

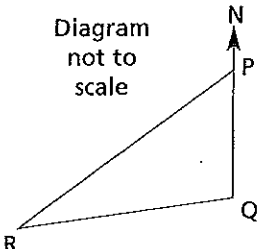
SAMPLE EXAMINATION PAPER

Instructions: Reading time: 5 minutes. Working time: $2\frac{1}{2}$ hours. Total marks: 100
Calculators may be used. Formulae sheet is provided on pages ii and iii.

Section I: Total marks: 22. Suggested time: 30 minutes. Attempt all questions.
Choose the alternative A, B, C, D, which best answers the question.

1 When $p = 2$, $3p^2 - p = ?$

- A 8 B 10 C 16 D 34

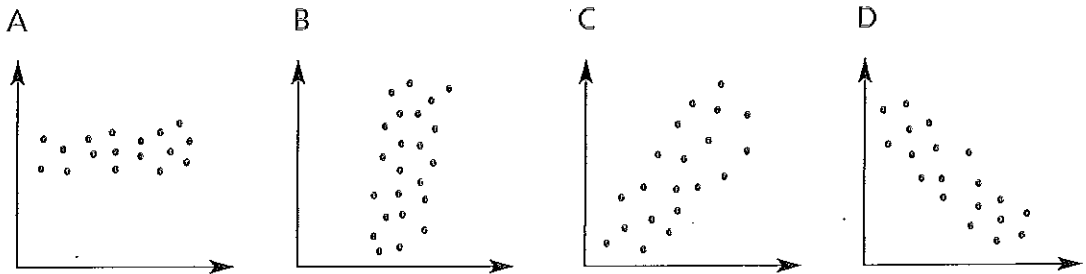
2  P is a point due north of Q and north-east of R.
The bearing of R from Q is 245° .
The size of $\angle PRQ$ is:

- A 20° B 45° C 65° D 70°

3 On a farm there are three different types of animals; cattle, sheep and goats. If one animal is chosen at random, what is the probability that it is a goat?

- A 0 B $\frac{1}{3}$ C $\frac{2}{3}$ D not enough information

4 Which diagram shows a negative correlation?



5 A photocopier was purchased for \$1650 seven years ago. It has been depreciated, using the straight line method of depreciation, at the rate of \$140 per year. What is its current value?

- A \$980 B \$670 C \$630 D \$510

6 $7x^2 - 5x + 2x + 4x^2 + 3x = ?$

- A $3x^2$ B $11x^2$ C $3x^2 - 10x$ D $11x^2 - 4x$

e?
es. *Hint 1*

5	6
4	19

s \$500.

ion?
at is the

of these

ace, but
Hint 3
ow much

assed an
ople had
ay table.
Hint 4
on who
accident

selected
ad not

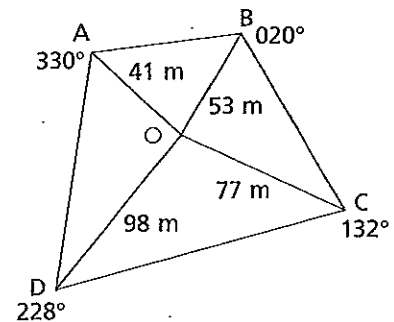
82 8 3
ANSW

page 115

SAMPLE EXAMINATION PAPER

Section I (cont.)

- 7 The diagram, not to scale, has been drawn as the result of a survey. Which formula would be the most appropriate to use to find the length of BC?



- A Simpson's rule
 B Pythagoras' theorem
 C Sine rule
 D Cosine rule
- 8 For the set of scores 4, 5, 2, 2, 7, 4, 4 which measure is not equal to 4?
 A Mean B Median C Mode D Range
- 9 The table shows the present value of an annuity of \$1.

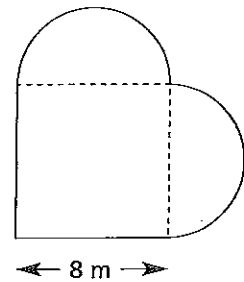
Periods	1%	2%	3%	4%	5%	6%	7%	8%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259
2	1.9704	1.9416	1.9135	1.8861	1.8594	1.8334	1.8080	1.7833
3	2.9410	2.8839	2.8286	2.7751	2.7233	2.6730	2.6243	2.5771
4	3.9020	3.8077	3.7171	3.6299	3.5460	3.4651	3.3872	3.3121
5	4.8534	4.7135	4.5797	4.4518	4.3295	4.2124	4.1002	3.9927
6	5.7955	5.6014	5.4172	5.2421	5.0757	4.9173	4.7665	4.6229
7	6.7282	6.4720	6.2303	6.0021	5.7864	5.5824	5.3893	5.2064
8	7.6517	7.3255	7.0197	6.7327	6.4632	6.2098	5.9713	5.7466

- What lump sum payment now would be equivalent to an annuity of \$3000 for 4 years, the interest rate being 7% pa.
 A \$10 161.60 B \$12 840 C \$3387.20 D \$10 497.20
- 10 To convert temperatures from degrees Celsius C to degrees Fahrenheit F , multiply the Celsius temperature by 9, divide by 5 and add 32. Which expression is correct?
 A $F = \frac{9C}{5} + 32$ B $F = \frac{9}{5}(C + 32)$ C $F = \frac{9C + 32}{5}$ D None of these
- 11 Colombo in Sri Lanka has latitude 7°N and longitude 80°E . If a cricket match begins at 11.00 a.m. Colombo time, what time will it be in Sydney (34°S , 150°E)? Ignore time zones.
 A 6.20 a.m. B 3.20 p.m. C 3.40 p.m. D 8.24 p.m.

SAMPLE EXAMINATION PAPER

Section I (cont.)

12 The entertainment area of a penthouse is in the shape of a square with semi-circular balconies on two sides as shown in the diagram.



