Student name/number: _____

Advanced

Mathematical

Publications

(Place your crest here)

General Mathematics

General Instructions

- Reading time – 5 minutes
- Working time –2 hours
- Write using blue or black pen
- Write your name on every page
- Calculators may be used
- A Formulae Sheet is provided at the back of this paper

(**Section I**) Pages 3 – 8

Total marks **(18)**

Attempt Questions 1 – 18
Allow about 30 minutes for this section

(**Section II**) Pages 9 – 14

Total marks **(60)**
Attempt Questions 19 – 23
Allow about 2 hours for this section

Select the alternative A, B, C, D that best answers the question. Fill in the response box completely.

Sample   A □   B■   C□   D□

If you think you have made a mistake, put a cross through the incorrect answer and fill in the new answer.

A ■   B■ ✗   C □   D □

If you change your mind and have crossed out what you consider to be the correct answer, then indicate this by writing the word *correct* and drawing an arrow as follows:
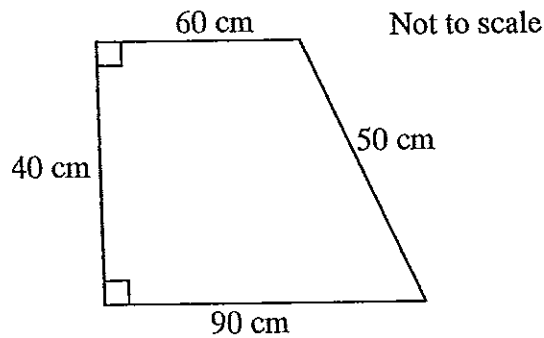
A ■ ✗   B■ ✗ ← *correct* C □   D □

Question	A	B	C	D
1	□	□	□	□
2	□	□	□	□
3	□	□	□	□
4	□	□	□	□
5	□	□	□	□
6	□	□	□	□
7	□	□	□	□
8	□	□	□	□
9	□	□	□	□
10	□	□	□	□
11	□	□	□	□
12	□	□	□	□
13	□	□	□	□
14	□	□	□	□
15	□	□	□	□
16	□	□	□	□
17	□	□	□	□
18	□	□	□	□

SECTION I
Use the multiple-choice answer sheet.

1. Evaluate $\sqrt{5.3^2 + 2.4^3}$ correct to one decimal place.

(A) 4.2

(B) 5.8

(C) 6.5

(D) 19.1

2. If $902 was divided in the ratio of 3:6:2, how much would the smallest share be?

(A) $82

(B) $164

(C) $200

(D) $246

3. Calculate the area of the block of land.

(A) 240 m²

(B) 300 m²

(C) 3 600 m²

(D) 5 400 m²

4. The daily newspaper costs $1.20. If ordered for seven days the total cost is $7. The percentage discount is closest to

(A) 16.67%

(B) 17.14%

(C) 20%

(D) 83.33%

5. A 3 metre roll of plastic 60 cm wide is used to cover textbooks. Each book uses plastic measuring 37 cm by 30 cm. How many textbooks can be covered with one roll?

    (A) 14

    (B) 15

    (C) 16

    (D) 17

6. Expand and simplify: $5x - 3(2x - 4)$

    (A) $4x^2 - 8x$

    (B) $4x - 8$

    (C) $-x - 12$

    (D) $12 - x$

7. Holiday loading is calculated at 17½% of 4 weeks wage. Find the holiday pay if a week's wage is $690.

    (A) $120.75

    (B) $483

    (C) $2 880.75

    (D) $3 243

8. Find the interest, to the nearest dollar, on $5000 invested for 2 years at 5.5% p.a., compounded annually.

    (A) $565

    (B) $550

    (C) $110

    (D) $55

9. Which of the following lines has a gradient of 2?

(A)

(B)

(C)

