuits = 15 x 17 = 255 g M1
17000 ÷ 255 = 66. ....
No. of packets = 66 and the number of biscuits remaining = 10 A1

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7 Ann is currently x years old. Her father is three times as old as she is.

(a) Find, in terms of x, Ann's age and her father's age in five years' time. [2]

Ann's age = $x + 5$ A1
Father's age = $3x + 5$ A1

In five years' time, their total age will be 58 years.

(b) Using the above information, form an equation in x and hence, solve the equation. [2]

$x + 5 + 3x + 5 = 58$
$4x + 10 = 58$ A1
$4x = 48$
$x = 12$ A1

(c) Find the current ages of both Ann and her father. [2]

Ann's age is 12 A1
Father's age is 36 A1

(d) Ann's brother, Austin, is 10 years younger than her. In how many years' time will Ann be twice as old as Austin? [2]
Let t be the number of years.

$12 + t = 2\,(2 + t)$ M1
$12 + t = 4 + 2t$
$8 = t$ A1

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8 (a) Given that $\frac{2a+b}{2a-b} = \frac{3}{4}$ and $a = 3$, find the value of b. [3]

$\frac{2(3)+b}{2(3)-b} = \frac{3}{4}$
$\frac{6+b}{6-b} = \frac{3}{4}$ M1
$4(6 + b) = 3(6 - b)$
$24 + 4b = 18 - 3b$ M1
$7b = -6$
$b = -\frac{6}{7}$ A1

(b) Express $1 + \frac{m-9}{6} - \frac{2(3m-1)}{3}$ as a single fraction in its simplest form. [3]

$\frac{6}{6} + \frac{(m-9)}{6} - \frac{4(3m-1)}{6}$ M1
$= \frac{6 + (m-9) - (12m-4)}{6}$
$= \frac{6 + m - 9 - 12m + 4}{6}$ M1
$= \frac{1 - 11m}{6}$ A1

(c) A restaurant owner pays a waiter \$$y$ per week based on the formula

$$y = a + \frac{11n}{10},$$

where a is constant and n is the number of customers he serves per week.

Given that the waiter received \$454 for serving 140 customers in a particular week,

(i) find a. [2]

$$454 = a + \frac{11 \times 140}{10}$$ M1

$$454 = a + 154$$
$$a = 300$$ A1

(ii) Calculate the amount he received after serving 180 customers in one week. [1]

$$y = 300 + \frac{11 \times 180}{10} = 498$$
Amt received = \$498 [1]

(iii) At the end of another week, the waiter received \$520. Find the number of customers he served in that week. [2]

$$520 = 300 + \frac{11n}{10}$$ M1

$$220 = \frac{11n}{10}$$
$$n = \frac{2200}{11} = 200$$ A1

Number of customers served = 200

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9 The table below shows some values for the equation $y = 3 - 2x$.

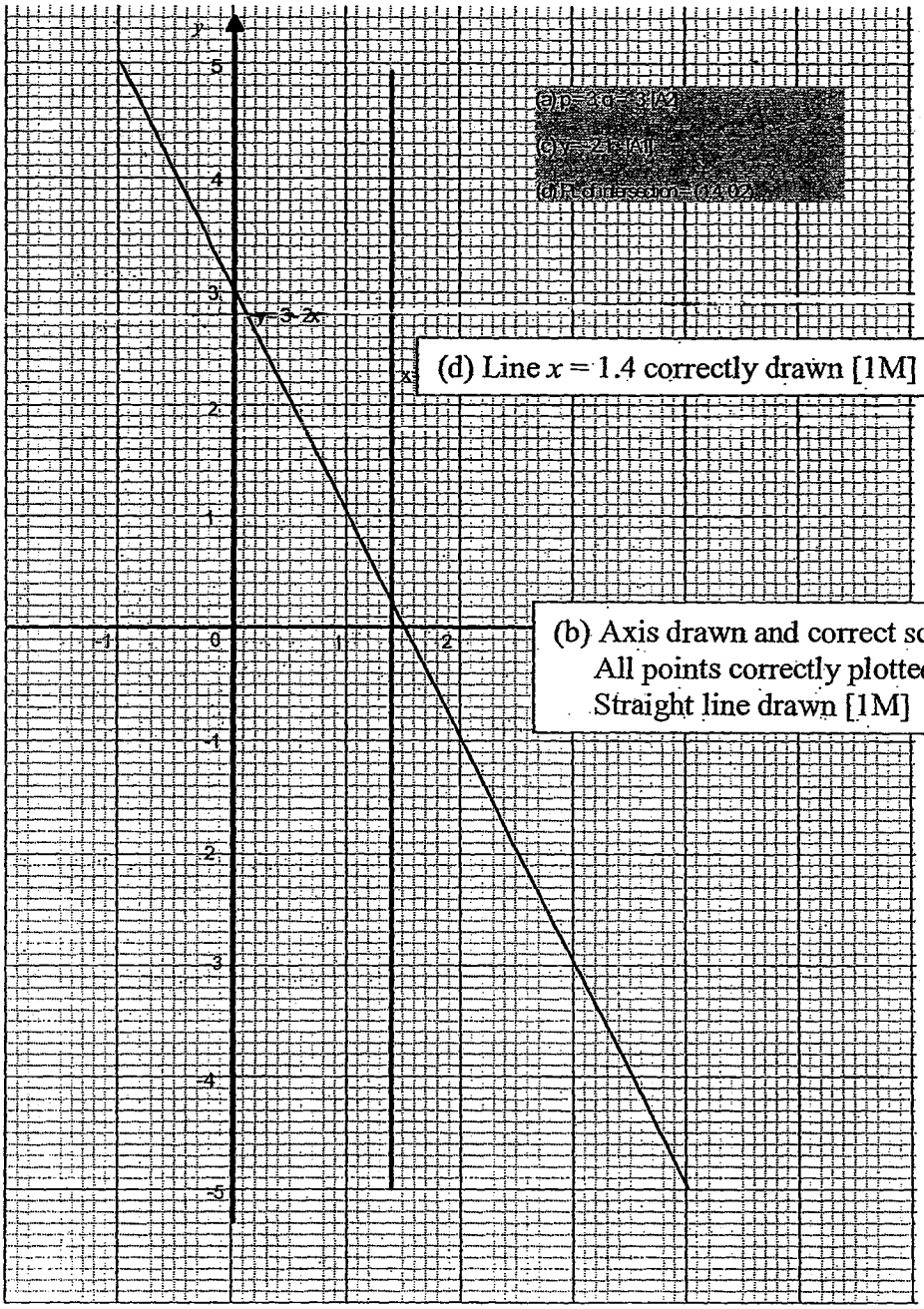
x	-1	0	1	2	3	4
y	5	p	1	-1	q	-5

(a) Calculate the values of p and q. [2]

(b) Using a scale of 2 cm to 1 unit for both axes, draw the graph $y = 3 - 2x$ for $-1 \le x \le 4$. [3]

(c) The point $(x, -1.2)$ lies on the graph. Find the value of x. [1]

(d) On the same axes, draw the line of $x = 1.4$. Find the coordinates of the point of intersection of the two lines. [2]



(d) Line $x = 1.4$ correctly drawn [1M]

(b) Axis drawn and correct scale [1M]
All points correctly plotted. [1M]
Straight line drawn [1M]