

Answer ALL questions. [50 marks]

- 1 Kim bought a MP3 player for \$89. One year later, he sold the MP3 player at Yahoo Auction for \$69. Calculate the percentage decrease in the price of the MP3 player.

Answer ..... % [2]

- 2 If  $a : b = 5 : 6$  and  $b : c = 9 : 11$ , find  $a : b : c$ .

Answer ..... [2]

- 3 Simplify  $\frac{4p + 7}{2} + \frac{3p - 3}{5}$ .

Answer ..... [3] 12

- 4 Three bells ring at intervals of 6 minutes, 15 minutes and 24 minutes respectively. If they ring together at 8.00 am, at what time will they next ring together again?

*Answer* ..... [3]

- 5 A sequence is 1, 3, 6, 10, ..., 21, ...

- (a) Write down the 5<sup>th</sup> term.  
(b) Write down the  $n^{\text{th}}$  term.  
(c) Hence, write down 101<sup>st</sup> term.

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

(b) ..... [1]

(c) ..... [1]

## 6 Factorise

(a)  $(2 - m)(2 - m) + (n - m)(2 - m).$

(b)  $x + y - xz - yz.$

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

(b) ..... [2]

## 7 Evaluate

(a)  $\sqrt{1.3^2 + 19.87^2},$

(b) 
$$\frac{5\frac{3}{4} + 2\frac{2}{3} \times 1\frac{5}{16}}{\frac{2}{5} \div \frac{4}{15}}.$$

Give both answers correct to 2 significant figures.

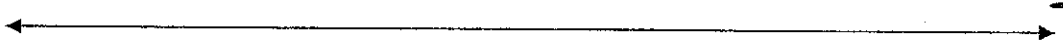
Answer (a) ..... [2]

(b) ..... [2]

13

- 8 (a) Arrange the numbers  $\sqrt{25}$ ,  $-6$ ,  $2^2$ ,  $0$ ,  $\sqrt[3]{8}$  on a number line.
- (b) Using the numbers in part (a), subtract the smallest number from the biggest number.

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



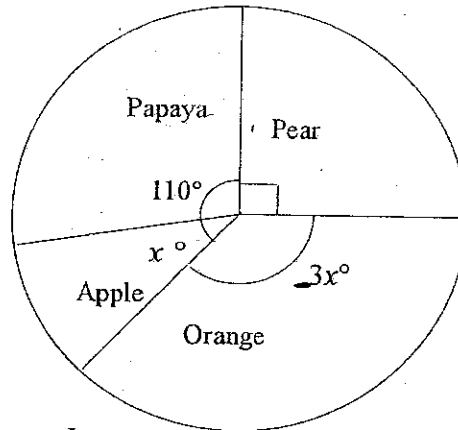
Answer (b) ..... [2]

- 9 A 28-litre solution is formed by mixing chemical A and water in the ratio 2 : 3.
- (a) How many litres of water are there in the solution?
- (b) If 8 litres of the solution are used and 8 litres of chemical A are added to the remaining solution, write down in its simplest form, the ratio of chemical A to water in the resulting solution.

Answer (a) ..... litres [2]

(b) ..... [3]

- 10 A survey was conducted on a class of 36 pupils to find out their favourite fruit. The results are represented on the given pie chart.



- (a) How many pupils chose orange as their favourite fruit?
- (b) Later in the year, 3 pupils joined the class and said their favourite fruit is orange. What is the percentage increase in the number of pupils who chose orange as their favourite fruit?

Answer (a).....pupils [3]

(b).....% [2]

- 11 On Justin's farm, there were  $3c$  cows,  $5p$  pigs and  $11d$  ducks. Express in terms of  $c$ ,  $p$  and/or  $d$ :
- the total number of animals on the farm,
  - the total number of wings among the animals and
  - the total number of legs of the remaining animals if 3 cows, 2 pigs and 4 ducks were sold.

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

(b) ..... [1]

(c) ..... [3]

- 12 In a quiz with 10 questions, each correct answer is awarded 4 marks, for each wrong answer, 2 marks are deducted and for each unanswered question, 1 mark is deducted.

- Find the maximum score for the quiz.
- Find the lowest possible score for the quiz.
- Momo sat for the quiz. He had 7 correct answers, 2 wrong answers and 1 blank. How many marks did he score?
- How many correct answers must one get to score 17 marks in this quiz?

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

(b) ..... [1]

(c) ..... marks [2]

(d) ..... [1]

- 13 Three companies, Linz, Poch and Koro, offer cars for hire. Their charges, based on the number of days for which a car is hired and the number of kilometres for which the car is driven, are shown in the following table:

Company	Cost (per day)	Cost (per kilometres)
Linz	\$120	Nil
Poch	Nil	55 cents
Koro	\$85	32 cents

- (a) Ken wishes to hire a car for 2 days to drive 296 kilometres.  
Find the difference between the maximum and minimum charges he might have to pay.
- (b) Norman wishes to hire a car for 5 days and finds that Linz and Poch make equal charges. How far does he intend to drive?

