ABBOTSLEIGH

2011

**YEAR 12
TRIAL HIGHER SCHOOL CERTIFICATE
EXAMINATION**

General Mathematics

General Instructions

- Reading time – 5 minutes.
- Working time – 2 ½ hours.
- Write using blue or black pen.
- Calculators may be used.
- A Formulae sheet is provided with this paper.

Total marks - 100

**Section I
22 Marks**
- Attempt Questions 1-22
- Allow about 30 minutes for this section.
- Give your answers on the multiple choice answer sheet.

**Section II
78 Marks**
- Attempt Questions 23 - 28
- Allow about 2 hours for this section.
- Use a separate writing booklet for each question.

Outcomes Assessed

Preliminary course
- **P1** develops a positive attitude to mathematics and appreciates its capacity to provide enjoyment and recreation
- **P2** applies mathematical knowledge and skills to solving problems within familiar contexts
- **P3** develops rules to represent patterns arising from numerical and other sources
- **P4** represents information in symbolic, graphical and tabular forms
- **P5** represents the relationships between changing quantities in algebraic and graphical form
- **P6** performs calculations in relation to two-dimensional and three-dimensional figures
- **P7** determines the degree of accuracy of measurements and calculations
- **P8** models financial situations using appropriate tools
- **P9** determines an appropriate form of organisation and representation of collected data
- **P10** performs simple calculations in relation to the likelihood of familiar events
- **P11** justifies his/her response to a given problem using appropriate mathematical terminology

HSC course
- **H1** appreciates the importance of mathematics and its usefulness in contributing to society
- **H2** integrates mathematical knowledge and skills from different content areas in exploring new situations
- **H3** develops and tests a general mathematical relationship from observed patterns
- **H4** analyses representations of data in order to make inferences, predictions and conclusions
- **H5** makes predictions about the behaviour of situations based on simple models
- **H6** analyses two-dimensional and three-dimensional models to solve practical and mathematical problems
- **H7** interprets the results of measurements and calculations and makes judgements about reasonableness
- **H8** makes informed decisions about financial situations
- **H9** develops and carries out statistical processes to answer questions which she/he and others have posed
- **H10** solves problems involving uncertainty using basic principles of probability
- **H11** uses mathematical argument and reasoning to evaluate conclusions drawn from other sources, communicating his/her position clearly to others

SECTION I

22 Marks
Attempt Question 1 – 22
Allow about 30 minutes for this section.

Use the multiple-choice answer sheet.

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

Sample: 2 + 4 =   (A) 2   (B) 6   (C) 8   (D) 9

            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:

                                    correct

            A ⨂   B ⨂↙   C ⬭   D ⬭

---

1.   Write 625 × 440 in scientific notation

   (A) 2.75×10^{-5} (B) 2.75×10^{5} (C) 2.75×10^{4} (D) 2.75×10^{-6}

2.   If $1^\circ = 60$ M, the distance between City A (26°N, 110°E) and City B (18°S, 110°E) in nautical miles is

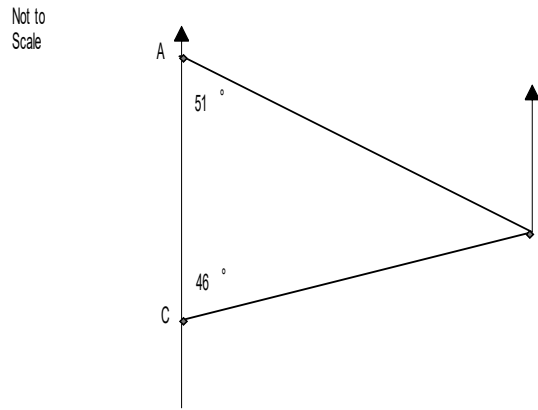   (A) 4889.28   (B) 2640   (C) 1820   (D) 480

3. The scatter graph below is most likely to have a correlation coefficient of:

   (A) -0.94   (B) -0.2   (C) 0   (D) 0.88
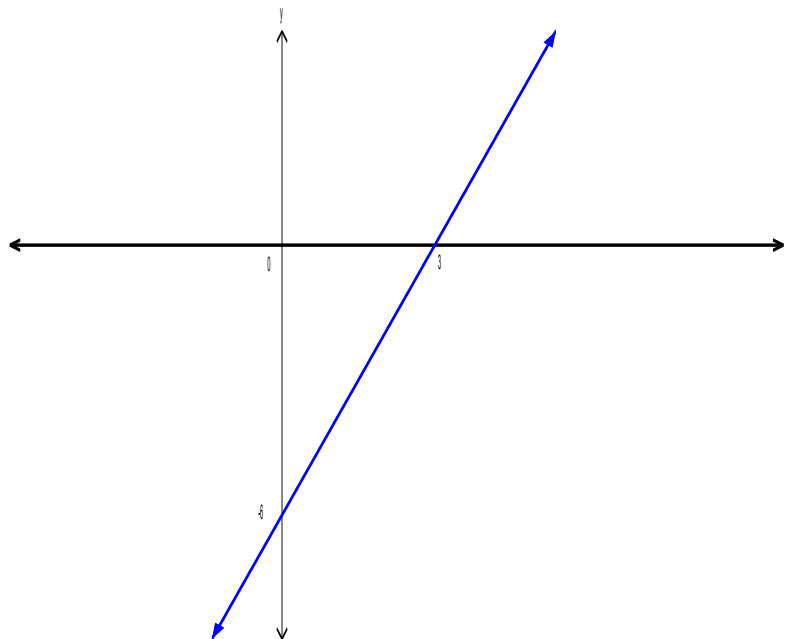
4. What is the compass bearing of A from B?

(A) N51°W   (B) S51°E   (C) N46°E   (D) S46°W

5. Matt, Darcy, Emily and Lucie enter a running race. In how many different ways can first and second place be filled, assuming no ties?

(A) 24   (B) 16   (C) 12   (D) 8

6. Which equation could represent the following graph?

(A) $y = -2x + 3$ (B) $y = -6x + 3$ (C) $y = \frac{1}{2}x - 6$ (D) $y = 2x - 6$

7. Two months after joining an aerobics class, Jonathan had reduced his weight of 89.5 kg by 15%. What is his new weight?

   (A) 59 kg   (B) 67.1 kg   (C) 74.5 kg   (D) 76.1 kg

8. Amy is saving for a trip to France after she finishes the HSC. She works at the *Park Café* most Thursday nights and weekends. The normal pay rate is $15.80 per hour for the first 4 hours then time and a half for additional hours worked. How much would Amy earn on a Thursday night when she works from 4:00 pm to 10:30 pm?