(D)
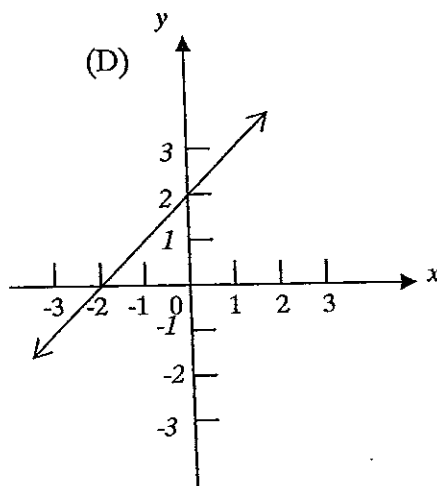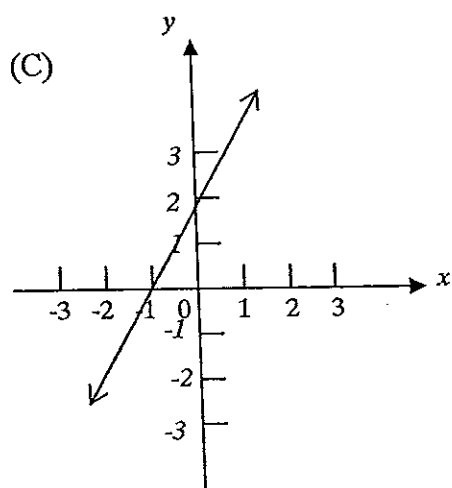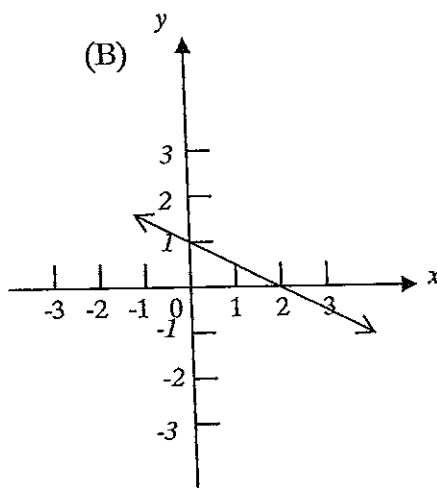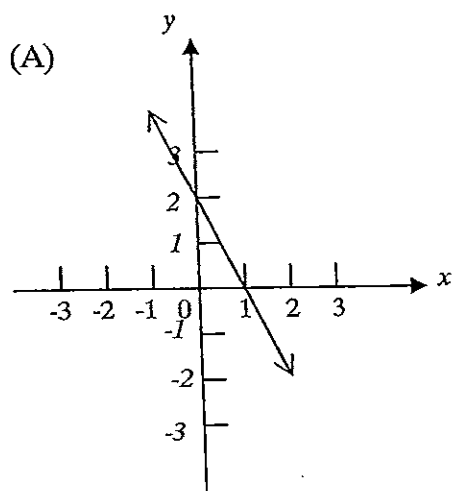
10. A receipt number involves a letter and 3 digits. How many receipt numbers are possible?

(A) 4

(B) 78

(C) 18 954

(D) 26 000

Continues next page...

11. Use Pythagoras' theorem to find the length of PR, to the nearest metre.

(A) 480

(B) 21

(C) 22

(D) 30

R

26 m

P   14 m   Q
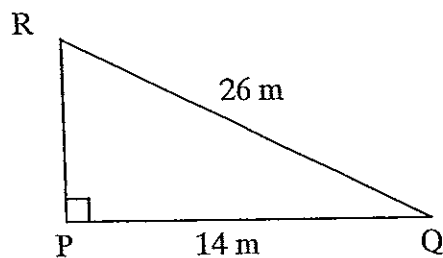
12. Solve $\dfrac{x}{4} - 5 = 2$.

