

QUESTION 1 (20 Marks)

(a) Simplify $1\frac{1}{2} + 3\frac{3}{4}$

(b) Find $\frac{3}{5}$ of 2 km

(c) 250g of sugar is mixed with 750g of salt.
What percentage of the mixture is sugar?

(d) Simplify (i) $7x + 5y - 8x$

(ii) $\frac{w^{16}}{w^2 \times w^6}$

(e) Factorise fully $6ad + 42d$

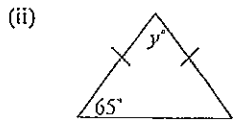
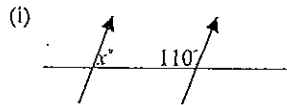
(f) If $m = 2t + 1$, find the value of m when $t = 100$

(g) Solve $2m + 10 = 50$

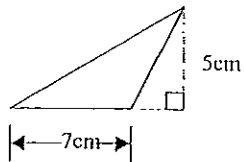
(h) Find the side length of a cube whose volume is 125 cm^3

(i) Calculate the 4.5% cancellation fee on two theatre tickets that cost \$95 each.

(j) Find the value of the pronumeral in each

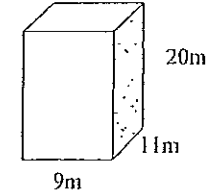


(k) Find the area of

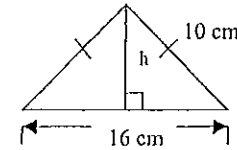


QUESTION 1 (Continued -20 Marks)

(l) Find the volume of

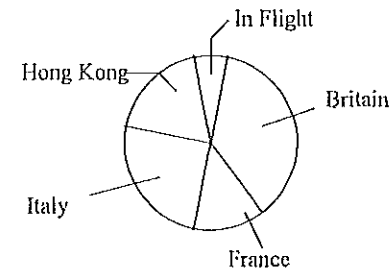


(m) Find the height h cm of this isosceles triangle



(n) A factory can build 7 motor cruisers in 12 working days.
Find how many working days will be required to build 175 motor cruisers.

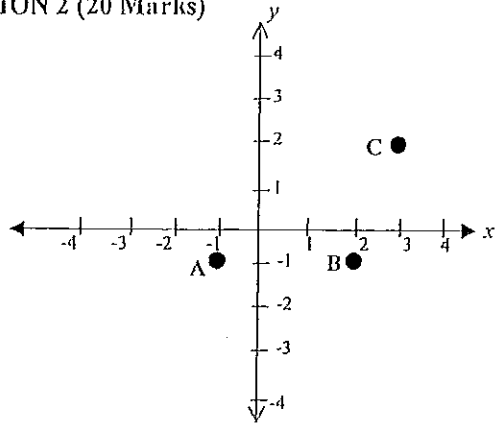
(o) The sector graph shows the holiday plans of a student who intends to tour parts of Europe for 72 days after the HSC.



What should the angle be at the centre of the Hong Kong sector if she intends to spend 9 days there?

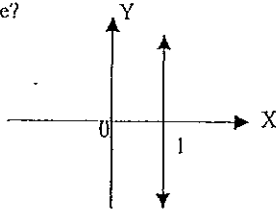
QUESTION 2 (20 Marks)

(a)



State the co-ordinate of D such that ABCD forms a parallelogram.

(b) What is the equation of this line?



- (c) (i) Draw a 70° angle on your answer sheet
 (ii) Bisect this angle by using a ruler and compasses

(d) Naomi was given $12\frac{1}{2}\%$ discount on a rug with a marked price of \$460.
 How much did she pay?

(e) Find the equation of the line that passes through the point $(-1, -3)$ and is parallel to the x-axis.

QUESTION 2 (Continued -20 Marks)

(f) The letters of the word PROBABILITY are placed in a bag. A letter is then drawn at random. Find the probability of:

- (i) drawing the letter R, I or B
 (ii) drawing a vowel
 (iii) not drawing a vowel

(g) Copy this on to your answer sheet

•P



Construct a perpendicular to this line through the point P using a ruler and compasses

(h) Jim bought a lounge with a marked price of \$3000. He paid a deposit of \$100 and 36 monthly payments of \$136.20.

- (i) How much did he pay?
 (ii) How much more than the marked price did he pay?

(i) On the same number plane draw a neat sketch of the following straight lines

$$y = x + 1$$

$$y = 2 - x$$

hence, find their point of intersection.