   (A) $122.45   (B) $102.70   (C) $98.75   (D) $86.90

9. Use the formula $T = a + (n-1)d$ to find the value of d when $a = 8$, $n = 4$ and $T = -7$

   (A) 4   (B) 3   (C) $\dfrac{1}{3}$ (D) -5

10. Sarah wants a feature glass window made up of a quarter of an ellipse and a rectangle. The window is to be placed over the stairwell of the new house she is building.
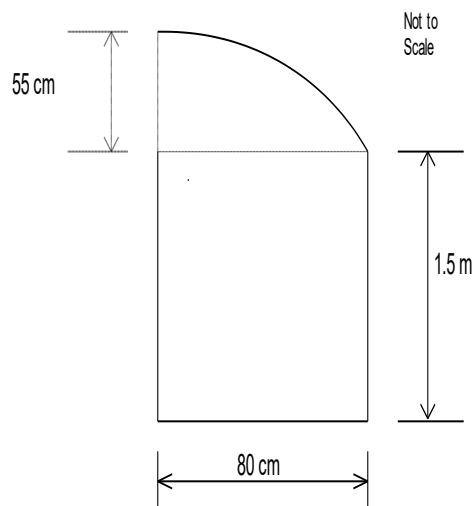
    The area of the glass window is closest to:

    (A) 25 823 cm^2 (B) 18 912 cm^2 (C) 15 456 cm^2 (D) 13 943 cm^2

11. Hannah solved the following equation, but has made two errors in her working. Which 2 steps contain an error from the previous line?

$$2(1-x)-4(3+x)=5$$
$$2-2x-12+4x=5 \qquad ...line\ 1$$
$$-10+2x=5 \qquad ...line\ 2$$
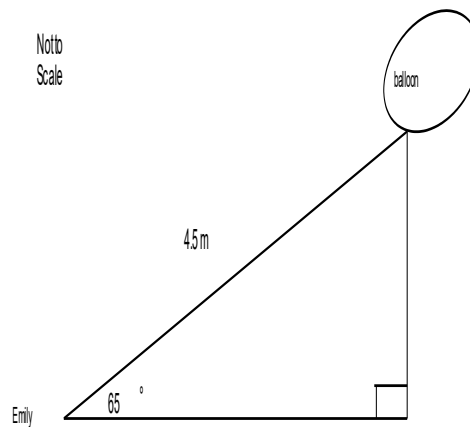$$2x=15 \qquad ...line\ 3$$
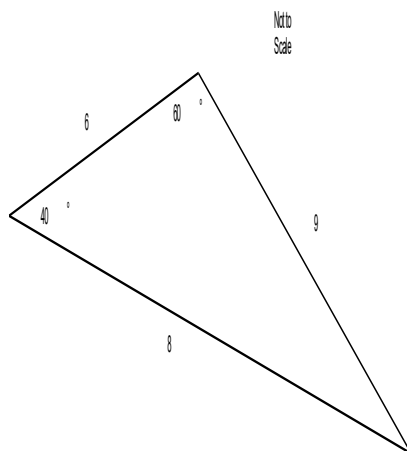$$x=13 \qquad ...line\ 4$$

(A) Lines 1 and 2   (B) Lines 1 and 4   (C) Lines 2 and 3   (D) Lines 3 and 4

12. Emily is holding a balloon by a 4.5 metre long string. If the wind blows the balloon so that the string makes an angle of 65° with the ground, what is the height of the balloon above the ground?

Not to Scale

balloon

4.5 m

65 °

Emily

(A) 9.7 m   (B) 4.1 m   (C) 3.6 m   (D) 1.9 m

13. Referring to the diagram below, which statement is correct?

Not to Scale

6

60 °

40 °

9

8

(A) $9^2 = 8^2 + 6^2 + 2 \times 8 \times 6\ cos\ 40°$

(B) $\dfrac{8}{\sin 60^o} = \dfrac{6}{\sin 80^o}$

(C) $6^2 = 9^2 + 8^2 - 2 \times 8 \times 6\ cos\ 80°$

(D) $\dfrac{9}{\sin 40^o} = \dfrac{8}{\sin 80^o}$

This information relates to question 14 and 15

Justin's marks and the class mean and standard deviation in three tests are given in the table.

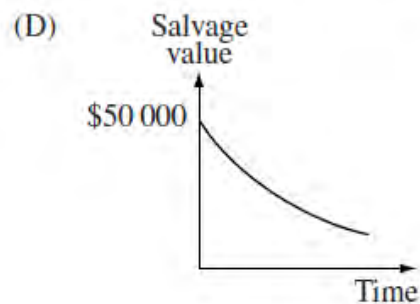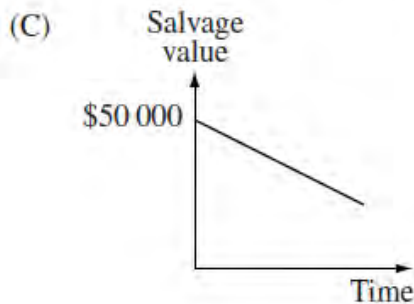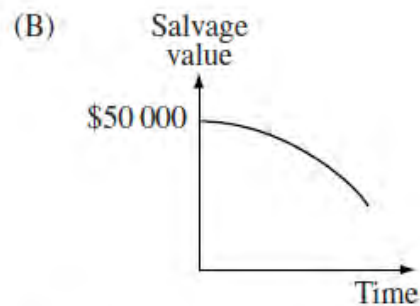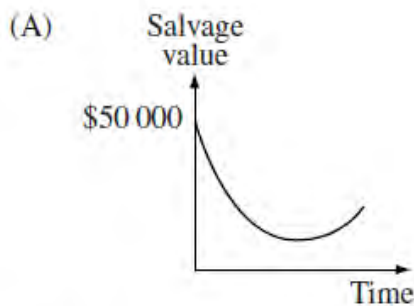|	PDHPE	English	Biology
Justin's mark	59	60	70
Class mean	55	50	72
Class standard deviation	4	5	2

14. Which of the following would be a correct statement?

    (A) Justin's Biology mark is 1 standard deviation *above* the class mean for Biology

    (B) Justin's English mark is 2 standard deviations *below* the class mean for English

    (C) Justin's English mark represents a z-score of 1.5

    (D) Justin's PDHPE mark represents a z-score of 1

15. By comparing Justin's test results, which one of the following is correct?

    (A) He did better in English compared to PDHPE

    (B) He did equally well in English and Biology

    (C) He did better in PDHPE compared to English

    (D) He did better in Biology compared to English

16. Mary bought a new computer system for her small business. It cost $50 000 and depreciated using the declining balance method. Which graph best represents the salvage value of the computer system over time?

(A) Salvage value / $50 000 / Time

(B) Salvage value / $50 000 / Time

(C) Salvage value / $50 000 / Time

(D) Salvage value / $50 000 / Time

17. There are 12 girls in a class of 28 students. The ratio of boys to girls in the class is:

   (A) 4:3   (B) 3:4   (C) 4:7   (D) 3:7

18. In the 2010 Bathurst 1000 car race, the winning time was 6 hours and 13 minutes. If the race is 1000 kilometres in length, what was the average speed for the entire race, of the car that won, in metres per second?

   (A) 4.47×10^1 m/s   (B) 2.68×10^3 m/s   (C) 1.63×10^4 m/s   (D) 1.61×10^5 m/s

19. The stem-and-leaf plot shows the daily sales of juice at a sandwich shop.

   If the range of sales is 44 what is the value of Ⓝ ?

2	Ⓝ 5 5
3	4 7 7 9
4	0 5 8
5	2
6	0 7

   (A) 3

   (B) 4

   (C) 23

   (D) 24

20. The table below shows the monthly repayment per $1000 on a monthly reducible loan.

Term in years	Interest Rate (p.a.)				
	7%	7.25%	7.50%	7.75%	8%
5	19.8012	19.9194	20.0379	20.1570	20.2765
10	11.6108	11.7401	11.8702	12.0011	12.1328
15	8.9883	9.1286	9.2701	9.4128	9.5566
20	7.7530	7.9036	8.0559	8.2095	8.3644
25	7.0678	7.2281	7.3899	7.5533	7.7182
30	6.6530	6.8218	6.9921	7.1641	7.3377

   The amount repaid per month on a loan of $570 000 over 15 years at 7.25% would be?