The total floor area is closest to:

- A 265 m^2 B 133 m^2
 C 114 m^2 D 89 m^2

13 Terri's school report listed her mark, the mean mark for her class and the standard deviation in four of her subjects.

Subject	Mark	Mean mark	Standard deviation
English	79%	70%	4.3
Maths	69%	62%	7.2
Science	75%	79%	5.8
Geography	84%	71%	13.4

In comparison with the rest of her class, in which subject did Terri perform best?

- A English B Maths C Science D Geography

14 Edward buys a new bed for \$1296. He pays \$300 deposit and borrows the rest at 7% pa simple interest over 2 years. The amount of each monthly instalment is:

- A \$44.41 B \$47.31 C \$49.06 D \$61.56

15 The probability that Jarod will sell a computer for a profit of \$300 is 70%. The probability that he breaks even is 20% but he has a 10% chance of losing \$1000. His expected profit is:

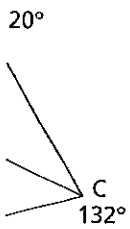
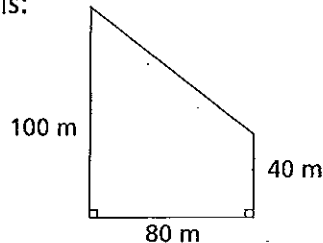
- A \$300 B \$210 C \$110 D -\$90

16 The solution to the equation $\frac{7t-2}{5} = \frac{t+4}{3}$ is $t = ?$

- A $\frac{4}{7}$ B $\frac{7}{8}$ C 1 D $1\frac{5}{8}$

17 The perimeter of this block of land is:

- A 220 m
 B 280 m
 C 320 m
 D 560 m



8%
0.9529
1.7833
2.5771
3.3121
3.9927
4.6229
5.2064
5.7466

3000 for

7.20

multiply correct?

of these

h begins

? ignore

.m.

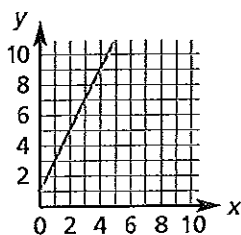
SAMPLE EXAMINATION PAPER

Section I (cont.)

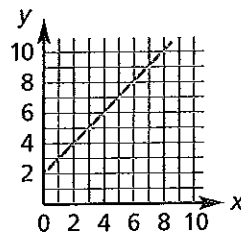
- 18 The mean and standard deviation were calculated for a set of scores, and then 9 was added to each of the scores. Which statement is true?
- A The mean will increase by 9 and the standard deviation will stay the same.
 - B Both the mean and the standard deviation will increase by 9.
 - C The mean will increase by 9 and the standard deviation will increase by 3.
 - D There is not enough information to say what will happen to the mean and standard deviation.

- 19 Which straight line has equation $y = 2x + 1$?

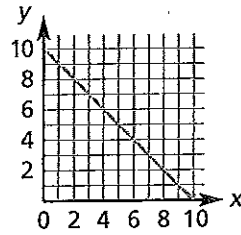
A



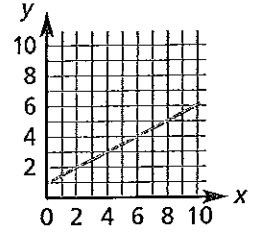
B



C



D



- 20 How much interest is earned, to the nearest dollar, when \$5000 is invested for 2 years at 8% pa interest compounded quarterly?

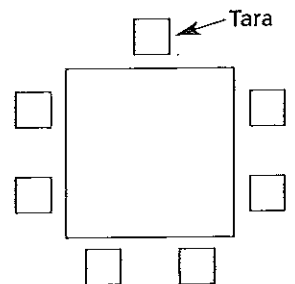
A \$202 B \$832 C \$858 D \$5832

- 21 The length of a pendulum is directly proportional to the square of its period of oscillation, the time for it to swing back and forth. A pendulum of length 1 metre has a period of 2 seconds. How long is a pendulum with period 4 seconds?

A 2 m B 4 m C 8 m D 16 m

- 22 Tara sits at the head of this table to chair the board meeting. In how many different arrangements can the other six people be seated?

A 6 B 30 C 360 D 720



SAMPLE EXAMINATION PAPER

Section II

Total marks for this section: 78

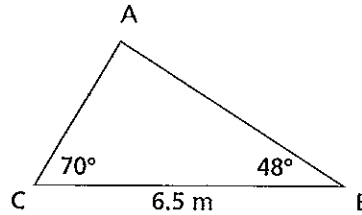
Suggested time for this section: 2 hours

Attempt every question.

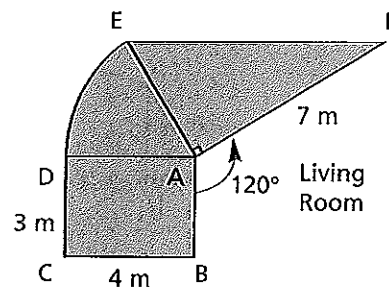
Question 23 (13 marks)

Marks

- a Find the length of AB, correct to one decimal place. 2



- b Solve the equation $5(3x - 4) + 2(6 - x) = 5$ 2
- c The probability that any painting displayed at an art show is sold is 0.4
- i What is the probability that a painting, selected at random, is not sold? 1
 - ii Three paintings are chosen at random. What is the probability that at least one is sold? 2
- d The mean number of matches in boxes produced by a certain company is 61 with standard deviation 5.5
- i What z-score applies to a box with 50 matches? 1
 - ii What percentage of boxes have less than 50 matches? 1
- e The living room of a house opens onto a timber deck. As shown in the diagram, the deck is made up of a rectangle, a sector centred at A, and a triangle right-angled at A. 1
- i Show that the angle at the centre of the sector, $\angle DAE$, measures 60° . 1
 - ii Show that the area of the triangle is 14 m^2 . 1
 - iii Find the total area of the deck. 2



SAMPLE EXAMINATION PAPER

Section II (cont.)