Answer (a) \$..... [3]

(b) ..... km [2]

End of Paper 1

Answer ALL questions. [50 marks]

1. a) Evaluate  $\frac{3.15^2 \times 5.28^3}{92.58}$ , giving your answer correct to 2 decimal places. [2]
- b) Given that  $74088000 = 2^m \times 3^3 \times 7^3 \times 5^n$ , find the values of  $m$  and  $n$ . [2]
- c) Evaluate  $\sqrt{0.02}$ , giving your answer correct to 3 significant figures. [2]
2. a) Simplify:  $8ab^2 \times a^3 b^4 \div (2ab)^2$  [3]
- b) Simplify:  $\frac{2(x+1)}{3} - \frac{x-2}{4} + \frac{x}{6}$  [3]
- c) Given that  $a = -2$ ,  $b = 3$  and  $c = -5$ , find the value of  $(2a + b - c)^2$ . [1]
3. a) Solve the equations:  
 i)  $3.2x - 1.5 = 1.2 - 1.3x$  [3]  
 ii)  $5y - [15 - 2(y - 3)] = 8 - y$  [3]
- b) Find the sum of  $8x^3 + 7x^2$ ,  $4x^2 + 3x - 1$  and  $9x^3 + 8x^2 - 4$  [3]
- c) Subtract  $5x(2x - 4y)$  from  $7(3x^2 + xy)$  [3]
4. a) A car uses  $5\frac{3}{4}$  litres of petrol for 48 km. How far can it go with 23 litres of petrol. [2]
- b) There are 640 secondary one pupils in a school and  $\frac{5}{8}$  of them are girls and the rest are boys. If  $\frac{1}{8}$  of the girls and  $\frac{1}{12}$  of the boys join the choir, how many secondary one pupils join the choir? [3]
- c) Peter distributed 98 strawberry sweets, 42 orange sweets and 140 lemon sweets equally to a group of students.  
 i) Calculate the largest possible number of students in the group. [3]  
 ii) Hence, calculate the total number of sweets each student gets. [3]

5. a) Factorise  $7rs - 28st + 49rst$  [2]
- b) Factorise  $24x^2y^2 - 54w^2$  [2]
- c) Study the number pattern below:

Line	Number Pattern
1	$1 + 3 = 4$
2	$1 + 3 + 5 = 9$
3	$1 + 3 + 5 + 7 = 16$
	⋮
	⋮
$N$	$1 + 3 + 5 + 7 + \dots + m = 100$

- i) Write down the 6<sup>th</sup> line of the sequence. [2]
- ii) Find the values of  $N$  and  $m$ . [2]
- 6) The frequency table shows the test marks scored by 30 students in a test.

Marks ( $x$ )	Frequency
$40 < x \leq 45$	5
$45 < x \leq 50$	4
$50 < x \leq 55$	3
$55 < x \leq 60$	5
$60 < x \leq 65$	$n$
$65 < x \leq 70$	6

- a) Find the value of  $n$ . [1]
- b) On a piece of graph paper and using 2 cm to represent 5 marks on the horizontal axis and 2 cm to represent 1 student on the vertical axis, construct a histogram to represent the data. [3]
- c) What percentage of the students scored 50 marks and below? [2]

End of Paper

Answer ALL questions. [50 marks]

- 1 Kim bought a MP3 player for \$89. One year later, he sold the MP3 player at Yahoo Auction for \$69. Calculate the percentage loss made by Kim.

$$\% \text{ loss} = \frac{89 - 69}{89} \times 100\% \quad [\text{M1}]$$

$$\text{Answer} \dots\dots\dots 22\frac{42}{89} \quad [\text{A1}] \text{ or } 22.47 \text{ or } 22.5 \quad \dots\dots\dots \% \quad [2]$$

- 2 If  $a : b = 5 : 6$  and  $b : c = 9 : 11$ , find  $a : b : c$ .

$$\begin{array}{l} a : b : c \\ 5 : 6 \\ \phantom{5 : } 9 : 11 \\ 15 : 18 : 22 \\ \text{[B1]} \end{array}$$

$$\text{Answer} \dots\dots\dots 15 : 18 : 22 \quad [\text{B1}] \quad \dots\dots\dots [2]$$

- 3 Simplify  $\frac{4p + 7}{2} + \frac{3p - 3}{5}$ .

$$\begin{aligned} & \frac{4p + 7}{2} + \frac{3p - 3}{5} \\ = & \frac{5(4p + 7) + 2(3p - 3)}{10} \quad [\text{M1}] \end{aligned}$$

$$= \frac{20p + 35 + 6p - 6}{10} \quad [\text{M1}]$$

$$\text{Answer} \dots\dots\dots \frac{26p + 29}{10} \quad [\text{A1}] \quad \dots\dots\dots [1]$$

- 4 Three bells ring at intervals of 6 minutes, 15 minutes and 24 minutes respectively. If they ring together at 8.00 am, at what time will they next ring together again?