   (A) $9128.60   (B)$8369.97   (C)$5203.30   (D)$2514.93

21. In a small country town, the age of the population is normally distributed. The mean age is 34 years and the standard deviation is 9 years. Between which two ages will 68% of the population's ages lie?

(A) 25 and 43   (B) 23 and 45   (C) 16 and 52   (D) 7 and 61
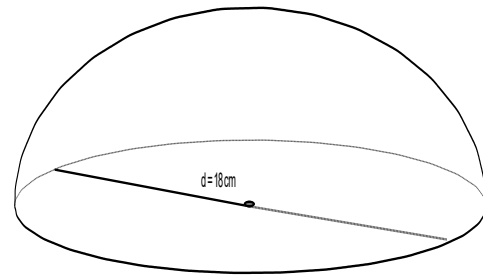
22. The surface area of this closed hemisphere is closest to:

(A) 3053.6 cm^2

(B) 2035.8 cm^2

(C) 763.4 cm^2

(D) 508.9 cm^2

Not to Scale

d = 18cm

SECTION II

78 Marks
Attempt questions 23-28.
Allow approximately 2 hours.

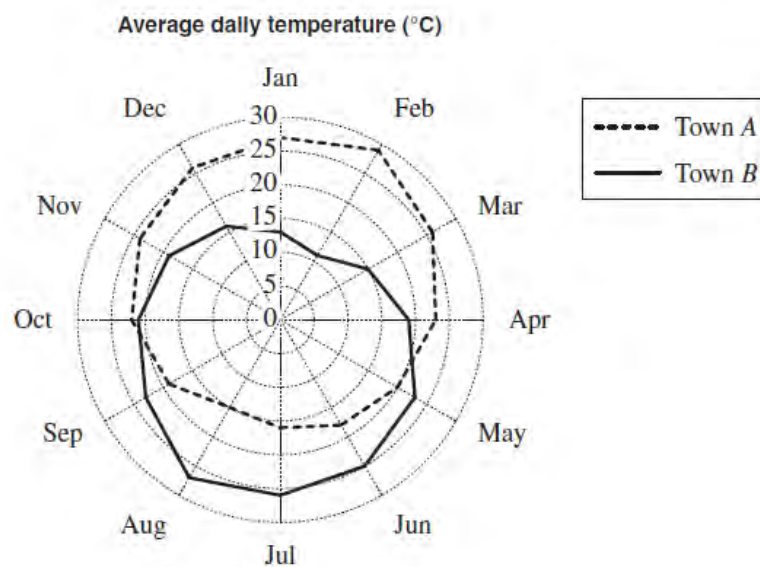**Question 23 (13 marks) Start a new booklet**   **Marks**

a) Evaluate C to three decimal places if $C = \sqrt{\dfrac{a}{a+b}}$ and $a = 2.3$ and $b = 5.1$ **2**

b) Simplify: $\dfrac{mn^2}{15q} \times \dfrac{5q}{n}$ **2**

c) This radar chart was used to display the average daily temperatures each month for two different towns.

i) What is the average daily temperature for Town A for November?   **1**

ii) In which months is the average daily temperature of the two towns the same?   **1**

iii) How many full months show the average daily temperature in Town A higher than in Town B?   **1**

iv) Describe the difference in temperatures from December to February for each Town.   **1**

d) Madeline surveyed the students in her year group and summarised the results in the table shown below.

	Play Basketball	Do Not Play Basketball	TOTALS
Male	44	26	70
Female	27	A	59
TOTALS	71	58	B

i) Calculate the values of A and B.   **2**

ii) What fraction of the year group plays basketball?   **1**

iii) What percentage of those students who DON'T play basketball are male? Answer to 1 decimal place.   **1**

iv) What percentage of females play basketball? Answer to 1 decimal place.   **1**

Question 24 (13 marks)   Start a new booklet.   **Marks**

a) The following is a sketch of a new housing development, showing Roy's Creek   **2**
    next to the housing complex that has been built.

    Use two applications of Simpson's Rule to calculate the approximate area of Roy's Creek.
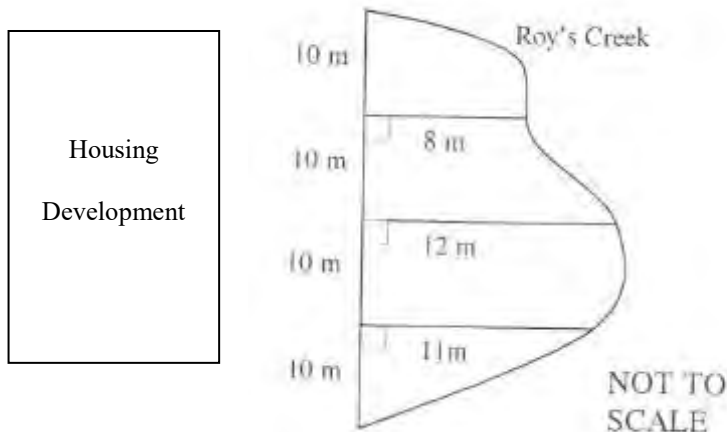

b) Naarah's gross pay is $1400 per fortnight.

   i) Deductions from Naarah's gross pay are: **3**

   - $243.16 for tax per fortnight
   - $9.78 for union fees each week
   - $52.80 for private health insurance per month

   Calculate Naarah's fortnightly net pay.

   ii) Naarah is paid an annual leave loading on 17.5 % of 4 weeks' gross pay.   **1**
       Calculate her annual leave loading.

c) Alia visits Italy for a holiday. She pays €220 (220 euros) for a pair of shoes.
   This price includes a value added tax (V.A.T.) of 15%.

   i)   What was the price of the shoes before the VAT was added?   **1**

   ii)   How much is €220 in Australian dollars, if $A1 is worth €0.62?   **1**

d) A camera was purchased by a professional photographer for $2500 and depreciated over six years, as shown in the graph below.
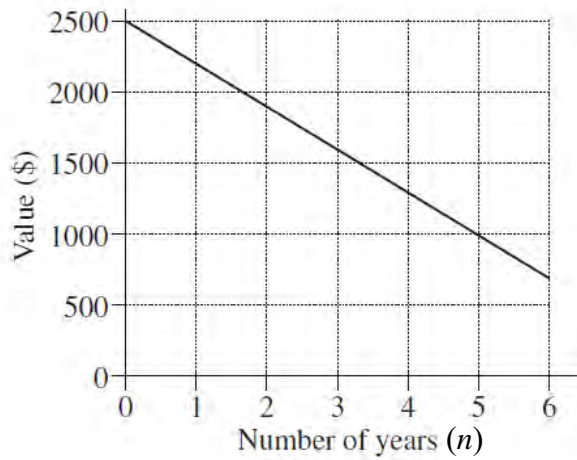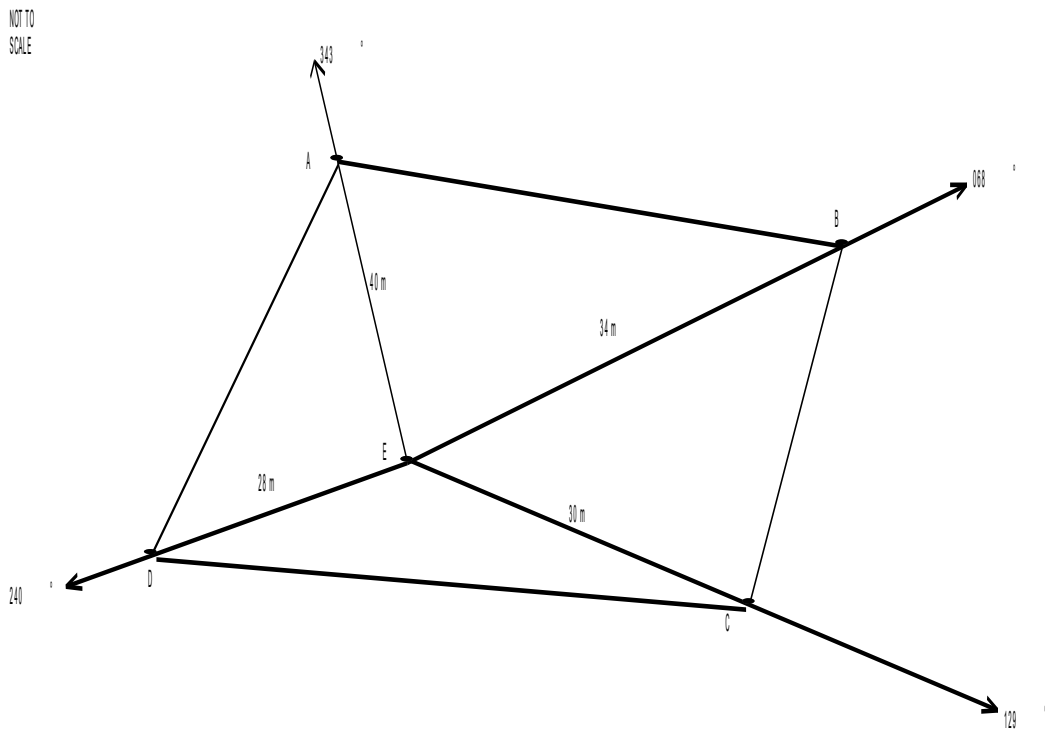

