

Mid Year Examination Paper 2

INSTRUCTION TO CANDIDATES:

1. Answer **all** questions.
2. Write your answers and working in the spaces provided.
3. Omission of essential working will result in loss of marks.
4. Calculators may be used in this paper.
5. If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer correct to three significant figures. Give answers in degrees correct to one decimal place.

Marks Obtained
50

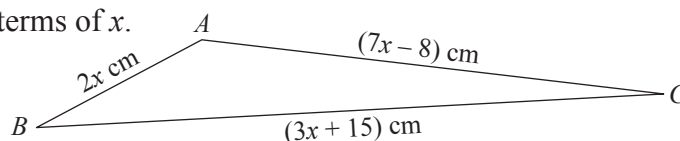
- 1 (a) Evaluate $\frac{4\frac{1}{2} - 1\frac{3}{7}}{4\frac{3}{28}}$, giving your answer as a fraction.
- (b) Estimate $\sqrt[3]{28} - 1.9^2$.

Ans: (a) _____ [1]

(b) _____ [2]

- 2 In the figure, the perimeter of $\triangle ABC$ is 55 cm.

- (a) Find the perimeter of $\triangle ABC$ in terms of x .
- (b) Find the length of side BC .



Ans: (a) _____ cm [2]

(b) _____ cm [3]

- 3** The scores of 2 students in a Mathematics and a Science examinations are shown in the table.

Student	Mathematics / 100	Science / 100
Xin Min	$x - 2y$	$2x - 5y$
Chan Seng	$7y + x$	$x + 4y$

- (a) Find Xin Min's and Chan Seng's total score for Mathematics.
(b) Chan Seng scored higher in Mathematics than in Science. Find the difference in scores in terms of x and y .
(c) Find Chan Seng's average score for his two subjects if $x = 50$ and $y = 4$.

Ans: (a) _____ [2]

(b) _____ [2]

(c) _____ [3]

- 4** A fruit grocer has three different types of fruits. There are 84 apples, 60 oranges and 72 guavas. The fruits are mixed into packets with equal number of each type of fruit per packet.

- (a) Find the maximum number of packets he can have.
(b) How many apples are there in each packet?
(c) If each packet is sold at \$6.50, how much will he receive if he sold all the packets of fruits?

Ans: (a) _____ [2]

(b) _____ [1]

(c) \$ _____ [1]

- 5** A number sequence is given as follows: $x - 1, x + 1, x + 3, \underline{\hspace{2cm}}$.
- (a) State the difference between two consecutive terms.
(b) State the next term, in terms of x .

Ans: (a) _____ [1]

(b) _____ [1]

- 6** Solve the following equations.

(a) $2x + 7 = x - 11 + 4x$

(b) $4(x - 2) = -(x + 2)$

Ans: (a) $x =$ _____ [2]

(b) $x =$ _____ [3]

- 7** (a) Evaluate $\sqrt{2025}$ using prime factorisation.
(b) Find the smallest k such that $2025k$ is a multiple of 6.
(c) Find the smallest value of x , given that the LCM of $2^8 \times 7^x$ and $2^7 \times 7^2$ is $2^8 \times 7^2$.

Ans: (a) _____ [2]

(b) $k =$ _____ [2]

(c) $x =$ _____ [1]

- 8** James' pocket money is \$4 per day for x days. Within the x days, he spent \$2.50 per day for the first 7 days and then spent \$3 per day for the remaining days. He saved the rest of the money.
- (a) Find the total amount he spent in terms of x during the x days. Simplify your answer.
(b) Given that he saved \$23.50, form an equation in terms of x and calculate the total pocket money he received altogether.

Ans: (a) \$ _____ [2]

(b) \$ _____ [3]

- 9 The diagram below shows different types of diamond cuts. The more cuts the diamond has, the better the quality of the diamond.