Question 24 (13 marks)

Marks

a Light travels at 3×10^5 kilometres per second. It takes 5×10^2 seconds for light to travel from the Sun to a particular planet. How far is that planet from the Sun?

1

b Matthew deposits \$200 in a savings account at the end of every 3 months. The account pays 6% pa interest, compounded quarterly. How much is in the account at the end of 5 years? Give the answer correct to the nearest whole dollar.

2

c One morning Pam conducted a survey for a research company. She recorded the number of vehicles passing through an intersection during each 5 minute interval for an hour. The number of vehicles counted in each interval is given below:

12 17 23 20 15 18 17 19 13 15 21 17

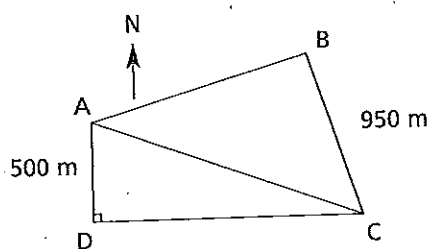
i Calculate the mean \bar{x} and standard deviation σ_{n-1} .

2

ii That afternoon Pam conducted another survey at the same intersection. She calculated the mean number of cars to be 17 and the standard deviation 3.74. Was there greater variation in the number of vehicles passing through the intersection in the morning or afternoon? Justify your answer.

2

d A, B and C are three points with the distance between B and C being 950 metres. The bearing of A from C is 298° and the bearing of B from C is 346° . D is a point due west of C and 500 metres due south of A.



i Copy the diagram and mark on it the size of angles ACD and ACB.

2

ii Find the distance from A to C.

2

iii Use the cosine rule in triangle ACB to find the distance from A to B.

2

SAMPLE EXAMINATION PAPER

Section II (cont.)

Question 25 (13 marks)

Marks		Marks																		
1	<p>a Connor has a credit card which has up to 46 days interest free on purchases but interest is payable immediately on any cash advances. The interest rate is 16.5% pa.</p> <p>i What is the interest rate charged per day on Connor's card? Give the answer correct to 4 decimal places.</p>	1																		
2	<p>ii Connor uses his credit card for a cash advance of \$500 which he repays in 20 days. How much interest is charged?</p>	1																		
2	<p>b Two towns, Burnie in Tasmania (41° S, 146° E) and Tidal River in Victoria (39° S, 146° E) are on opposite sides of Bass Strait. (The radius of the Earth is 6400 km; 1 nautical mile = 1.852 km.)</p> <p>i What is the distance between the towns in kilometres?</p> <p>ii What is the distance between the towns in nautical miles?</p> <p>iii If a yacht sails across Bass Strait from Tidal River to Burnie in 20 hours, what is its average speed in knots?</p>	2 1 1																		
2	<p>c Neroli and Joanne belong to a reading group whose members meet every fortnight to discuss a particular book they are all required to read. Each person is also required to give the book a rating out of 50. The ratings that Neroli and Joanne gave the 24 books they have read over the last year have been displayed in the double ordered stem-and-leaf plot.</p>																			
	<table border="0" style="margin: auto;"> <tr> <td style="padding-right: 20px;">Neroli</td> <td style="padding: 0 10px;"> </td> <td style="padding-right: 20px;">Joanne</td> </tr> <tr> <td style="padding-right: 20px;">8</td> <td style="padding: 0 10px;"> </td> <td style="padding-right: 20px;">0 7</td> </tr> <tr> <td style="padding-right: 20px;">9 7 7 4</td> <td style="padding: 0 10px;"> </td> <td style="padding-right: 20px;">6 8 9</td> </tr> <tr> <td style="padding-right: 20px;">9 9 7 6 6 4 3 3 0</td> <td style="padding: 0 10px;"> </td> <td style="padding-right: 20px;">2 1 3 3 3 4 6 7 8 8</td> </tr> <tr> <td style="padding-right: 20px;">8 7 7 5 4 2 0</td> <td style="padding: 0 10px;"> </td> <td style="padding-right: 20px;">3 1 1 3 4 5 5 7 8</td> </tr> <tr> <td style="padding-right: 20px;">9 5 3</td> <td style="padding: 0 10px;"> </td> <td style="padding-right: 20px;">4 4 6 9</td> </tr> </table>	Neroli		Joanne	8		0 7	9 7 7 4		6 8 9	9 9 7 6 6 4 3 3 0		2 1 3 3 3 4 6 7 8 8	8 7 7 5 4 2 0		3 1 1 3 4 5 5 7 8	9 5 3		4 4 6 9	
Neroli		Joanne																		
8		0 7																		
9 7 7 4		6 8 9																		
9 9 7 6 6 4 3 3 0		2 1 3 3 3 4 6 7 8 8																		
8 7 7 5 4 2 0		3 1 1 3 4 5 5 7 8																		
9 5 3		4 4 6 9																		
2	<p>i What is the range of Joanne's scores?</p>	1																		
2	<p>ii Which set of scores has the higher median? Justify your answer.</p>	2																		
2	<p>iii Are Neroli's scores normally distributed? Justify your answer.</p>	2																		
2	<p>iv Another member of the reading group looked at the stem-and-leaf plot and commented that there was a high correlation between Neroli and Joanne's scores. Do you agree? Explain.</p>	2																		

SAMPLE EXAMINATION PAPER

Section II (cont.)