i) Calculate the amount by which the camera depreciated each year.   **1**

ii) Write an equation to represent the straight-line depreciation of the camera.   **2**

iii) Use your answer from (ii) or otherwise, to determine when the camera's value reached $1500. Answer in years and months.   **2**

Question 25 (13 marks) Start a new booklet   **Marks**

a) The local time in Perth is 1115 and the local time in Adelaide is 1345.   **1**
   Calculate the difference in longitude between the two locations.

b) Grace's height is measured as 168 cm. Calculate the percentage error of this   **2**
   measurement, correct to 3 significant figures.

c) Solve for x: $\sqrt[3]{x+3} = 8$ **2**

d) Zoe's mother travels overseas to San Francisco (37°N, 122°W) for a business conference.   **2**
   Zoe's family lives in Sydney (34°S, 151°E), Australia. On Monday 11th July, Zoe rings her
   mother at 3:20 pm Sydney time. What <u>day and **exact** time</u> is it then in San Francisco?

e) A scientist tags 400 birds in a forest. The next week she returns and catches 50 birds   **2**
   and counts that 16 of are tagged. What is the estimated population of birds in the
   forest?

Question 25 continued   **Marks**

f) A sketch of a radial survey is shown.

NOT TO
SCALE

343 °

A

068 °

B

40 m

34 m

E

28 m

30 m

D

240 °

C

129 °

Calculate the:

i) area of ABCE correct to one decimal place.   **2**

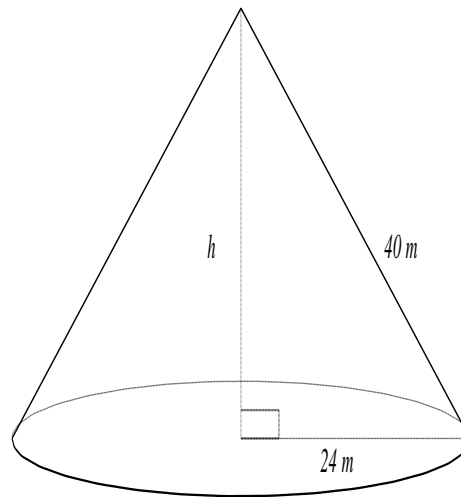ii) distance from B to C to the nearest metre.   **2**

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Question 26   (13 marks)   Start a new booklet.   **Marks**

a) Rome $(42^{o}N , 13^{o}E)$ and Berlin $(52^{o}N,13^{o}E)$ lie on the same great circle.   **2**
   If the radius of the Earth is 6400 km, calculate the distance, between Rome
   and Berlin. Answer to the nearest 10 km.

b) A cone is shown below.

Not to
Scale

h 40 m

24 m
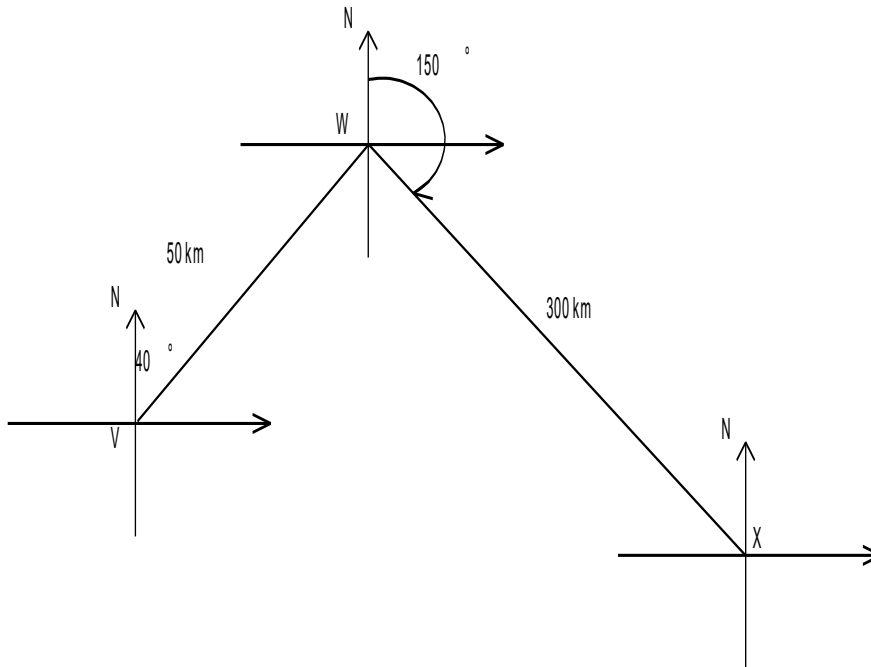
   i) Show that the perpendicular height, h, of the cone is 32 m.   **1**

   ii) Given 1 kL = 1000 L calculate the capacity of the cone.   **2**
      Answer to the nearest kilolitre.

c) A plane flies 50 km from Vannune (V) to Wavern (W) on a bearing of 040°T. It then flies
on a bearing of 150°T to Xanter (X) which is 300 km from Wavern.