QUESTION 3 (20 Marks)

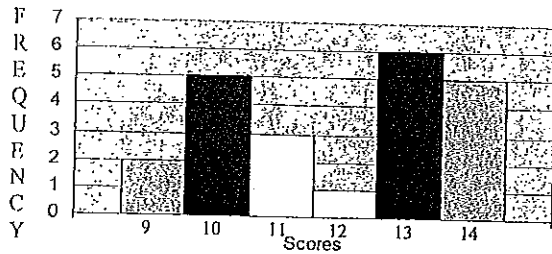
(a) During one week Petra worked 35 hours at the normal rate of \$12.60 per hour. She also worked 4 hours at 'time-and-a-half' and 2 at 'double time'. How much did she earn?

(b) In one week John earns \$586.80. He is taxed \$128.60 and pays \$43.50 for superannuation and has miscellaneous deductions totaling \$79.40.

- (i) Find his net pay for the week
- (ii) What percentage of John's gross pay did he pay in tax?

(c) Given:

HISTOGRAM



From the above Histogram complete a frequency distribution table on to your answer sheet with the following headings

| Score x | Frequency f | Cumulative Frequency cf |
|------------|----------------|----------------------------|
|------------|----------------|----------------------------|

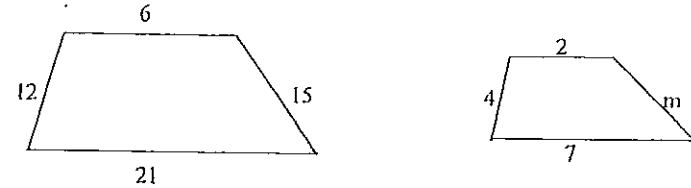
Hence, find

- (i) mean (correct to two decimal places)
 - (ii) median
 - (iii) mode
- and (iv) range of the scores.

QUESTION 3 (Continued -20 Marks)

(d) Find the value of k if $(k, 7)$ lies on the line $y = 3x - 5$

(e) Find the value of the pronumeral for the pair of similar figures

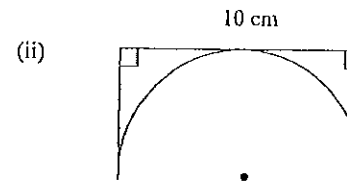
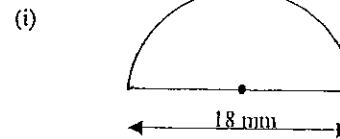


(f) 'Rich Red' strawberry flavouring can be purchased at 240ml for \$1.70, 660ml for \$3.75, or 1L for \$6.25. Which buy represents the best value?

QUESTION 4 (20 Marks)

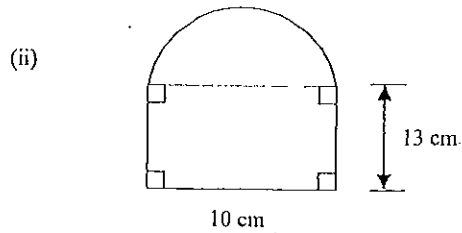
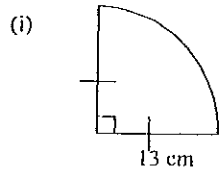
(a) Rachel bought a painting for \$250 and sold it for \$575. Find the profit as a percentage of the cost.

(b) Find the perimeter of each figure correct to 1 decimal place

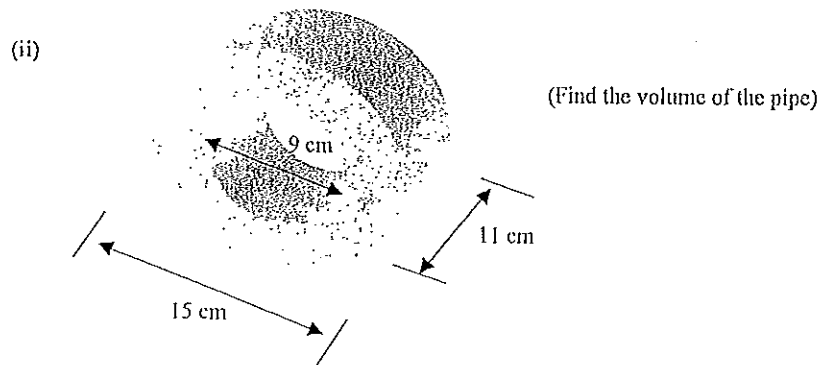
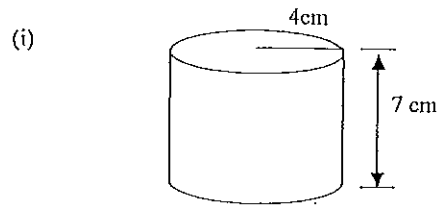


QUESTION 4 (Continued -20 Marks)

(c) Find the total area of each figure, correct to 2 decimal place.