Question 26 (13 marks)

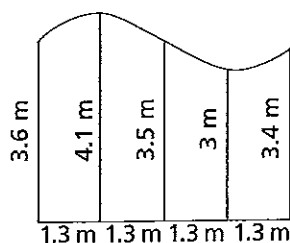
Marks

- a Lucy wants to spray her lawn to get rid of the weeds. The spray she chooses recommends the use of 30 mL of spray concentrate per 10 L of water.

i How many millilitres of the concentrate should be added to 7 litres of water? 1

ii Lucy finds after several applications that she has only 8 mL of spray concentrate left. How much water should she use with this amount of concentrate? 1

- b The diagram shows an aerial view of a swimming pool, with measurements as given.



i Use two applications of Simpson's rule to approximate the area of this cross-section. 2

ii The swimming pool is filled to a constant depth of 1.2 m. Find the volume of water required. ($1 \text{ m}^3 = 1000 \text{ L}$) 2

- c The formula $V = 1800(1.02)^t$ can be used to find the approximate value of a piece of jewellery which has been increasing in value since it was purchased at the beginning of 1970. V is the value in dollars and t is the time in years since 1970.

i What was the value of the jewellery in 1970? 1

ii What was the approximate value of the jewellery in 2000? 1

iii How many years after it was purchased would you expect the piece of jewellery to have doubled in value? 2

- d Wasim passes through two sets of traffic lights on his way to work. He knows that the probability of getting a green light at each set of lights is 0.4, the probability of amber is 0.1, and of red 0.5.

i Draw a probability tree diagram and write down the sample space. 1

ii What is the probability that both lights are red? 1

iii What is the probability that at least one light is green? 1

SAMPLE EXAMINATION PAPER

Section II (cont.)

Question 27 (13 marks)

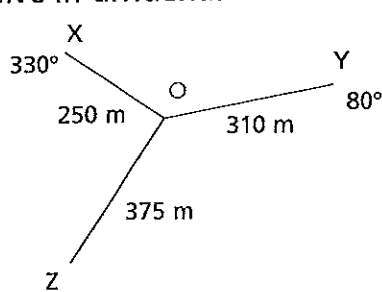
Marks		Marks																
	a A caravan purchased for \$12 500 in January 1997 is depreciated using the declining balance method at 15% per year. What is its value in January 2002?	1																
1																		
	b The mean age of the 20 members of the Green Youth conservation group is 19.5 years and the mean age of the 30 member Grey Nature group is 67.5 years. All of the members of both groups attend a joint meeting. What is the mean age of the combined group?	2																
1																		
	c 'Lottuhoh' is a lottery type game where players choose 2 numbers from 7																	
	i How many choices are there?	1																
	ii There are two 'Lottuhoh' games every week. Pete buys a ticket in every game. How many times would he expect to win in a year?	1																
	d The Body-Mass Index is used to determine whether adults are a healthy weight. The Body-Mass Index B is found by dividing the person's weight (mass m) in kilograms, by the square of the height (h) in metres.																	
	i Write a formula for the Body-Mass Index.	1																
	ii Rewrite the formula with m as the subject.	1																
2																		
	iii A certain swimmer has a Body-Mass Index of 21 and is 1.95 metres tall. How much does he weigh? Answer to the nearest kilogram.	1																
2																		
	e Medical researchers have been testing the effectiveness of a new drug. Some patients have been taking this drug while others have been given a vitamin pill. The researchers expected that those taking the drug would show an improvement in their symptoms while those taking the vitamin pills would not show any improvement.																	
1																		
1																		
2																		
	<table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;"></th> <th style="width: 20%;">Improvement</th> <th style="width: 20%;">No Improvement</th> <th style="width: 30%;">Total</th> </tr> </thead> <tbody> <tr> <td>Took Drug</td> <td style="text-align: center;">187</td> <td style="text-align: center;">63</td> <td style="text-align: center;">250</td> </tr> <tr> <td>Took Vitamin Pill</td> <td style="text-align: center;">95</td> <td style="text-align: center;">155</td> <td style="text-align: center;">250</td> </tr> <tr> <td>Total</td> <td style="text-align: center;">282</td> <td style="text-align: center;">218</td> <td></td> </tr> </tbody> </table>		Improvement	No Improvement	Total	Took Drug	187	63	250	Took Vitamin Pill	95	155	250	Total	282	218		
	Improvement	No Improvement	Total															
Took Drug	187	63	250															
Took Vitamin Pill	95	155	250															
Total	282	218																
	i How many people took part in the trial?	1																
	ii What percentage of those taking the drug showed improvement?	1																
	iii What percentage of those who showed improvement were taking the drug?	1																
1																		
1																		
1	iv What is the probability that a participant reported a result different to the scientists' expectations?	2																

SAMPLE EXAMINATION PAPER

Section II (cont.)

Question 28 (13 marks)

Marks

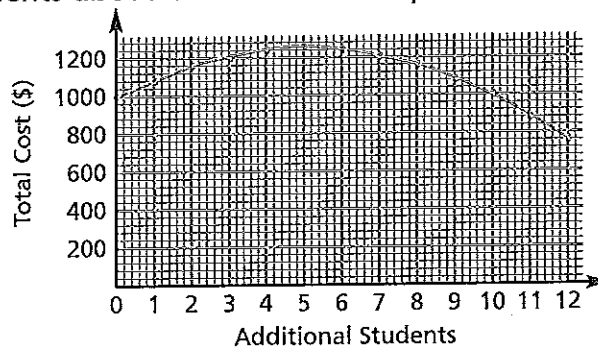
- a Rachel invests \$9000 into an account that pays 0.8% per month compound interest. What is the value of her investment at the end of 7 years? 1
- b Larissa has 1057 shares. If the market price is \$2.40 per share and the dividend yield is 6.25%, how much will she receive in dividends? 2
- c A compass radial survey of a rural property has been conducted and the diagram shows the result. The bearing at Z is missing.
- 

i What is the size of $\angle XOY$? 1

ii What is the area of $\triangle XOY$? 1

iii It is known that the boundary YZ is 600 m long. Find the bearing of Z from O. 2

- d A school will run an excursion if 20 or more students agree to participate. The school decides to subsidise the excursion by paying some of the costs. The graph shows the total cost to the school for different numbers of additional students above the minimum requirement of 20 participants.