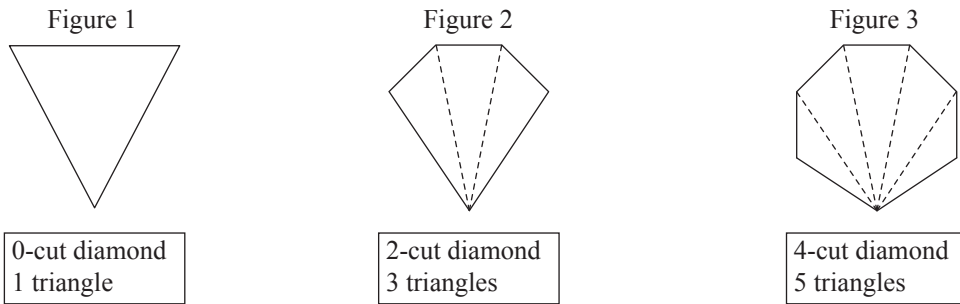


Figure	1	2	3	4	...	n
Number of cuts	0	2	4	d	...	C_n
Number of triangles	1	3	5	t	...	T_n

- (a) Find the value of d and the value of t .
- (b) Find the number of triangles present for Figure 8.
- (c) Write down an expression, in terms of n , for
- (i) the number of diamond cuts, C_n , in Fig n ,
 - (ii) the number of triangles, T_n , in Fig n .

Ans: (a) $d =$ _____, $t =$ _____ [2]

(b) _____ [1]

(c) (i) $C_n =$ _____ [1]

(ii) $T_n =$ _____ [1]

10 Simplify the following expressions.

(a) $3y - [3 - 2(y - 3)]$

(b) $(3b)^2 - 5b \times 7c + b^2$

Ans: (a) _____ [2]

(b) _____ [3]

11 (a) Let x be an even number.

(i) Express the next two even numbers in terms of x .

(ii) Express the sum of the three consecutive even numbers in terms of x .

Ans: (a) (i) _____ [1]

(ii) _____ [1]

(b) Peter received $\$(x + 2y - 4)$ and George received $\$(3x - y + 6)$. Given that George received more than Peter, express the difference in the amount they received in terms of x and y .

Ans: (b) \$ _____ [2]

Solutions to:

Mid Year Examination Paper 2

$$1. (a) \frac{4\frac{1}{2} - 1\frac{3}{7}}{4\frac{3}{28}} = \frac{3\frac{1}{14}}{4\frac{3}{28}}$$

$$= \frac{86}{115}$$

$$(b) \sqrt[3]{28} - 1.9^2 \approx \sqrt[3]{27} - 2^2$$

$$= 3 - 4$$

$$= -1$$

$$2. (a) \text{Perimeter of } \triangle ABC$$

$$= 2x + (7x - 8) + (3x + 15)$$

$$= (12x + 7) \text{ cm}$$

$$(b) \text{Since the perimeter is 55 cm,}$$

$$12x + 7 = 55$$

$$12x = 48$$

$$x = 4$$

To find BC , substitute $x = 4$ into $3x + 15$.

$$\text{Length } BC = 3(4) + 15$$

$$= 12 + 15$$

$$= 27 \text{ cm}$$

$$3. (a) \text{Total score} = (x - 2y) + (7y + x)$$

$$= x - 2y + 7y + x$$

$$= 2x + 5y$$

$$(b) \text{Difference in scores} = (7y + x) - (x + 4y)$$

$$= 7y + x - x - 4y$$

$$= 3y$$

$$(c) \text{Chan Seng's total score for Mathematics and Science} = (7y + x) + (x + 4y)$$

$$= 7y + x + x + 4y$$

$$= 11y + 2x$$

Substituting $x = 50$ and $y = 4$ into $11y + 2x$.