(d) Find the volume of each figure correct to nearest whole number.



QUESTION 5 (20 Marks)

(a) The traffic lights at a certain intersection show red 45% of the time, amber 15% of the time and green the rest of the time. If I drive through this intersection, what is the probability that the lights will be:

- (i) red
- (ii) green or amber
- (iii) Neither red nor green?

(b) After a discount of 13% was given, I paid \$27 840 for a silver Holden. What was the original marked price?

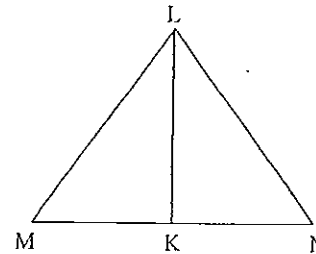
(c) Two coins are tossed once.

(i) Draw a tree diagram and list all possibilities.

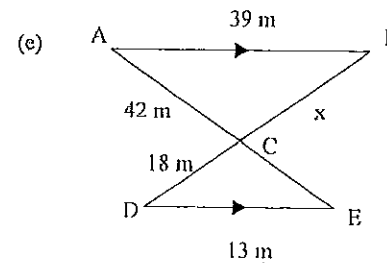
What is the probability of:

- (ii) two heads?
- (iii) one head and one tail?

(d) $\triangle LMN$ is an equilateral triangle.
LK is an axis of symmetry



- (i) Copy diagram on to your answer sheet
- (ii) Label all information given
- (iii) Prove $\triangle LMK$ is congruent to $\triangle LNK$



In $\triangle ABC$ and $\triangle EDC$, $AB \parallel ED$

- (i) Prove $\triangle ABC$ is similar to $\triangle EDC$
- (ii) Hence, find the value of x

THE END

YEAR 8

YEARLY

2003

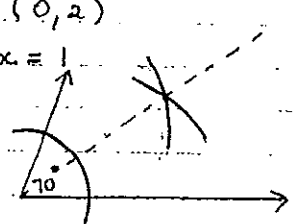
Question 1

SOLUTIONS

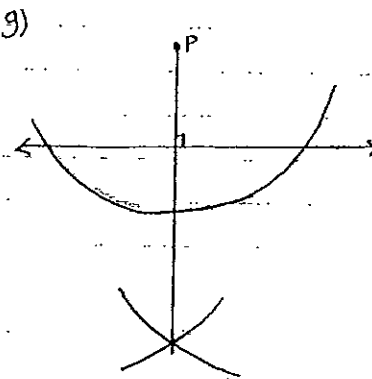
- a) $\frac{2}{5}$
- b) $1\frac{1}{5}$ km
- c) $\frac{250}{1000} \times \frac{100}{1} = 25\%$
- d) (i) $5y = x$
 (ii) $\frac{w^{10}}{w^8} = w^2$
- e) $6ad + 42d = 6d(a + 7)$
- f) $m = 2t + 1$
 $= 2(100) + 1$
 $m = 2001$
- g) $2m + 10 = 50$
 $2m = 40$
 $m = 20$
- h) $V = s^3$
 $125 = s^3$
 $\sqrt[3]{125} = s$
 $\therefore s = 5$ cm
- i) Cancellation fee
 $= \frac{4.5}{100} \times (2 \times 95)$
 $= \frac{4.5}{100} \times 190$
 $= \$8.55$
- (j) (i) $x = 180 - 110$
 $x = 70^\circ$
 (ii) $y = 180 - (2 \times 65)$
 $= 180 - 130$
 $y = 50^\circ$

