

Name: _____ () Class: _____



華僑中學

HWA CHONG INSTITUTION

Practice Paper B

INTEGRATED MATHEMATICS

Level : Secondary One

Duration : 2 hours

Do not open this booklet until you are told to do so.

INSTRUCTIONS TO CANDIDATES

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

Answer **all** questions.

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 .

INFORMATION FOR CANDIDATES

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 80.

You are expected to use an electronic calculator to evaluate explicit numerical expressions.

The use of a graphing calculator is not permitted.

You are reminded of the need for clear presentation in your answers. Omission of essential working will result in loss of marks.

This question paper consists 6 printed pages, including this page.

- 1 (a) Estimate the value of $\frac{35.3 \times \sqrt[3]{1001.2}}{4.971^2}$ to 1 significant figure. [2]
- (b) Without using the calculator, evaluate $2\frac{1}{3} \times (-1 - 2^2) - \frac{75}{6} \div \left(-\frac{5}{2}\right)^3$. [3]
- 2 Given that $P = 2^3 \times 3^2 \times 7$ and $Q = 2 \times 3^5 \times 7^3$,
- (i) find the HCF and LCM of P and Q , leaving your answers in index notation. [2]
- (ii) using prime factorisation, find the value of $\sqrt{\frac{P \times Q}{108}}$, leaving your answer in index notation. [2]
- 3 (a) Simplify $3(5x - 2y) - 4(-x - 3y)$. [2]
- (b) Make x the subject of $y = \frac{w}{2x} - \frac{3z}{m}$. [4]
- 4 Factorise the following expressions completely.
- (a) $9xyz + 3wxy$, [1]
- (b) $3a(x - 2y) + 2b(2y - x)$. [2]
- 5 Solve the following equations.
- (a) $3a - [4 - 3(a + 9)] = 23$, [2]
- (b) $\frac{3-x}{x-5} + \frac{x}{3x-15} - \frac{5}{7} = 0$. [4]
- 6 Solve the inequality $\frac{-3x-8}{2} > 4(x-5)$, illustrating your solutions on a number line. [3]
- 7 **(Not examinable in 2020)**
 Given that $x = 5 \times 10^{12}$ and $y = 2 \times 10^{-7}$, without the use of a calculator, evaluate
- (i) $\frac{x}{y}$,
 (ii) xy ,
 leaving your answers in standard form. [3]
- 8 **(Not examinable in 2020)**
 Simplify $\frac{xy^3z^2}{(xy)^3} \div \frac{xy^2}{z}$, leaving your answer in positive indices. [3]

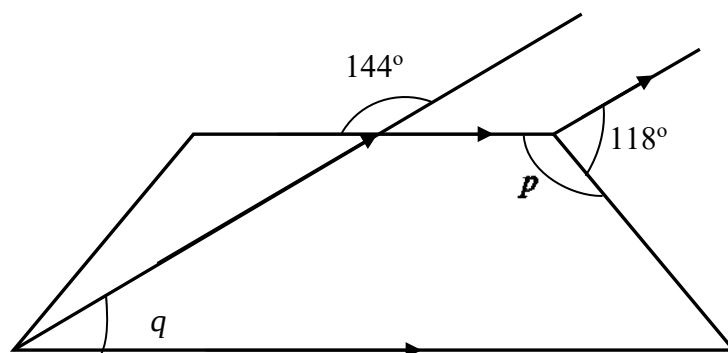
9 (Not examinable in 2020)

Solve $9^{x-1} \div 27^{2x+1} = 1$. [4]

- 10 8 men took 12 hours to paint 3 identical houses. If all the men work at the same rate, how many hours will be needed by 10 men to paint 5 houses? [2]

- 11 John and Chris cycled from Town X to Town Y by different routes. John cycled at an average speed of x km/h and took the longer route which was 4.5 km. Chris took the other route which was 0.5 km shorter and cycled at an average speed of 2 km/h slower than John. Find John's average speed if both of them arrived at Town Y at the same time. [3]

- 12 (a) Find the value of p and q in the diagram, stating clearly the properties used. [3]