- i What will be the total cost if 22 students go on the excursion? 1
- ii How many students participate if the total cost is a maximum? 1
- iii What is the average subsidy per student if 32 students go? 1
- The formula $C = 1000 + 100n - 10n^2$ was used to find the total cost, where C is the cost and n the number of additional students.
- iv Use the formula to find the total cost if an additional 15 students go. 1
- v The school knows that the maximum number of students who are eligible to participate is 36. Would they use this formula if more students could participate? Justify your answer. 2

————— End of paper —————

Answers on page 116, Worked solutions on page 117



ANSWERS

ANSWERS – Sample Examination Paper

Answers

1 B	2 A	3 D	4 D	5 B
6 B	7 D	8 D	9 A	10 A
11 C	12 C	13 A	14 B	15 C
16 D	17 C	18 A	19 A	20 C
21 B	22 D			

23 a 6.9 m b $x = 1$ c i 0.6 ii 0.784 d i -2 ii 2.5% e iii 34.4 m²

24 a 1.5×10^8 km b \$4625

c i $\bar{x} = 17.25$, $\sigma_{n-1} = 3.22$ ii Afternoon, the standard deviation is larger

d i $\angle ACD = 28^\circ$, $\angle ACB = 48^\circ$ ii 1065 m iii 826 m

25 a i 0.0452% ii \$4.52 b i 223 km ii 121 M iii 6 knots

c i 42 ii Both medians are 28 iii No, there are 5 different modes

iv No. There is insufficient information to make this claim

26 a i 21 mL ii $2\frac{2}{3}$ L b i 18.37 m² ii 22048 L c i \$1800 ii \$3260 iii 35 years

d i see solutions ii 0.25 iii 0.64

27 a \$5546 b 48.3 c i 21 ii 5 d i $B = \frac{m}{h^2}$ ii $m = Bh^2$ iii 80 kg

e i 500 ii 74.8% iii 66.3% iv $\frac{79}{250}$ (31.6%)

28 a \$17576 b \$158.55 c i 110° ii 36413 m² iii 202°

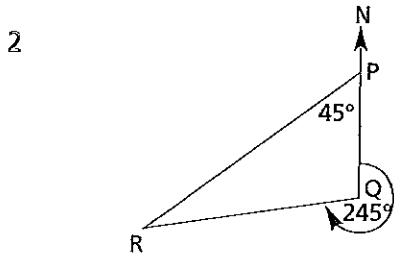
d i \$1160 ii 25 iii \$23.75 iv \$250

v No, the formula would give a negative value. There is no additional cost



Section I

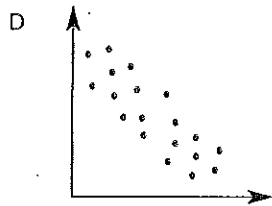
1 When $p = 2$, $3p^2 - p = 3 \times 2^2 - 2$
 $= 3 \times 4 - 2$
 $= 12 - 2$
 $= 10$



P is north-east of R
 $\therefore \angle RPQ = 45^\circ$
 Reflex $\angle RQP = 245^\circ$
 $\therefore \angle PQR = 360^\circ - 245^\circ$
 $= 115^\circ$
 $\angle PRQ + 115^\circ + 45^\circ = 180^\circ$
 angle sum of a triangle
 $\angle PRQ + 160^\circ = 180^\circ$
 $\angle PRQ = 20^\circ$

3 We don't know how many of each animal there are on the farm. The probability that an animal is a goat depends on how many goats there are. There is not enough information to tell.

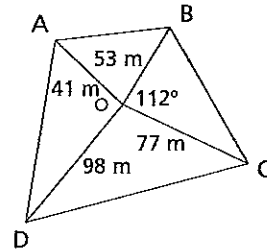
4 Negative correlation leans to the left.



5 $S = V_0 - Dn$
 $V_0 = \$1650, D = \$140, n = 7$
 $S = \$1650 - \140×7
 $S = \$1650 - \980
 $S = \$670$

6 $7x^2 - 5x + 2x + 4x^2 + 3x = 11x^2$

7 $\angle BOC = 132^\circ - 20^\circ$
 $= 112^\circ$



The triangle is not right-angled.
 3 sides and 1 angle; cosine rule

8 Mean = $\frac{4 + 5 + 2 + 2 + 7 + 4 + 4}{7}$
 $= 4$

Mode = 4

Ordered numbers are 2, 2, 4, 4, 4, 5, 7

Median = 4

Range = $7 - 2$
 $= 5$

Only the range is not equal to 4

9 Rate = 7% period = 4
 The table gives the value 3.3872
 $\$3000 \times 3.3872 = \$10\,161.60$

10 a $F = \frac{9C}{5} + 32$

11 Difference in longitude
 $= 150^\circ - 80^\circ$
 $= 70^\circ$

Time difference = $70 \div 15$
 $= 4.666666\dots$ hours
 $= 4$ hours 40 minutes

Sydney is east of Colombo

Sydney's time is 4 hours and 40 minutes ahead of Colombo's time.

Sydney time = 3.40 p.m.



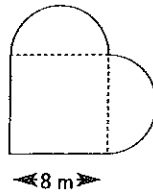
Section I (cont.)

12 Area of square = 8^2
 $= 64 \text{ m}^2$

Two semi-circles = area of a circle of radius 4 m

Area = πr^2
 $= \pi \times 4^2$
 $= 50.26548246... \text{ m}^2$

Total area = $64 + 50.26548...$
 $= 114.26548...$
 $= 114 \text{ m}^2$ (nearest m^2)



13 In science, Terri's mark was below the mean. In maths and geography, her mark was approximately 1 standard deviation above the mean. In English her mark was more than 2 standard deviations above the mean; English was her best performance.