(A) $x = 28$

(B) $x = -28$

(C) $x = 1\frac{3}{4}$

(D) $x = -1\frac{3}{4}$

13. Find the surface area of the cube shown.

(A) 25 cm^2

(B) 125 cm^2

(C) 60 cm^2

(D) 150 cm^2

5 cm
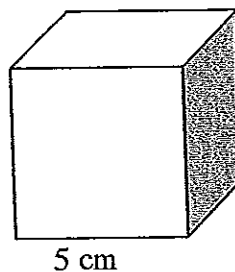
14. On a map, a distance of 11.5 cm represents 5.75 km. The scale used was:

(A) 11.5 : 5.75

(B) 1 : 50 000

(C) 1 : 5

(D) 1 : 5000

15. If tan β = ¾, find the size of angle β to the nearest degree.

(A) 36°

(B) 37°

(C) 43°

(D) 42°

16. The table shows the scores in a test.

Score	Frequency
15	3
16	11
17	4
18	7
20	5

The mean is:

(A) 17

(B) 16

(C) 5

(D) 17.17

17. The value of *w* is given by:

(A) $w = \dfrac{\sin 33°}{8}$

(B) $w = \dfrac{8}{\cos 33°}$

(C) $w = \dfrac{8}{\sin 33°}$

(D) $w = 8 \times \sin 33°$

7
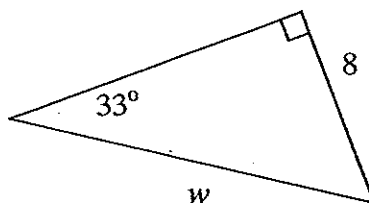
18. A new TV show was rated between 1 and 10 in a survey. The results are shown in the dot plot below.
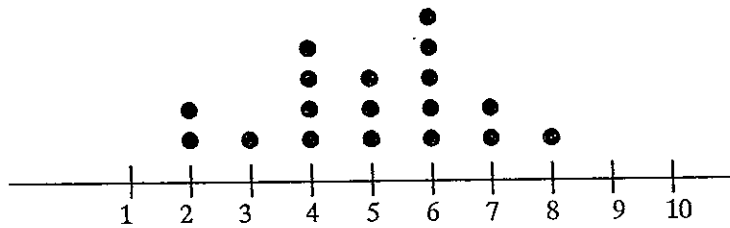
What percentage of people, to one decimal place, rated the show below 6?

(A) 55.6%

(B) 83.2%

(C) 27.7%

(D) 55%

End of Section I

Total marks (60)
Attempt Questions 19 - 23
Allow about 1½ hour for this section.

Answer each question in a SEPARATE writing booklet. Extra writing booklets are available.

Question 19 (12 marks) Use a separate writing booklet.   **Marks**

(a) On Tuesday the price of petrol was 80.9 cents per litre. By Thursday the price had
     increased to 93.9 cents per litre. What percentage increase was this correct to one
     decimal place?   **2**

(b) Calculate the simple interest on $8 500 at 5.1% p.a. for 3 months.   **2**

(c) The masses of 30 students are recorded below. The masses have been rounded to the
     nearest kilogram.

Stem	Leaf
3	6 6 7 8 8 9 9
4	2 3 □ 6 7 7 8 8 9
5	1 3 3 3 4 4 6 8 9
6	0 1 2 3 4

   (i)   Write all the possible values of □.   **1**

   (ii)   Find the range.   **1**

   (iii) Find the median mass.   **1**

   (iv)   Find the mean and standard deviation correct to one decimal place.   **2**

   (v)   Find the probability that if a student was selected at random, the mass would be
          over 53 kg.   **1**

(d) The bungee jumper dived 9° out from the vertical. If the stretched rope measures 52
     metres, how far from the pole are the jumper's feet before she springs back?   **2**
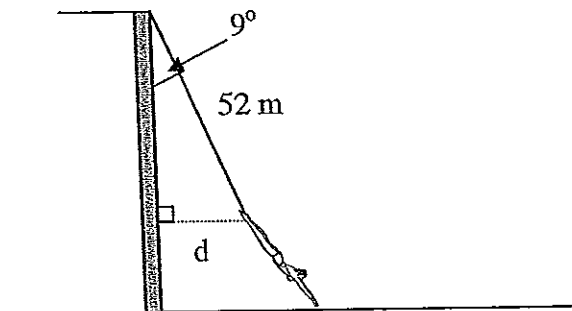
End of Question 19

Question 20 (12 marks) Use a separate writing booklet.