Not to
Scale

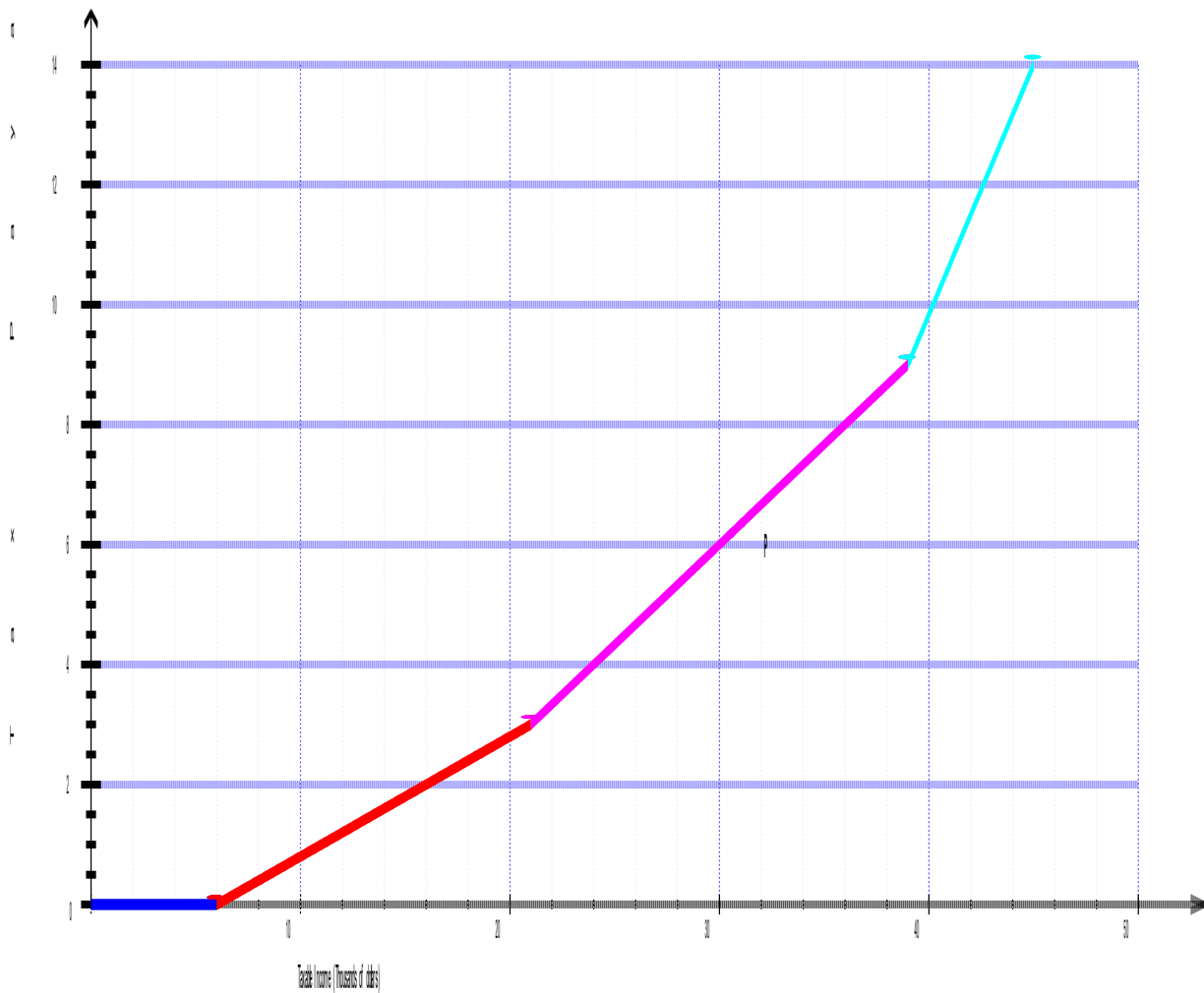**Copy or trace the diagram onto your page.**

   i) Show that the size of $\angle$VWX is 70° **1**

   ii) Find the distance from Vannune to Xanter.   **2**

   iii) What is the bearing of Vannune from Xanter?   **2**

d) The graph below shows tax payable against taxable income, in thousands of dollars.

Taxable Income (Thousands of dollars)

i) Use the graph to find the tax payable on a taxable income of $35 000.   **1**

ii) Use suitable points to find the gradient of the section of the graph labelled P.   **1**

iii) Calculate the amount <u>available</u> per dollar, after tax, for a taxable income   **1**
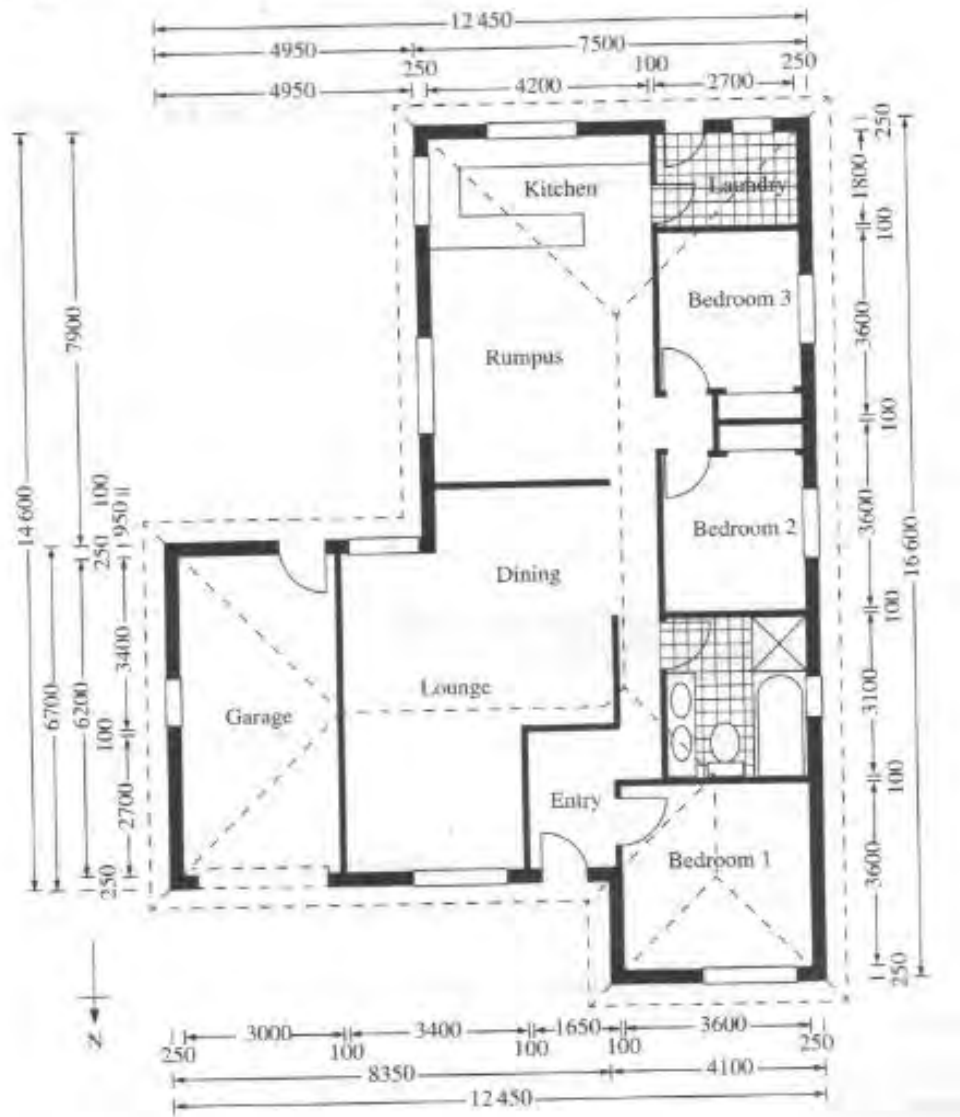   between $21 000 and $39 000.