14 Balance = $\$1296 - \300
 $= \$996$

Interest = $0.07 \times \$996 \times 2$
 $= \$139.44$

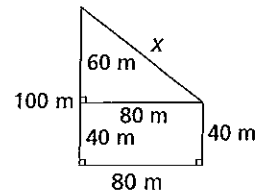
Total to be repaid = $\$996 + \139.44
 $= \$1135.44$

Each instalment = $\$1135.44 \div 24$
 $= \$47.31$

15 Expected profit
 $= 0.7 \times \$300 + 0.2 \times \$0 + 0.1 \times -\$1000$
 $= \$110$

16 $\frac{7t-2}{5} = \frac{t+4}{3}$
 $3(7t-2) = 5(t+4)$
 $21t - 6 = 5t + 20$
 $16t = 26$
 $t = \frac{26}{16}$
 $t = 1\frac{5}{8}$

17



Let the unknown side be x

$x^2 = 60^2 + 80^2$

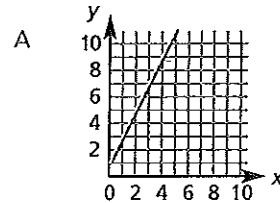
$x^2 = 10000$

$x = 100$

Perimeter = $100 + 100 + 40 + 80$
 $= 320 \text{ m}$

18 A The mean will increase by 9 and the standard deviation will stay the same. The spread of scores is the same.

19



gradient = 2, y-intercept = 1

20 $P = \$5000, r = 0.02, n = 8$

$A = P(1+r)^n$

$= \$5000(1 + 0.02)^8$

$= \$5858.296905...$

$= \$5858$ (nearest dollar)

Interest = $\$5858 - \5000

$= \$858$

21 $l \propto t^2$

$l = kt^2$

When $t = 2, l = 1$

$1 = k \times 2^2$

$1 = 4k$

$k = \frac{1}{4}$

$l = \frac{1}{4}t^2$

When $t = 4$

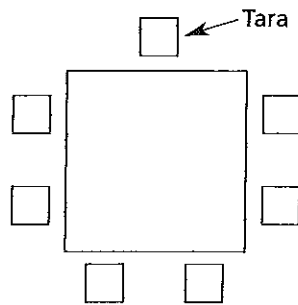
$l = \frac{1}{4} \times 4^2$

$l = 4 \text{ m}$



Section I (cont.)/Section II

22

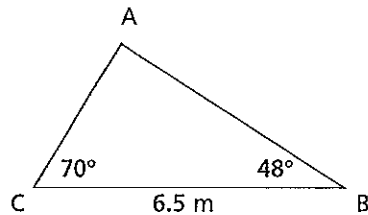


There are 6 selections for the first chair,
then 5 for each of those 6 ...
Selections = $6 \times 5 \times 4 \times 3 \times 2 \times 1$
= 720

Section II

Question 23

a $\angle CAB = 180^\circ - (70^\circ + 48^\circ)$
= 62°



$$\frac{c}{\sin C} = \frac{a}{\sin A}$$

$$\frac{c}{\sin 70^\circ} = \frac{6.5}{\sin 62^\circ}$$

$$c = \frac{6.5}{\sin 62^\circ} \times \sin 70^\circ$$

$$c = 6.917740174\dots$$

AB = 6.9 m (1 d.p.)

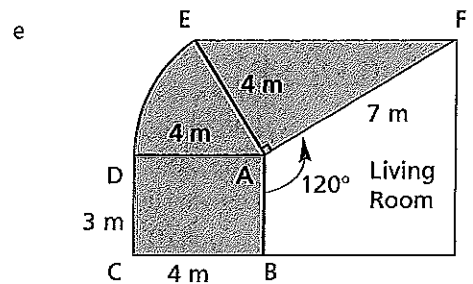
b $5(3x - 4) + 2(6 - x) = 5$
 $15x - 20 + 12 - 2x = 5$
 $13x - 8 = 5$
 $13x = 13$
 $x = 1$

c i $P(\text{painting is sold}) = 0.4$
 $P(\text{not sold}) = 1 - 0.4$
 $= 0.6$
 ii $P(\text{none are sold}) = 0.6 \times 0.6 \times 0.6$
 $= 0.216$

$P(\text{at least one is sold})$
 $= 1 - P(\text{none are sold})$
 $= 1 - 0.216$
 $= 0.784$

d i $z = \frac{x - \bar{x}}{s}$
 $= \frac{50 - 61}{5.5}$
 $= -2$

- ii 95% of scores have $-2 \leq z \leq 2$
 5% have $z < -2$ or $z > 2$
 2.5% have $z < -2$
 2.5% of boxes have less than 50 matches.



- e
- i $\angle EAF = 90^\circ$ and
 $\angle FAB = 120^\circ$ (given)
 $\angle DAB = 90^\circ$ angle of a rectangle
 $\angle DAE = 360^\circ - (90^\circ + 120^\circ + 90^\circ)$
 $= 360^\circ - 300^\circ$
 $= 60^\circ$
- ii DA = CB (opposite sides of a rectangle)
 EA = DA (radii of sector)
 $\therefore EA = 4$ m
 Area = $\frac{1}{2}bh$
 $= \frac{1}{2} \times 7 \times 4$
 $= 14 \text{ m}^2$



Section II (cont.)

e iii Area of rectangle:

$$\begin{aligned} A &= lb \\ &= 4 \times 3 \\ &= 12 \text{ m}^2 \end{aligned}$$

Area of sector:

$$\begin{aligned} A &= \frac{\theta}{360} \pi r^2 \\ &= \frac{60}{360} \times \pi \times 4^2 \\ &= 8.37758041... \\ &= 8.4 \text{ m}^2 \text{ (1 d.p.)} \end{aligned}$$

$$\begin{aligned} \text{Total area} &= 14 + 12 + 8.377... \\ &= 34.4 \text{ m}^2 \text{ (1 d.p.)} \end{aligned}$$