(a)   Kevin has a 60% no-claim discount on his car insurance. He pays $881 to insure his car. How much would he have to pay if he did not have the 60% discount?   **2**

(b)   Using the formula $v^2 = u^2 + 2as$, find the value of a if $v = 8$, $u = 3$ and $s = 5$.   **2**

(c) (i)   What solid is represented by the net drawn below?   **1**

(ii)   Find the perpendicular height of each triangle.   **2**

(iii)   Calculate the surface area of the solid formed from this net.

(c)   Find the equation of the line shown below.   **3**

End of Question 20

Question 21 (12 marks) Use a separate writing booklet.   **Marks**

(a)   Muskeen earns $58 300 annually. He has deductions of $1 115.
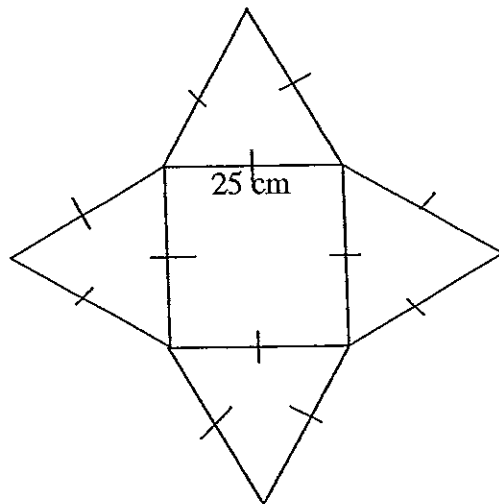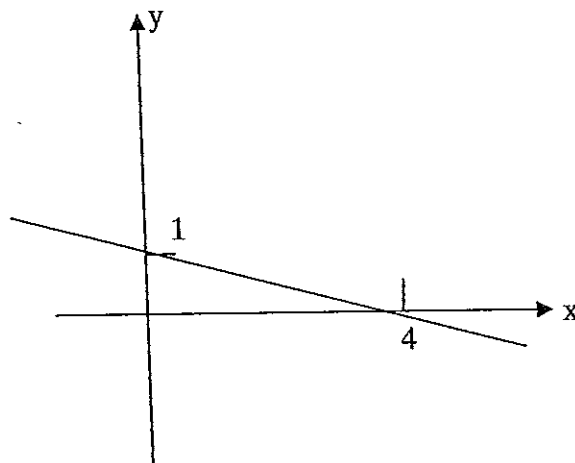
   (i)   Use the table below to calculate the tax owed.   2

Taxable income	Tax on this income
$1-$6000	Nil
$6001-$20 000	17 cents for each $1 over $6000
$20 001-$50 000	$2380 + 30 cents for each $1 over $20 000
$50 001-$60 000	$11 380 + 42 cents for each $1 over $50 000
$60 001 and over	$15 580 + 47 cents for each $1 over $60 000

   (ii)   Every taxpayer also must pay a Medicare levy of 1.5% of taxable income. Find
          the Medicare levy Muskeen has to pay.

   (iii)   Muskeen pays $578.76 per fortnight in tax. Calculate the refund or tax owed.   2

(b)   Ocean Oil shares were trading at 24 cents each on the Share Market. Binty has $800
      to invest. She must pay $50 brokerage fees if she buys or sells shares.

   (i)   How many shares can she buy after paying brokerage fees?   1

   (ii)   The share price rises to 31.8 cents and Binty decides to sell. Calculate the total
          profit Binty made from buying and selling.   3

(c)   Four consecutive numbers add up to 542.