3	6, 15, 24
2	2, 5, 8
2	1, 5, 4
2	1, 5, 2
5	1, 5, 1
	1, 1, 1

$$\begin{aligned} \text{LCM} &= 3 \times 2 \times 2 \times 2 \times 5 \\ &= 120 \text{ min} \end{aligned} \quad [\text{M1}]$$

$$\begin{aligned} &8.00 + 2.00 \quad [\text{M1}] \\ &= 10 \text{ 00 hours or } 10.00 \text{ am} \quad [\text{A1}] \end{aligned}$$

Answer ..... [3]

- 5 A sequence is 1, 3, 6, 10, ..., 21, ...
- (a) Write down the 5<sup>th</sup> term.
- (b) Write down the  $n^{\text{th}}$  term.
- (c) Hence, write down 101<sup>st</sup> term.

$$\begin{aligned} \text{Answer (a)} & \dots \frac{15}{n^2 + n} \quad [\text{B1}] \dots [1] \\ & \dots \frac{\quad}{2} \quad [\text{B1}] \\ \text{(b)} & \dots \frac{\quad}{2} \dots [1] \\ \text{(c)} & \dots 5151 \quad [\text{B1}] \dots [1] \end{aligned}$$

6 Factorise

(a)  $(2 - m)(2 - m) + (n - m)(2 - m)$ .

(b)  $x + y - xz - yz$ .

(a)  $(2 - m)(2 - m + n - m)$  [M1]

(b)  $(x + y) - z(x + y)$  [M1]

Answer (a)  $(2 - m)(2 - 2m + n)$  [A1] [2]

(b)  $(x + y)(1 - z)$  [A1] [2]

7 Evaluate

(a)  $\sqrt{1.3^2 + 19.87^2}$ ,

(b)  $\frac{5\frac{3}{4} + 2\frac{2}{3} \times 1\frac{5}{16}}{\frac{2}{5} \div \frac{4}{15}}$ .

Give both answers correct to 2 significant figures.

(a)  $\sqrt{396.5069}$  or 19.91248101 [B1] or

(b)  $\frac{9\frac{1}{4}}{1\frac{1}{2}}$  or  $6\frac{1}{6}$  [B1] or

\*\* Students are awarded one mark if they get the answer but not able to round off to the correct significant figures.

Answer (a) ..... 20 [B2] ..... [2]

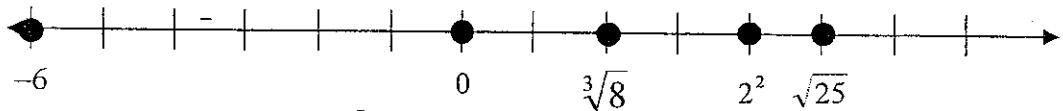
6.2 [B2]

(b) ..... [2]

8 (a) Arrange the numbers  $\sqrt{25}$ ,  $-6$ ,  $2^2$ ,  $0$ ,  $\sqrt[3]{8}$  on a number line.

(b) Using the numbers in part (a), subtract the smallest number from the biggest number.

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



(b)  $5 - (-6)$  [m1]

Answer (b) 11 [A1] ..... [2]

9 A 28-litre solution is formed by mixing chemical A and water in the ratio 2 : 3.

(a) How many litres of water are there in the solution?

(b) If 8 litres of the solution are used and 8 litres of chemical A are added to the remaining solution, write down in its simplest form, the ratio of chemical A to water in the resulting solution.

(a) no. of litres of water =  $\frac{3}{5} \times 28$  [M1]

(b) no. of litres of chemical A in remaining solution =  $\frac{2}{5} \times 20$  [M1]

= 8 litres OR

No. of litres of water in remaining solution = 12 litres [M1]

Chemical A : Water

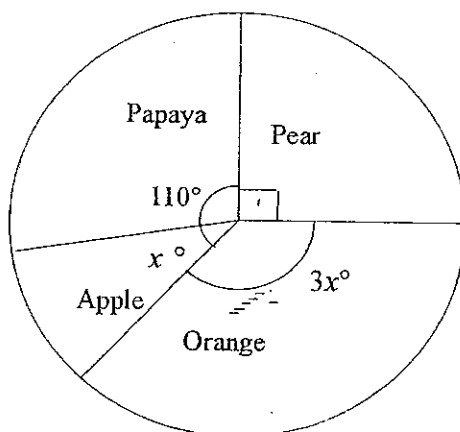
8 + 8 : 12 [M1]

4 : 3

Answer (a) 16.8 [A1] ..... litres [2]

(b) 4 : 3 [A1] ..... [3]

- 10 A survey was conducted on a class of 36 pupils to find out their favourite fruit. The results are represented on the given pie chart.