- k) Area = $\frac{bh}{2}$
 $= \frac{7.5}{2}$
 $= 17.5 \text{ cm}^2$
- l) $V = lbh$
 $= 9 \times 11 \times 20$
 $= 1980 \text{ m}^3$
- m) $h^2 + 8^2 = 10^2$
 $h^2 = 10^2 - 8^2$
 $h^2 = 36$
 $\therefore h = 6$ cm
- n) 7 cruises in 12 days
 $\therefore 1$ cruiser in $\frac{12}{7}$ days
 $\therefore 175$ motor cruises
 $= \frac{12}{7} \times 175$
 $= 300$ days.
- o) Hong Kong = $\frac{9}{72} \times 360$
 $= 45^\circ$

Question 2

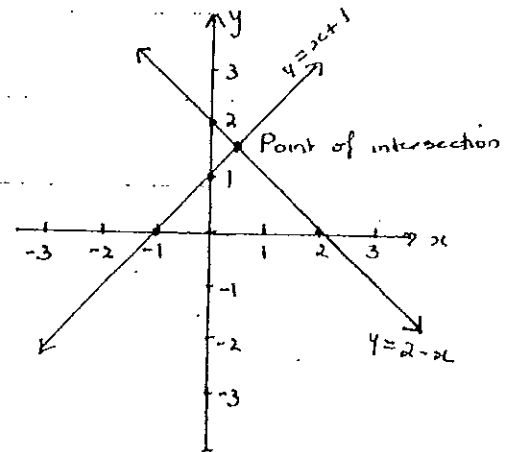
- a) $D(0, 2)$
- b) $x = 1$
- c) (i) 
- d) Discount = $12\frac{1}{2}\%$ of \$460
 $= \$57.50$
 \therefore Paid = $460 - 57.50$
 $= \$402.50$

- e) $y = -3$
- f) (i) $P(R, I, or B) = \frac{5}{11}$
 (ii) $P(\text{vowel}) = \frac{4}{11}$
 (iii) $P(\text{vowel}) = 1 - \frac{4}{11}$
 $= \frac{7}{11}$



- h) He paid = $136 \cdot 20 \times 36$
 $+ 100$
 $= \$4903.20 + 100$
 $= \$5003.20$
- (ii) Paid extra = $5003.20 - 3000$
 $= \$2003.20$

- (i) $y = x + 1$
 at $x = 0$ at $y = 0$
 $y = 1$ $x = -1$
 $P_1(0, 1)$ $P_2(-1, 0)$
- $y = 2 - x$
 at $x = 0$ at $x = 2$
 $y = 2$ $y = 0$
 $P_1(0, 2)$ $P_2(2, 0)$



\therefore Point of intersection
 $(\frac{1}{2}, 1\frac{1}{2})$

Question 3

$$\begin{aligned} \text{a) Earned} &= 35 \times 12.60 \\ &+ 4 \times 1\frac{1}{2} \times 12.60 + \\ &2 \times 2 \times 12.60 \\ &= \$441 + 75.60 \\ &+ \$50.40 \\ &= \$567 \end{aligned}$$

$$\begin{aligned} \text{b) (i) Net} &= \text{Earnings} - \text{deductions} \\ &\text{pay} \\ &= \$586.80 - (128.60 + \\ &\$43.50 + \$79.40) \\ &= \$586.80 - \$251.50 \\ &= \$335.30 \end{aligned}$$

c)

| Score x_c | frequency f | cumulative frequency |
|-------------|---------------|----------------------|
| 9 | 2 | 2 |
| 10 | 5 | 7 |
| 11 | 3 | 10 |
| 12 | 1 | 11 |
| 13 | 6 | 17 |
| 14 | 5 | 22 |

Total 22

- (i) Mean = 11.86
 (ii) Median 11^{th} & 12^{th} scores
 $= \frac{12+13}{2}$
 $= 12.5$
 (iii) Mode = 13
 (iv) Range = 14 - 9
 $= 5$

$$\begin{aligned} \text{d) } y &= 3x - 5 \\ 7 &= 3k - 5 \\ 12 &= 3k \\ \therefore k &= 4 \end{aligned}$$

$$\begin{aligned} \text{c) } \frac{2}{6} &= \frac{m}{15} \\ \frac{2}{6} \times 15 &= m \\ \therefore m &= 5 \end{aligned}$$

$$\begin{aligned} \text{f) } 240 \text{ mL for } \$1.70 \\ \therefore 1 \text{ mL for } \frac{1.70}{240} &= 0.0071 \end{aligned}$$

$$\begin{aligned} 660 \text{ mL for } \$3.75 \\ \therefore 1 \text{ mL for } \frac{3.75}{660} &= 0.0057 \end{aligned}$$

$$\begin{aligned} 1 \text{ L for } \$6.25 \\ \therefore 1 \text{ mL for } \frac{6.25}{1000} &= 0.00625 \\ \therefore 660 \text{ mL for } \$3.75 \\ &\text{is the best value.} \end{aligned}$$