   (i)   Write an equation to express this statement in algebraic terms.   1

   (ii)   Solve the equation to find the smallest number.   2

End of Question 21

Question 22 (12 marks) Use a separate writing booklet.   **Marks**

(a)

(i)   Calculate the volume of this cylindrical water tank, to one decimal place   2

4.5 m

|← ——— 10.4 m ———→ |
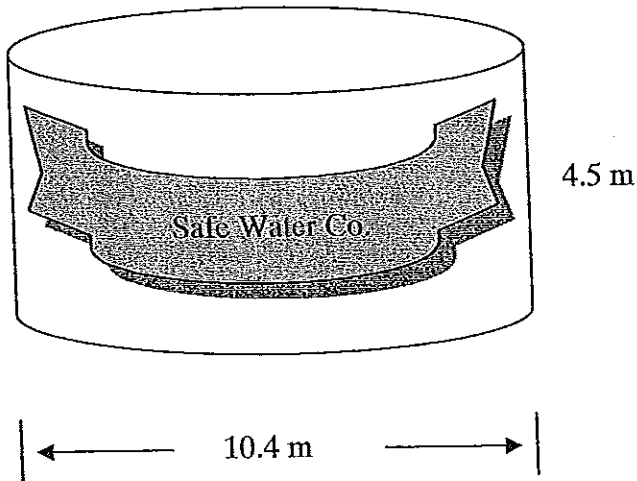
(ii)   Find the capacity of this tank in litres.   1

(b)   Alf's Sand and Soil Company supplies and delivers building materials. Sand is
charged at $20 per tonne plus $30 delivery.

(i)   Copy and complete the table below.

2

Numbers of tonnes	0	1	2	3	4
Cost of delivered sand	30				

(ii)   Copy this grid and plot the points from the table in (i). Join your dots.

2

Cost in $ (C)

120
100
80
60
40
20

1   2   3   4   5
Number of tonnes (n)
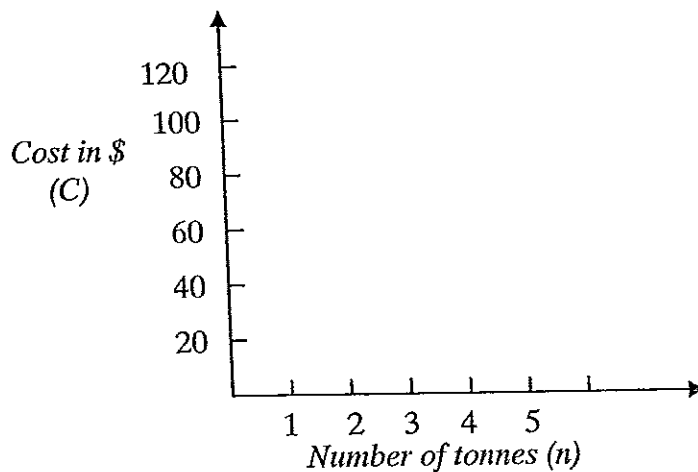
Question 22 continued

(iii) Where does the graph cross the vertical axis? 1

(iv) Find the gradient of the line. 1

(v) Explain what the gradient represents. 1

(vi) Write a formula which could be used to calculate the cost (C) of having n tonnes of sand delivered. 2

End of Question 22

Question 23 (12 marks) Use a separate writing booklet.

(a) Paul, Vanessa, Mary and George have been nominated for the positions of president and vice-president of a club.

   (i) Draw a tree diagram to show all the different ways the president and vice-president may be chosen.   3

   (ii) What is the probability that Vanessa would be president?   1

   (iii) What is the probability that George will not be chosen at all?   1

   (iv) What is the probability that the two girls, Vanessa and Mary, will take both positions?   1

(b) Evaluate x to 1 decimal place using the two similar triangles.