- (b) A regular polygon has interior angles of 156° . Find the number of sides of the polygon. [2]

13 (Not examinable in 2020)

$$P = \{x : x \in \mathbb{Z} \text{ such that } x^2 \leq 20\}$$

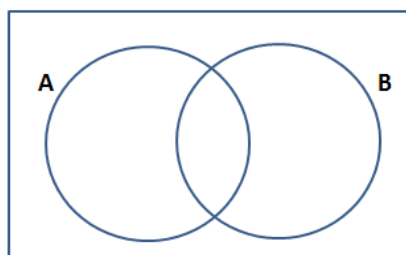
$$Q = \{x : x \in \mathbb{Z} \text{ such that } -3 < x < 8\}$$

List the elements contained in the set $P \cap Q$ and find $n(P \cup Q)$. [3]

14 (Not examinable in 2020)

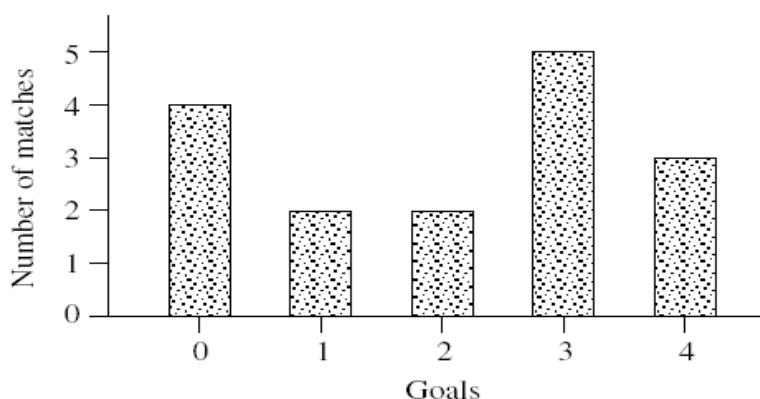
Copy the following diagram and shade the regions representing [2]

- (i) $(A \cup B)'$, (ii) $A' \cap B$.



15 (Not examinable in 2020)

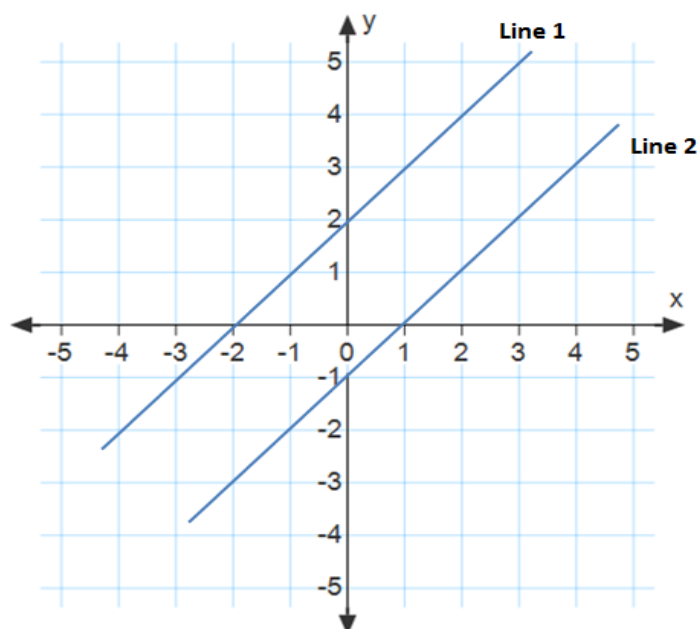
The graph shows the number of goals scored by the Forward soccer team in its matches over the season.



- (i) Find the total number of matches throughout the season. [1]
- (ii) Calculate the mean number of goals. [2]
- (iii) Find the median number of goals. [1]
- (iv) A pie chart is drawn to represent the data. Find the angle of the sector of the pie chart representing the goal score of '3'. [1]

16 (Not examinable in 2020)

The figure below shows the graph of 2 lines.