Question 27 (13 marks) Start a new booklet   **Marks**

a) In how many ways can a team of 4 debaters be chosen from 10 debaters?   **1**

b) The diagram shows the floor plan of a house.

i) Copy one symbol used on the plan in the bathroom and explain what it represents.   **1**

ii) What is the length of the west side of the house? Answer in metres.   **1**

iii) Bedroom 2 is to be carpeted. Carpet is laid in the most economical way so   **2**
that it uses the smallest possible length of carpet without waste.
The carpet chosen is 1.8 metres wide and sold at $265.80 per metre laid.
How much will it cost to carpet Bedroom 2?

c) The data below shows a back-to-back stem and leaf plot of the marks of males
and females in a Mathematics test. The marks are out of 40.

Marks in a Mathematics Test

Males			Females
9 8 6	0	4	
4 4 4 2 2	1	2 2 5 9	
9 3 2 1 1	2	3 3 4 5 5 6	
5 4 2	3	2 2 8	
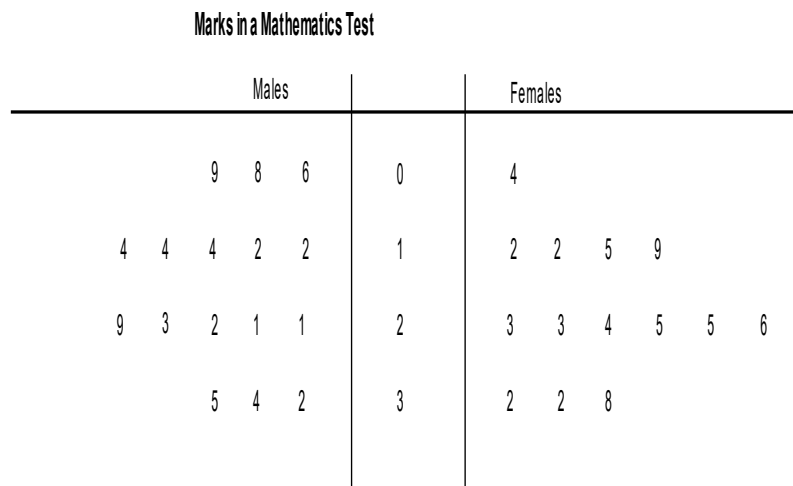
i) What was the highest mark given to the male students in the class?   **1**

ii) Find the mean test mark for the **whole** class.   **1**

iii) Calculate the five figure data number summary for the **male**   **2**
Mathematics test results.

iv) The box-and-whisker plot for female Mathematics test results is
attached to the back of this question booklet.

    1) What is the interquartile range of the female Mathematics test results?   **1**

    2) Draw the **male Mathematics test results** onto this grid.   **2**

    3) Use your box-and-whisker plots to explain the differences   **1**
in the shape of each set of test results.

Question 28   (13 marks)   Start a new booklet   **Marks**

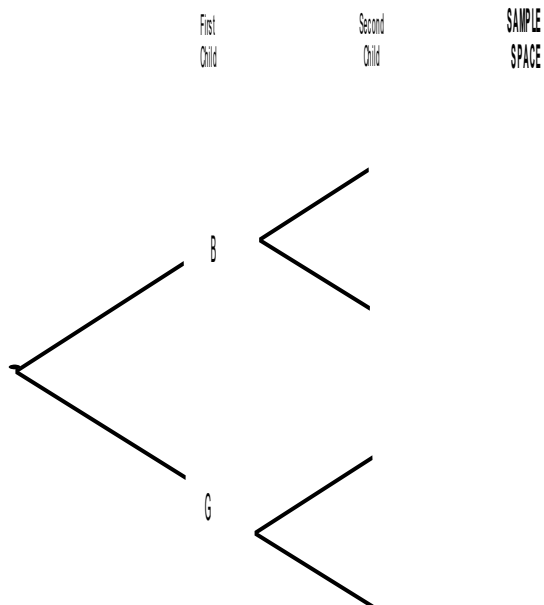a) The probability of a baby girl being born in New South Wales is 0.52.

The tree diagram below is for a family of two children.   **2**
Copy or trace the tree diagram below into your booklet.
Show the probabilities on each branch and complete the sample space.

First   Second   SAMPLE
Child   Child   SPACE

B

G

Use your tree diagram to calculate the probability of a family having:

ii) two girls   **1**

iii) at least one boy   **1**

Question 28 continued **Marks**

b) William and Kate are newlyweds and are deciding whether to take out private health insurance.
   If you are a member of a private health fund, it will pay 85% of the cost of your medical
   consulting fees. Annual membership of the private fund William and Kate are considering costs
   $680 per year.

   i) If an average medical consulting fee is $32, write an equation for the **1**
   total cost per year, C, paid for medical consultations. Let n represent the
   number of medical consultations. Assume William and Kate do NOT take out
   private health insurance.

   ii) If William and Kate do take out private health insurance, show that the equation **2**
   for the total cost per year, C, in terms of the number of medical consultations, n,
   is given by $C = 680 + 4.8n$

   iii) On the graph paper provided at the end of this booklet, draw the **2**
   graph of $C = 680 + 4.8n$

   iv) Briefly describe what the point of intersection represents. **1**

c) The spreadsheet shows monthly home loan repayments with interest rate changes from March to September 2010.

Monthly home loan repayments

	A	B	C	D	E
1					
2	Dates	March 2010	May 2010	July 2010	September 2010
3	Increase/Decrease	-1.00%	-0.10%	0.05%	0.25%
4	Rate	5.85%	5.75%	5.80%	6.05%
5	$1 000	$6.35	$6.29	$6.32	$6.47
6	$50 000	$318	$315	$316	$324
7	$100 000	$635	$629	$632	$647
8	$150 000	$953	$944	$948	$971
9	$200 000	$1 270	$1 258	$1 264	$1 295
10	$250 000	$1 588	$1 573	$1 580	$1 618
11	$300 000	$1 905	$1 887	$1 896	$1 942
12	$350 000	$2 223	$2 202	$2 212	$2 266
13	$400 000	$2 541	$2 516	$2 529	$2 589
14					

i) What is the change in monthly repayments on a $200 000 loan from March 2010 to May 2010?   **1**

ii) Miss Cameron wants to borrow $300 000 to buy an apartment in the city.   **2**

Miss Cameron's bank approves loans for customers if their loan repayments are no more than 30% of their monthly gross salary.
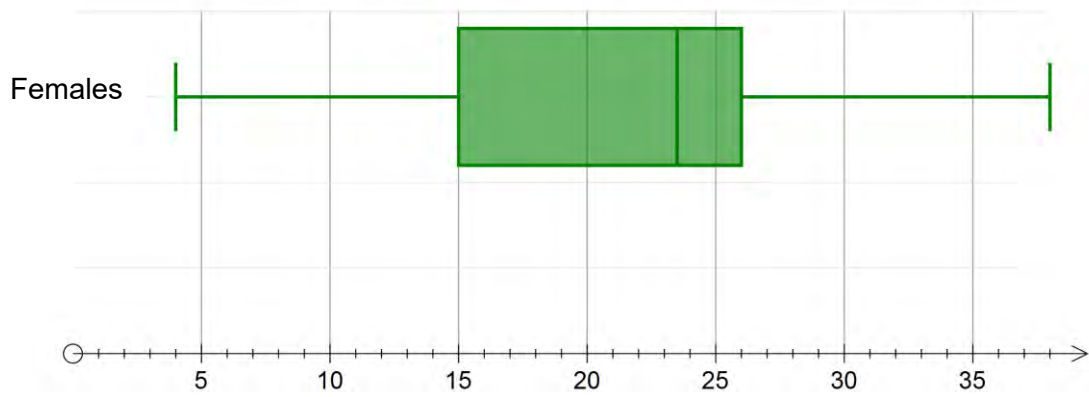
Miss Cameron's monthly gross salary is $6 250.