$$\text{Chan Seng's total score} = 11(4) + 2(50)$$

$$= 144$$

$$\text{Average score} = 144 \div 2$$

$$= 72$$

$$4. (a) \begin{array}{r|l} 2 & 84, 60, 72 \\ 2 & 42, 30, 36 \\ 3 & 21, 15, 18 \\ & 7, 5, 6 \end{array}$$

$$\text{HCF}(84, 60, 72) = 2^2 \times 3$$

$$= 12$$

He can have a maximum of 12 packets.

$$(b) \text{Number of apples per packet} = 84 \div 12$$

$$= 7$$

$$(c) \text{Total amount received} = 12 \times \$6.50$$

$$= \$78$$

$$5. (a) \text{Difference} = (x + 3) - (x + 1) \text{ or } x + 1 - (x - 1) = 2$$

$$= x + 3 - x - 1$$

$$= 2$$

$$(b) \text{Next term} = x + 5$$

$$6. (a) \begin{array}{r} 2x + 7 = x - 11 + 4x \\ 2x + 7 = 5x - 11 \\ 2x - 5x = -7 - 11 \\ -3x = -18 \\ -3x = -18 \\ x = \frac{-18}{-3} \\ = 6 \end{array}$$

$$(b) \begin{array}{r} 4(x - 2) = -(x + 2) \\ 4x - 8 = -x - 2 \\ 4x + x = 8 - 2 \\ 5x = 6 \\ x = 1\frac{1}{5} \end{array}$$

$$7. (a) \begin{array}{r|l} 5 & 2025 \\ 5 & 405 \\ 3 & 81 \\ 3 & 27 \\ 3 & 9 \\ 3 & 3 \\ & 1 \end{array}$$

$$2025 = 3^4 \times 5^2$$

$$\therefore \sqrt{2025} = \sqrt{3^4 \times 5^2}$$

$$= 3^2 \times 5$$

$$= 45$$

$$(b) 6 = 2 \times 3$$

Since 6 has a factor 2 which is not a factor of 2025, $k = 2$.

$$(c) \begin{array}{r} 2^8 \times 7^x \\ 2^7 \times 7^2 \\ \hline \text{LCM} = 2^8 \times 7^2 \end{array}$$

Since the LCM is obtained by finding the highest power of each factor, x can be 0, 1 or 2.

\therefore Smallest value of $x = 0$.

$$8. (a) \text{Total amount spent} = 7 \times 2.50 + (x - 7) \times 3$$

$$= 17.50 + 3x - 21$$

$$= \$(3x - 3.50)$$

$$(b) \text{Total pocket money} = \$4x$$

$$\text{Total amount saved} = \$4x - \$(3x - 3.5)$$

$$= \$(x + 3.5)$$

Hence, $x + 3.50 = 23.50$

$$x = 23.50 - 3.50$$

$$= 20$$

Total pocket money = $\$4 \times 20 = \80

9. (a) $d = 6$
 $t = 7$
- (b) 15 triangles
- (c) (i) Using the formula $C_n = C_1 + (n - 1)d$ where
 first term, $C_1 = 0$ and
 common difference, $d = 2$,
 $C_n = 0 + (n - 1)(2)$
 $C_n = 2n - 2$
- (ii) Using the formula $T_n = T_1 + (n - 1)d$ where
 first term, $T_1 = 1$ and
 common difference, $d = 2$,
 $T_n = 1 + (n - 1)(2)$
 $T_n = 2n - 1$

10. (a) $3y - [3 - 2(y - 3)] = 3y - [3 - 2y + 6]$
 $= 3y - (9 - 2y)$
 $= 3y - 9 + 2y$
 $= 5y - 9$

(b) $(3b)^2 - 5b \times 7c + b^2 = 9b^2 - 35bc + b^2$
 $= 10b^2 - 35bc$

11. (a) (i) $x + 2$ and $x + 4$
 (ii) Sum $= x + (x + 2) + (x + 4)$
 $= 3x + 6$
- (b) Difference $= (3x - y + 6) - (x + 2y - 4)$
 $= 3x - y + 6 - x - 2y + 4$
 $= (2x - 3y + 10)$