Question 24

a $D = 5T$

$$D = 3 \times 10^5 \times 5 \times 10^2$$

$$D = 1.5 \times 10^8 \text{ km}$$

b $M = \$200$, $r = 0.015$ (6% ÷ 4)

$$n = 20 \text{ (5} \times \text{4)}$$

$$\begin{aligned} A &= M \left\{ \frac{(1+r)^n - 1}{r} \right\} \\ &= \$200 \times \left\{ \frac{1.015^{20} - 1}{0.015} \right\} \\ &= \$4624.733421... \\ &= \$4625 \text{ (nearest dollar)} \end{aligned}$$

c i $\bar{x} = 17.25$

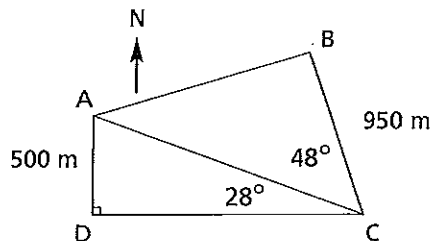
$$\sigma_{n-1} = 3.222788177...$$

$$\sigma_{n-1} = 3.22 \text{ (2 d.p.)}$$

ii There was greater variation in the afternoon because the standard deviation was larger.

d i $\angle ACD = 298^\circ - 270^\circ$
 $= 28^\circ$

$$\begin{aligned} \angle ACB &= 346^\circ - 298^\circ \\ &= 48^\circ \end{aligned}$$



ii $\sin 28^\circ = \frac{500}{AC}$

$$AC = \frac{500}{\sin 28^\circ}$$

$$AC = 1065.027234...$$

$$AC = 1065 \text{ m (nearest metre)}$$

iii $c^2 = a^2 + b^2 - 2ab \cos C$

$$c^2 = 950^2 + 1065^2$$

$$- 2 \times 950 \times 1065 \times \cos 48^\circ$$

$$= 682762.6...$$

$$c = 826.2945...$$

$$c = 826 \text{ m (nearest metre)}$$

(Using the actual value for AC from the calculator's memory.)

Question 25

a i Rate = 16.5% ÷ 365

$$= 0.045205479...%$$

$$= 0.0452% \text{ (4 d.p.)}$$

ii Interest = 0.000452 × \$500 × 20

$$= \$4.520547945...$$

$$= \$4.52 \text{ (nearest cent)}$$



WORKED SOLUTIONS – Sample Examination Paper

Section II (cont.)

b i Degree difference = $41^\circ - 39^\circ$
 $= 2^\circ$

$$l = \frac{\theta}{360} 2\pi r$$

$$= \frac{2}{360} \times 2 \times \pi \times 6400$$

$$= 223.4021443\dots$$

$$= 223 \text{ km (nearest km)}$$

ii Distance = $223.402\dots \div 1.852$
 $= 120.6275077\dots$
 $= 121 \text{ M (nearest nautical mile)}$

iii Speed = $120.6275\dots \div 20$
 $= 6.031375385\dots$
 $= 6 \text{ knots (nearest knot)}$

c i Range = $49 - 7$
 $= 42$

ii Neroli: Median = 28
 Joanne: Median = 28
 Both sets of scores have the same median.

iii Neroli's scores are not normally distributed. There are 5 modes, all of which are different to the median.

iv No. We have no information about the correlation of their scores. Although both distributions have a similar shape and pattern, it may be that all the books to which Neroli gave a high rating may be the books to which Joanne gave a low rating and vice versa.

Question 26

a i $30 \text{ mL}/10 \text{ L} = 3 \text{ mL}/\text{litre}$
 For 7 litres we need $3 \times 7 = 21 \text{ mL}$

ii $3 \text{ mL}/\text{litre} = 1 \text{ mL}/\frac{1}{3} \text{ litre}$
 $8 \text{ mL require } 8 \times \frac{1}{3} \text{ litres} = 2\frac{2}{3} \text{ litres}$

b i $A_1 \approx \frac{h}{3}(d_f + 4d_m + d_l)$
 $= \frac{1.3}{3} \times (3.6 + 4 \times 4.1 + 3.5)$
 $= 10.1833333\dots$

$$A_2 \approx \frac{h}{3}(d_f + 4d_m + d_l)$$

$$= \frac{1.3}{3} \times (3.5 + 4 \times 3 + 3.4)$$

$$= 8.19$$

$$\text{Total} = 10.18333\dots + 8.19$$

$$= 18.373333\dots$$

$$= 18.37 \text{ m}^2 \text{ (2 d.p.)}$$

ii $V = Ah$
 $= 18.37333\dots \times 1.2$
 $= 22.048 \text{ m}^3$

$$\text{Water Volume} = 22.048 \times 1000 \text{ litres}$$

$$= 22\,048 \text{ litres}$$

c i $V = 1800(1.02)^t$
 In 1970, $t = 0$
 $V = 1800 \times 1.02^0$
 $= 1800$

In 1970, the value of the jewellery was \$1800

ii In 2000, $t = 30$
 $V = 1800 \times 1.02^{30}$
 $= 3260.450851\dots$
 $= 3260 \text{ (nearest whole number)}$

In 2000, the value of the jewellery was \$3260

iii Jewellery has doubled in value when
 $V = 3600$
 $3600 = 1800(1.02)^t$
 $2 = 1.02^t$