                                                                                                 2

Not to scale   16.8

x

4.7   9.7   6.3
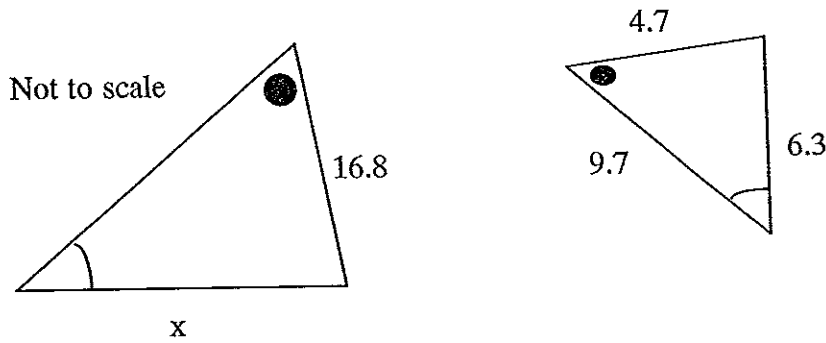
(c) The table below shows the results of a survey on favourite foods.

                                                                                                 2

Food	Frequency
Pasta	4
Pizza	8
Hamburger	3
Chinese	5

If this information is displayed on a sector graph, find the angle used for the pizza sector.

(d) Solve $\dfrac{x+3}{5} = \dfrac{2x-4}{2}$.   2

End of paper

General Preliminary Trials 2001

Solutions

Section I

1. C 2. B 3. B 4. A 5. C

6. D 7. D 8. A 9. C 10. D

11. C 12. A 13. D 14.B 15. B

16. D 17.C 18. A

Section II

Question 19 (12 marks)

(a) Percentage increase = $\dfrac{13}{80.9} \times 100\%$ ✓

$\qquad = 16.1\%$ ✓

(b) $SI = \dfrac{8500 \times 5.1 \times \frac{3}{12}}{100}$ ✓

$\qquad = \$108.38$ ✓

(c) (i) ☐ could be 3,4,5 or 6 ✓

(ii) Range = $64 - 36 = 28$ ✓

(iii) Median = 48.5 kg ✓

(iv) Mean = 49.3 kg ✓ S.D. = 8.6 ✓

(v) p(mass over 53 kg) = $\dfrac{1}{3}$ ✓

(d) $\sin 9° = \dfrac{d}{52}$ ✓

$\qquad d = 8.1$ m ✓

Question 20 (12 marks)

(a) $40\% = 881$

$\qquad 1\% = \dfrac{881}{40}$ ✓

$\qquad 100\% = \$2\,202.50$ ✓

(b) $8^2 = 3^2 + 2 \times a \times 5$ ✓

$\qquad 55 = 10a$

$\qquad a = 5.5$ ✓

(c) (i) Square based pyramid. ✓

(ii) $25^2 = 12.5^2 + a^2$ ✓

$\qquad 468.75 = a^2$

$\qquad\qquad a = 21.7$ cm ✓

(iii) SA $= 25^2 + 4 \times \frac{1}{2} \times 21.7 \times 25$ ✓

$\qquad = 1710$ cm^2 ✓

(d) $m = -\frac{1}{4}$ ✓

$\qquad b = 1$ ✓

$\qquad y = -\frac{1}{4}x + 1$ ✓

Question 21 (12 mark)