Question 4

$$\begin{aligned} \text{a) Profit} &= 575 - 250 \\ &= \$325 \\ \text{Profit as \% of cost} \\ &= \frac{325}{250} \times \frac{100}{1} \\ &= 130\% \end{aligned}$$

$$\begin{aligned} \text{b) (i) Perimeter} &= \frac{2\pi r}{2} + 18 \\ &= \pi \times 9 + 18 \\ &= 46.3 \text{ mm} \end{aligned}$$

$$\begin{aligned} \text{(ii) Perimeter} &= \frac{2\pi r}{2} + 10 + 10 \\ &= \pi \times 5 + 20 \\ &= 35.7 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{c) (i) Area} &= \frac{\pi r^2}{4} \\ &= \frac{\pi (13)^2}{4} \\ &= 132.73 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{(ii) Area} &= \frac{\pi r^2}{2} + lb \\ &= \frac{\pi (5)^2}{2} + 10 \times 13 \\ &= 169.27 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{d) (i) Volume} &= \pi r^2 h \\ &= \pi (4)^2 \cdot 7 \\ &= 351.68 \\ &= 352 \text{ cm}^3 \end{aligned}$$

$$\begin{aligned} \text{(ii) Volume} &= [\pi R^2 - \pi r^2] H \\ &= [\pi (7.5)^2 - \pi (4.5)^2] \\ &\quad \times 11 \\ &= 1244.07 \text{ cm}^3 \end{aligned}$$

Question 5

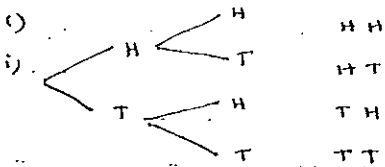
- a) Red = 45%
 amber = 15%
 Green = 40%

(i) $P(\text{Red}) = \frac{45}{100}$
 $= \frac{9}{20}$

(ii) $P(\text{Green or amber}) = \frac{55}{100}$
 $= \frac{11}{20}$

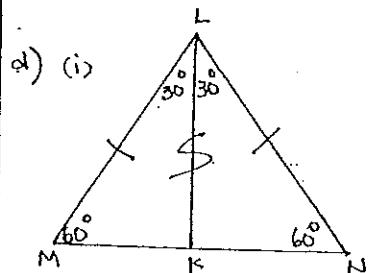
(iii) $P(\text{neither red nor green}) = \frac{15}{100}$
 $= \frac{3}{20}$

b) $87\% = \frac{27840}{100}$
 $1\% = \frac{27840}{87}$
 $\therefore 100\% = \frac{27840}{87} \times 100$
 $= \text{₹ } 32,000$



(ii) $P(\text{two heads}) = \frac{1}{4}$

(iii) $P(\text{one tail \& one head}) = \frac{2}{4}$
 $= \frac{1}{2}$



iii) Data: $\triangle LMN$ is an equilateral triangle.

LK is an axis of symmetry.

Aim: Prove $\triangle LMK$ is congruent to $\triangle LNK$.

Proof: Consider $\triangle LMK$ and $\triangle LNK$.

$LN = LM$ (equilateral \triangle).

$\hat{M}LK = \hat{N}LK = 30^\circ$ (LK is an axis of symmetry \therefore bisects $\angle MLN$).

LK is common.

\therefore By SAS Test $\triangle LMK \cong \triangle LNK$.

e) (i) Prove $\triangle ABC \cong \triangle EDC$.

Consider $\triangle ABC$ and $\triangle EDC$.

$\angle B = \angle D$ (alternate angles, $AB \parallel ED$).

$\angle A = \angle E$ (" ").

$\hat{A}CB = \hat{E}DC$ (vertically opposite).

$\therefore \triangle ABC \cong \triangle EDC$ equiangular, hence, corresponding sides in the same ratio.

(ii) $\frac{AB}{ED} = \frac{CB}{CD}$

$\frac{39}{13} = \frac{x}{18}$

$\frac{39 \times 18}{13} = x$

$\therefore x = 54 \text{ m}$