Guess $t = 33$
 $1.02^{33} = 1.922231404\dots$
 $t = 36$

$$1.02^{36} = 2.039887344\dots$$

$$t = 35$$

$$1.02^{35} = 1.999889553$$

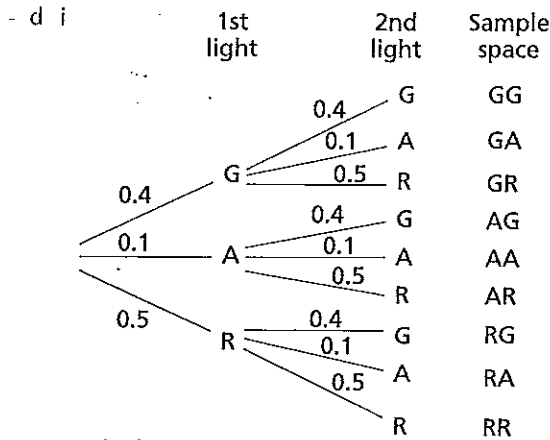
After 35 years the jewellery doubles in value.

the



WORKED SOLUTIONS – Sample Examination Paper

Section II (cont.)



ii $P(RR) = 0.5 \times 0.5$
 $= 0.25$

iii $P(\text{no green})$
 $= P(RR) + P(RA) + P(AR) + P(AA)$
 $= 0.25 + 0.5 \times 0.1 + 0.1 \times 0.5 + 0.1 \times 0.1$
 $= 0.36$

$P(\text{at least one green}) = 1 - P(\text{no green})$
 $= 1 - 0.36$
 $= 0.64$

Question 27

a $S = V_0(1 - r)^n$
 $V_0 = \$12\,500$, $r = 0.15$, $n = 5$
 $S = \$12\,500 \times (1 - 0.15)^5$
 $S = \$5\,546.316406\dots$
 $S = \$5\,546$ (nearest dollar)

b Green Youth:
 Total of ages = 20×19.5
 $= 390$

Grey Nature:
 Total of ages = 30×67.5
 $= 2025$

Total age of combined group
 $= 390 + 2025$
 $= 2415$

Mean age = $2415 \div 50$
 $= 48.3$

c i Number of choices = $\frac{7 \times 6}{2 \times 1}$
 $= 21$

ii $P(\text{Pete wins a game}) = \frac{1}{21}$

There are $2 \times 52 = 104$ games a year

Expected wins = $\frac{1}{21} \times 104$
 $= 4.95238\dots$

Pete would expect to win approximately 5 times.

d i $B = \frac{m}{h^2}$

ii $m = Bh^2$

iii $B = 21$, $h = 1.95$

$m = Bh^2$

$m = 21 \times 1.95^2$

$= 79.8525$

$= 80$ kg (nearest kg)

The swimmer would weigh 80 kg

e

	Symptoms Improved	Did Not Improve	Total
Drug	187	63	250
Vitamin	95	155	250
Total	282	218	

i $250 + 250 = 500$

ii Improvement = $\frac{187}{250} \times 100\%$
 $= 74.8\%$

iii Taking drug = $\frac{187}{282} \times 100\%$
 $= 66.31205674\dots$
 $= 66.3\%$ (1 d.p.)

iv Different result = $63 + 95$
 $= 158$

$P(\text{different result}) = \frac{158}{500}$
 $= \frac{79}{250}$ (31.6%)



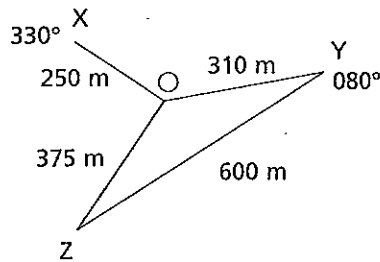
Section II (cont.)

Question 28

a $A = P(1 + r)^n$
 $P = \$9000, r = 0.008, n = 84$
 $A = \$9000 \times (1.008)^{84}$
 $= \$17576.28988\dots$
 $= \$17576$ (nearest dollar)

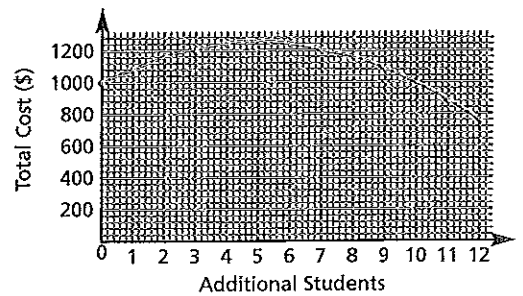
b Dividend yield = 6.25%
 Dividend = 6.25% of \$2.40
 $= \$0.15$
 Larissa's dividends = $1057 \times \$0.15$
 $= \$158.55$

c i $\angle XOY = (360 - 330)^\circ + 80^\circ$
 $= 110^\circ$
 ii Area = $\frac{1}{2}ab \sin C$
 $= \frac{1}{2} \times 250 \times 310 \times \sin 110^\circ$
 $= 36413.08906\dots$
 $= 36413 \text{ m}^2$ (nearest m^2)



iii Let $\angle YOZ = \theta$
 $\cos C = \frac{a^2 + b^2 - c^2}{2ab}$
 $\cos \theta = \frac{310^2 + 375^2 - 600^2}{2 \times 310 \times 375}$
 $\cos \theta = -0.530215053\dots$
 $\theta = 122.0199863\dots$
 $\theta = 122^\circ$ (nearest whole degree)
 Bearing = $80^\circ + 122^\circ$
 $= 202^\circ$

d



- i \$1160
- ii Maximum cost when 5 additional students go on the excursion, that is if 25 students participate.
- iii 32 students in total
 $= 12$ additional students
 Total cost = \$760
 Average cost = $\$760 \div 32$
 $= \$23.75$
- iv $C = 1000 + 100n - 10n^2$
 If $n = 15$
 $C = 1000 + 100 \times 15 - 10 \times 15^2$
 $C = 250$
 The total cost would be \$250
- v 37 students
 $= 17$ additional students
 $C = 1000 + 100n - 10n^2$
 If $n = 17$
 $C = 1000 + 100 \times 17 - 10 \times 17^2$
 $C = -190$
 The school would not use this formula because it would give a negative result. There would not be any additional cost to the school if $n > 16$

tely

al

0

0