- (a) How many pupils chose orange as their favourite fruit?
- (b) Later in the year, 3 pupils joined the class and said their favourite fruit is orange. What is the percentage increase in the number of pupils who chose orange as their favourite fruit?

(a)  $110^\circ + 90^\circ + x^\circ + 3x^\circ = 360^\circ$  [M1]

$$4x^\circ = 160^\circ$$

$$x^\circ = 40^\circ$$

No. of pupils =  $\frac{3 \times 40^\circ}{360^\circ} \times 36$  [M1]

(b) % increase =  $\frac{3}{12} \times 100\%$  [M1]

Answer (a)..... 12 [A1]..... pupils [3]

(b)..... 25 [A1]..... % [2]

19

11 On Justin's farm, there were  $3c$  cows,  $5p$  pigs and  $11d$  ducks. Express in terms of  $c$ ,  $p$  and/or  $d$ :

- (a) the total number of animals on the farm,
- (b) the total number of wings among the animals and
- (c) the total number of legs of the remaining animals if 3 cows, 2 pigs and 4 ducks were sold.

(c) total number of legs =  $4(3c - 3) + 4(5p - 2) + 2(11d - 4)$  [M1]

$= 12c - 12 + 20p - 8 + 22d - 8$  [M1]

Answer (a)  $3c + 5p + 11d$  [B1] ..... [1]

(b)  $22d$  [B1] ..... [1]

(c)  $12c + 20p + 22d - 28$  [A1] [3]

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- (a) Find the maximum score for the quiz.
- (b) Find the lowest possible score for the quiz.
- (c) Momo sat for the quiz. He had 7 correct answers, 2 wrong answers and 1 blank. How many marks did he score?
- (d) How many correct answers must one get to score 17 marks in this quiz?

(c) no. of marks =  $7 \times 4 + 2 \times (-2) + 1 \times (-1)$  [M1]

Answer (a)  $40$  [B1] ..... [1]

(b)  $-20$  [B1] ..... [1]

(c)  $23$  [A1] ..... marks [2]

(d)  $6$  [B1] ..... [1]

- 13 Three companies, Linz, Poch and Koro, offer cars for hire. Their total charges, based on the number of days for which a car is hired and the number of kilometres for which the car is driven, are shown in the following table:

Company	Cost (per day)	Cost (per kilometres)
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Poch	Nil	55 cents
Koro	\$85	32 cents

- (a) Ken wishes to hire a car for 2 days to drive 296 kilometres.  
Find the difference between the largest and smallest charges he might have to pay.
- (b) Norman wishes to hire a car for 5 days and finds that Linz and Poch make equal charges. How far does he intend to drive?

(a) Linz's charge =  $2 \times \$120$   
= \$240

Poch's charge =  $296 \times \$0.55$   
= \$162.80

Koro's charge =  $2 \times \$85 + 296 \times \$0.32$  [M1]  
= \$264.72

Difference =  $\$264.72 - \$162.80$  [M1]  
= \$101.92

(b) Linz's charges =  $\$120 \times 5$   
= \$600

Distance travelled =  $\frac{600}{0.55}$  [M1]

Answer (a) \$ 101.92 [A1] [3]

(b) 1090 (3SF) [A1] km [2]  
or  $1090 \frac{10}{11}$

End of Paper 1

### Mid-Year Exam Sec 1 Express Paper 2 Answers

1a) 15.78 (2 dec pl)

b)  $m = 2, n = 1$

c) 0.141 (3sf)

2a)  $2a^2b^4$

b)  $\frac{7x+14}{12}$

c) 16

3a) i)  $1.9x - 2.7$

a) ii)  $7y - 21$

b)  $17x^3 + 19x^2 + 3x - 5$

c)  $11x^2 + 27xy$

4a) 192 km

b) 70 pupils

c) i) 14

ii) 20 sweets/packet

5a)  $7s(r - 4t + 7rt)$

b)  $(m - 2n)(3 + 5y)$

c) i)  $1+3+5+7+9+11+13 = 49$

ii) N is the 9<sup>th</sup> line,  $m = 19$

6a)  $n = 7$

b) graph

c) 30%