- (i) Given that point A is the x-intercept of line 1, state the coordinates of A. [1]
- (ii) Given that the equation of line 1 is $y = mx + c$, find the value of m and of c . [2]
- (iii) Hence, state the equation of line 2. [1]

- 17 (a) The cash price for a computer is \$1589. Gary buys it on hire purchase. He pays a deposit of 30% of the cash price followed by 24 monthly instalments of \$59.40.
- (i) What is the total amount that Gary will pay for the computer? [2]
- (ii) Find the extra cost of buying the computer on hire purchase as a percentage of the cash price. [2]
- (b) Ken bought a digital camera for \$859 from a trader. When Ken bought the camera, the trader made a profit of 15% of the price he paid for it. Calculate how much the trader paid for the camera. [2]
- 18 (a) In Figure 1, $ABCD$ is a square cardboard of side 14 cm. P , Q , R and S are the midpoints of the sides. The triangle PBQ and the quadrant SDR (both shaded) are cut off. Calculate the area and perimeter of the remaining cardboard. [5]

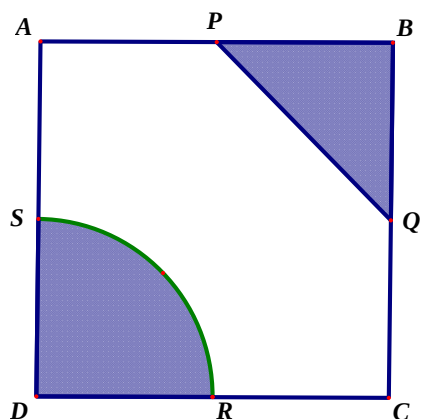


Figure 1

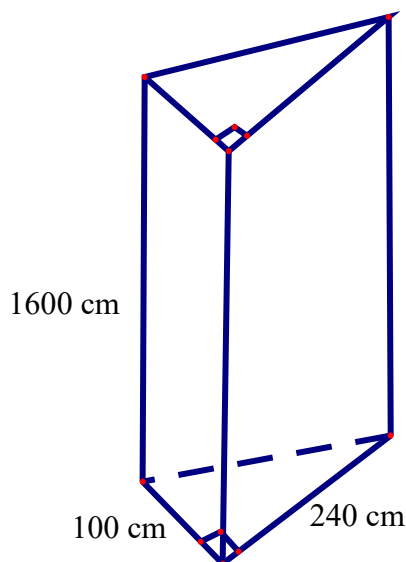


Figure 2

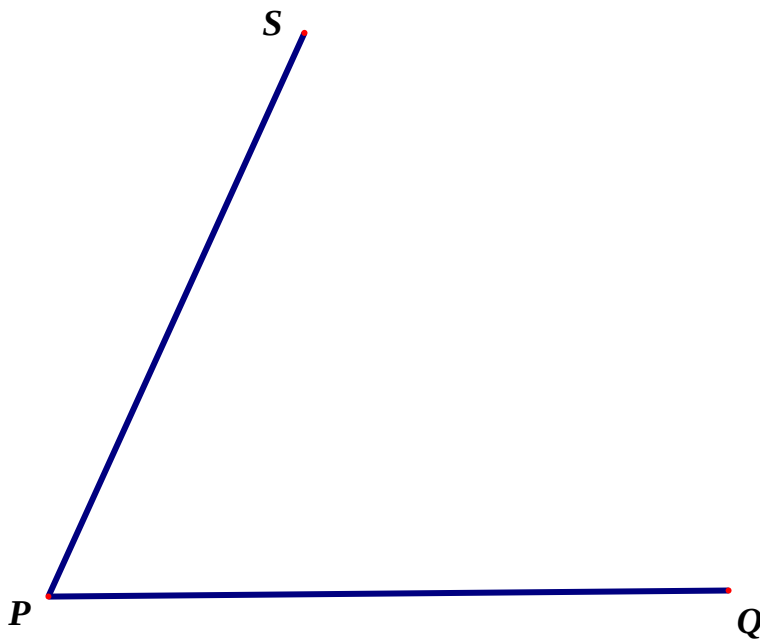
- (b) The water tank, in Figure 2 above (not drawn to scale), is a right-angled triangular prism. It is opened at one end and filled completely with water. Calculate
- (i) the volume, in litres, of water in the tank, [2]
- (ii) the total surface area of the tank in contact with water. [3]

Detach this sheet of paper and attach it as the last page of your solution.