(a) (i) Taxable income = $58\,300 - \$1116$

$\qquad\qquad = \$57\,184$

$\qquad$ Tax $= \$11\,380 + \$7\,184 \times 0.42$ ✓

$\qquad\qquad = \$14\,397.28$ ✓

(ii) Medicare levy $= 1.5\%$ of $\$57\,184$

$\qquad\qquad = \$857.76$ ✓

(iii) Total tax owed $= \$15\,255.04$

$\qquad$ Tax paid $= \$578.76 \times 26$

$\qquad\qquad = \$15\,047.76$ ✓

$\qquad$ Tax owed $= \$15\,255.04 - \$15\,047.76$

$\qquad\qquad = \$207.28$ ✓

(b) (i) Number of shares $= \dfrac{750}{0.24}$

$\qquad\qquad = 3125$ ✓

(ii) Total return = 3125 x 31.8 cents

  = $993.75 ✓

Return after brokerage = $993.75 - $50

  = $943.75 ✓

Profit = $943.75 - $800

  = $143.75 ✓

(c) (i) x + (x+1) + (x+2) + (x+3) = 542 ✓

(ii)   4x + 6 = 542

    4x = 536 ✓

    x = 134 ✓

Question 22 (12 marks)
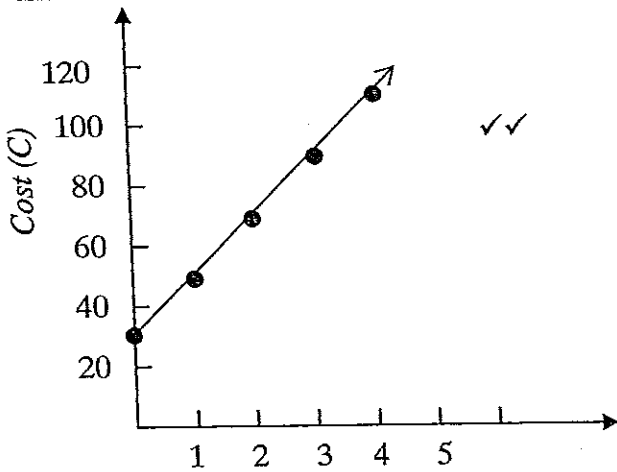
(a) (i) $V = \pi \times 5.2^2 \times 4.5$ ✓

  $= 382.3 \text{ m}^3$ ✓

(ii) Capacity = 382.3 x 1000

  = 382 300 L ✓

(b) (i)

No. tonnes	0	1	2	3	4
Cost sand	30	50	70	90	110

✓✓

(ii)

✓✓

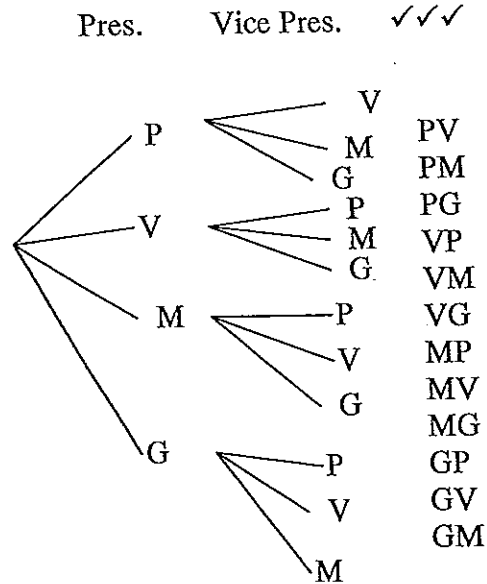(iii) (0, 30) or 30 ✓

(iv) gradient = 20 ✓

(v) The cost per tonne. ✓

(vi) C = 30 + 20n ✓✓

Question 23

(a) (i)

  Pres.   Vice Pres. ✓✓✓

(i) p(V pres.) = $\frac{3}{12} = \frac{1}{4}$ ✓

(ii) p(G out) = $\frac{6}{12} = \frac{1}{2}$ ✓

(iii) p(VM, MV) = $\frac{2}{12} = \frac{1}{6}$ ✓

(b) $\frac{x}{6.3} = \frac{16.8}{4.7}$ ✓

  $x = \frac{16.8 \times 6.3}{4.7} = 22.5$ ✓

(c) angle for pizza = $\frac{8}{20} \times 360°$ ✓

  $= 144°$ ✓

(d) $\frac{x+3}{5} = \frac{2x-4}{2}$

  2x + 6 = 10x - 20 ✓

  x = 3¼ ✓