If she had applied for the loan in **September 2010**, would her bank have approved her loan? Justify your answer with suitable calculations.

END OF ASSESSMENT

Answer sheet to Question 27 c) iv) 2)

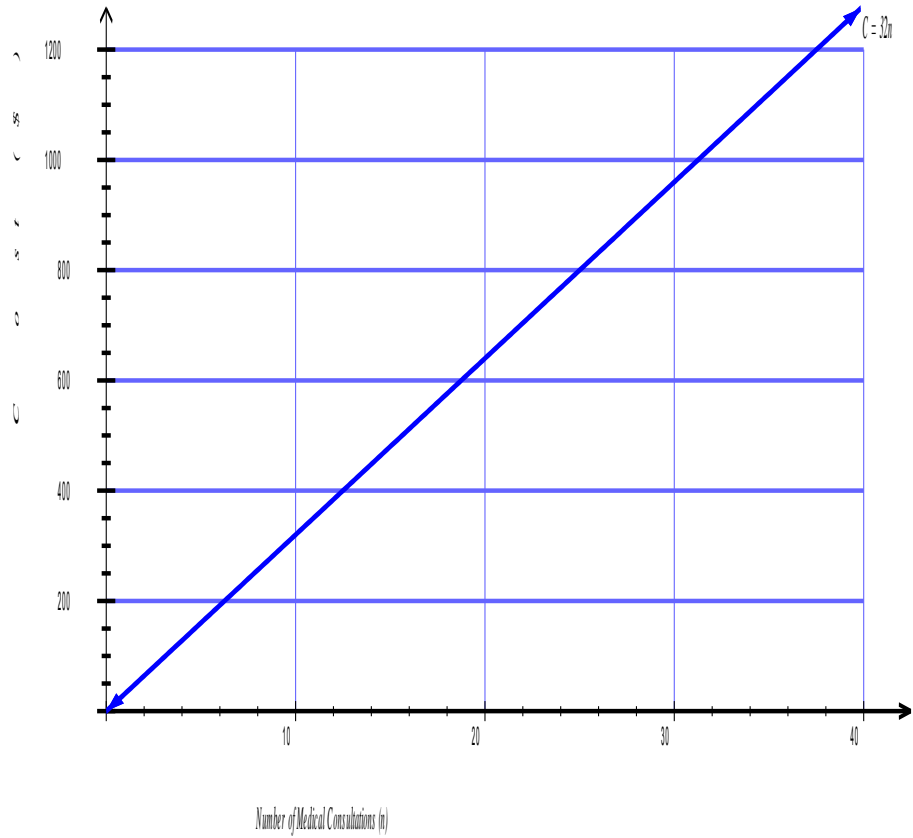**Attach this sheet to your Question 27 Answer Booklet**

Marks in a Mathematics Test

Answer sheet to Question 28 b iii

Attach this sheet to your Question 28 Answer Booklet

Number of Medical Consultations (n)

GENERAL TRIAL 2011.

MULTIPLE CHOICE.

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

SECTION 2. (YR 12 GENERAL TRIAL 2011)

QUESTION 23 (13 marks)

a) $C = \sqrt{\dfrac{2.3}{2.3+5.1}}$

     $= \sqrt{\dfrac{2.3}{7.4}}$

      $= 0.55750...$ ✓

      $= 0.558 \ (3 \ dp)$ ✓

b) $\dfrac{mn^2}{15q} \times \dfrac{5q}{n} = \dfrac{mn}{3}$ ✓✓

c) i) Town A, November $= 24°C$ ✓

   ii) During September & April

     towns have same temp. ✓

   iii) 6 complete months temp

     town A $>$ temp town B ✓

   iv) the difference in temp of

     town A to town B is

     increasing from Dec → Feb ✓

d) i) $A = 59 - 27$ $B = 71 + 58$

      $= 32$ ✓ $= 129$ ✓

   ii) $\dfrac{play \ bball}{year \ group} = \dfrac{71}{129}$ ✓

   iii) $\dfrac{male \ dont \ play}{total \ dont \ play} = \dfrac{26}{58}$

         $= 44.8\%$ ✓

   iv) $\dfrac{females \ play \ bball}{females} \times 100$

     $= \dfrac{27}{59} \times 100$

     $= 45.76...$

     $= 45.8\%$ ✓

     $=$

     no rounding

QUESTION 24. (13 marks)

a) $A \doteq \dfrac{10}{3}\left\{(0+4\times8+12)+(12+4\times11+0)\right\}$ ✓

       $\doteq \dfrac{10}{3}\left\{44+56\right\}$

       $\doteq 333\frac{1}{3} \; m^2$ ✓

b) (i) Gross pay = \$1400 per fortnight.

    Deductions per fortnight:

      tax = \$243·16

      union = \$9·78 × 2

      health = $\dfrac{52\cdot80 \times 12}{26}$

      TOTAL = \$287.09 (2 dp)   ✓

    ∴ Net pay = \$1400 − 287·09   ✓

          = \$1112·91

(ii)   4 weeks Gross pay × 0·175

    = 0·175 × 2 × 1400   ✓

    = \$490   ✓

C. (i)   115% = €220

      1% = $\dfrac{44}{23}$ (1·91...)

      100% = €191.30 (2 dp) ✓

(ii) x = €220

      1 = €0.62

      x = 220 ÷ 0·62

        = \$354·84 (2 dp) ✓

d) i) depreciation over 5 years

$= 2500 - 1000$

$= 1500$

per year $= \dfrac{1500}{5}$

$= \$300$ ✓

(ii) $S_V = 2500 - 300n$ ✓✓

(iii) $S_V = 1500$

$1500 = 2500 - 300n$ ✓

$\dfrac{-1000}{-300} = n$

$n = 3\frac{1}{3}$ years

$= 3$ years 4 months ✓

QUESTION 25 (13 marks)

a) time difference : 1345 and 1115

$= 2.5$ hours

$2.5 \times 15 = 37.5°$ ✓

b) absolute error $= 0.5cm$

% error $= \dfrac{0.5}{168} \times 100$ ✓

$0.2976....$

$= 0.298 \%$ (3 sig fig) ✓

c) $\sqrt[3]{x+3} = 8$

$x+3 = 8^3$ ✓

$x = 512 - 3$

$x = 509$ ✓

Question 25 (cont.)

d) Sydney $(34°S \ 151°E)$

San Francisco $(37°N \ 122°W)$
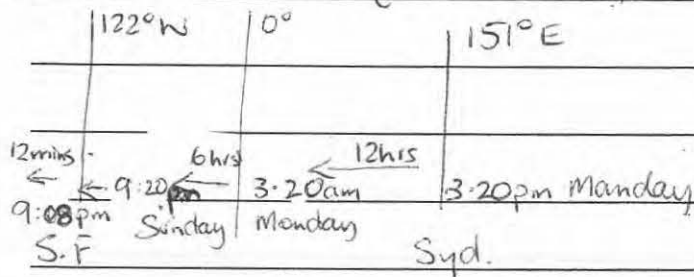
longitude difference $= 273°$

time difference $= 1092$ mins

$= 18$ hrs 12 mins

Sydney is ahead 18 hrs 12 mins.