- 19** Complete the quadrilateral $PQRS$ with the following dimensions: $\angle PSR = 110^\circ$
and $SR = 4$ cm. [1]

On the completed diagram, construct

- (i) an angle bisector of $\angle PSR$, [1]
(ii) a perpendicular bisector of QR . [1]



End of Paper

Practice Paper B Sec 1 Math Answer Key

1 (a) 10

(b) $-\frac{163}{15}$ or $-10\frac{13}{15}$

2 (i) $\text{HCF} = 2 \times 3^2 \times 7$; $\text{LCM} = 2^3 \times 3^5 \times 7^3$

(ii) $2 \times 3^2 \times 7^2$

3 (a) $19x + 6y$

(b) $x = \frac{mw}{2my + 6z}$

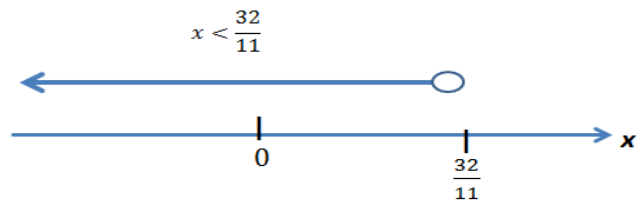
4 (a) $3xy(3z + w)$

(b) $(x - 2y)(3a - 2b)$ or $(2y - x)(2b - 3a)$

5 (a) $a = 0$

(b) $x = 4\frac{22}{29}$

6 $x < \frac{32}{11}$ or $x < 2\frac{10}{11}$



10 16 hours

11 18 km/h

12 (i) $p = 98^\circ$, $q = 36^\circ$

(ii) $n = 15$

17 (a) (i) \$1902.30

(ii) 19.7%

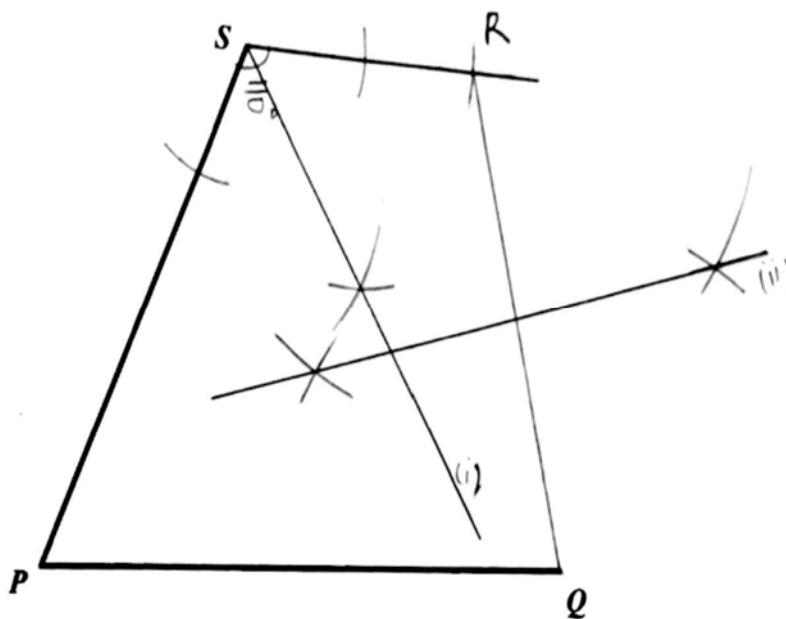
(b) \$746.96 (nearest cent)

18 (a) Area is 133 cm^2 (3 sf); Perimeter is 48.9 cm

(b) (i) 19200l

(ii) 972000 cm^2 or 97.2 m^2

19



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Final answer looks "different" as the question paper is pre-shrunk for printing.