SF $\to 9:08$ pm Sunday. ✓✓ July 10

e) $\dfrac{16}{50} = \dfrac{400}{x}$ ✓

$x = \dfrac{50 \times 400}{16}$

$x \doteq 1250.$ ✓

f)(i) Area ABCE

$A_{ABE} = \frac{1}{2} \times 40 \times 34 \times \sin(17+68)$

$= 20 \times 34 \times \sin 85$

$= 677.41....$

$A_{BEC} = \frac{1}{2} \times 30 \times 34 \times \sin(129-68)$

$= 15 \times 34 \times \sin 61$

$= 446.06$

$A_T = 1123.47 \ m^2$

$= 1123.5 \ m^2$

(ii) $BC^2 = 30^2 + 34^2 - 2 \times 30 \times 34 \times \cos 61$

$BC^2 = 1066.98....$

$= 32.66.$

$= 33m$ (nearest.

QUESTION 26 (13 marks)

a) Rome 42°N , Berlin 52°N

∠ difference 52° - 42° = 10° ✓

$d = 2 \times \Pi \times r \times \dfrac{\theta}{360}$

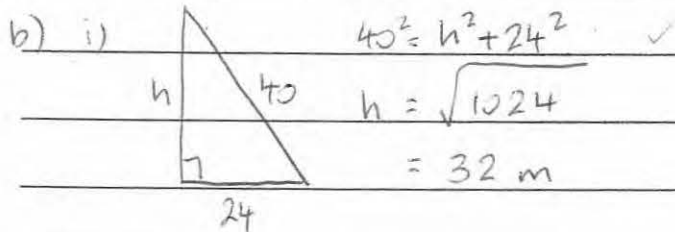$= 2 \times \Pi \times 6400 \times \dfrac{10}{360}$ ✓

$= 1117.01\ldots$

$= 1120$ km (nearest 10 km) ✓

$\dfrac{\theta}{=}$

$\dfrac{10 \times 60}{1.852}$

$= 1110$ km

b) i)

$40^2 = h^2 + 24^2$ ✓

$h = \sqrt{1024}$

$= 32$ m

ii) $V = \frac{1}{3} \Pi r^2 h$

$= \frac{1}{3} \Pi \times 24^2 \times 32$

$= 19301.94526 \, m^3$ ✓

$1 m^3 = 1000 L$

$= 19301945.26 \, L$

$= 19301.94 \, KL$

$= 19302 \, KL$ ✓

c)
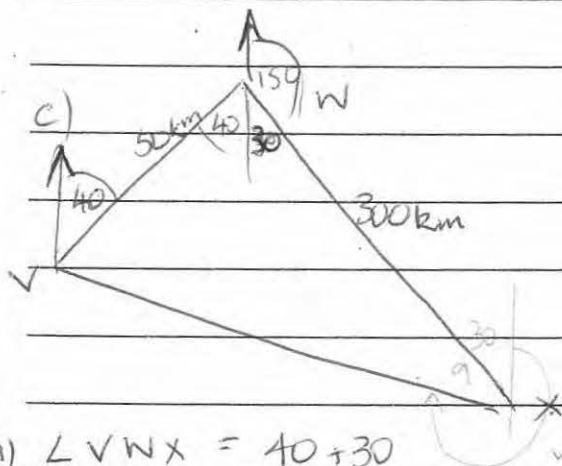
i) $\angle VWX = 40 + 30$

$= 70$

(40° from alternate ∠
30° from straight ∠)

ii) $d_{vx}^2 = 50^2 + 300^2 - 2 \times 50 \times 300 \times \cos 70$ ✓

$\qquad = 82239.3957$

$\qquad d_{vx} = 286.774\ldots$ ✓

$\qquad \vdots$

iii) find $\angle NXV$

$\qquad \dfrac{\sin X}{50} = \dfrac{\sin 70}{286.774\ldots}$

$\qquad \sin X = \dfrac{50 \times \sin 70}{286.774\ldots}$

$\qquad\qquad = 9° \text{ (nearest}$ ✓

$\qquad$ Bearing: $360 - (30 + 9)°$

$\qquad\qquad = 321° \text{ (True)}$ ✓

d) i) $\$7500$ from graph ✓

$\quad$ ii) $\quad m = \dfrac{9000 - 3000}{39000 - 21000}$

$\qquad\qquad = \dfrac{6000}{18000}$

$\qquad\qquad = \dfrac{1}{3}$ ✓

$\quad$ iii) Tax rate between $\$21000$ and $\$39000$

$\qquad\qquad = \dfrac{1}{3} \times 1.00$

$\qquad\qquad = 33\frac{1}{3} \text{ cents per dollar}$

$\qquad \therefore 66.7 \text{ cents per dollar}$

$\qquad\qquad \text{is available after tax}$

QUESTION 27

a) order NOT important.

$$\frac{\boxed{10} \times \boxed{9} \times \boxed{8} \times \boxed{7}}{\boxed{4} \times \boxed{3} \times \boxed{2} \times \boxed{1}}$$

or $^{10}C_4 = 210$ ✓ 1

b) i) ⊐ door
   ⊠ shower
   (▭) bath   1
   ⊡ toilet
   |⊙⊙| double vanity.
   \# tiled floor

ii) 16·6 m ✓ 1

iii) bedroom 2 = 3600 × 2700
              = 3·6 × 2·7 m

   Carpet 1·8 m wide
   ∴ 2 × 2·7 required
   ∴ cost = 2 × 2·7 × 268·80 ✓
          = $1435·32   2
   (including cupboard.) ✓

c) i) 35 ✓ 1

   ii) $\bar{x} = \frac{616}{30}$
           = 20·53 ✓ 1

   iii) max = 35
        $Q_3 = 26$
        Md = 17·5   2
        $Q_1 = 12$
        min = 6

QUESTION 27 (CONT)

iv) 1. IQR = 26 - 15

   = 11   ✓ ①
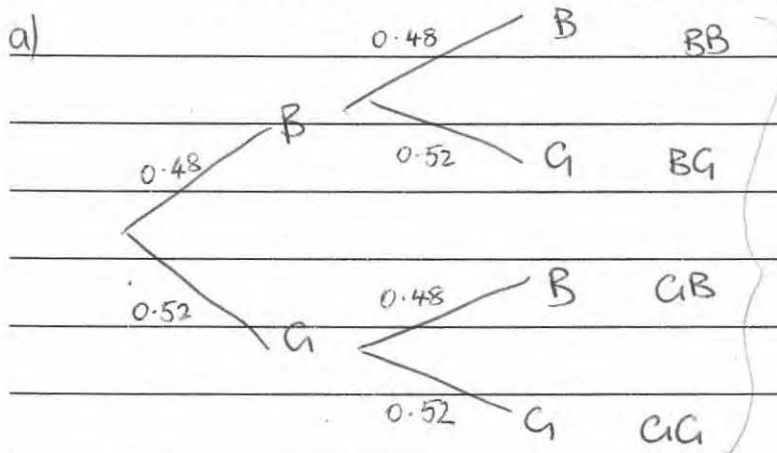
2. on paper

3. femals have a -ve skew ⎫
   OR males have a +ve skew ⎬ ①
   OR range for males smaller
   OR IQR for female smaller.

QUESTION 28. (13 marks)

a)   First Child 2nd Child SS.

(i) $P(GG) = 0.52 \times 0.52 = 0.2704$ ✓①

   P(at least one boy) $= P(\overline{GG})$

                       $= 1 - 0.2704$

                       $= 0.7296$ ✓ ①

b) i) $C = 32n$ ✓ ①

ii) $C = 0.15 \times 32n + 680$ ✓

   $= 4.8n + 680$ ✓ 2

iv) on paper

iv) point of intersection is
    the break even point; ✓ ①
    the number of consultations
    makes it worthwhile to have
    insurance.

QUESTION 28 (CONT.)

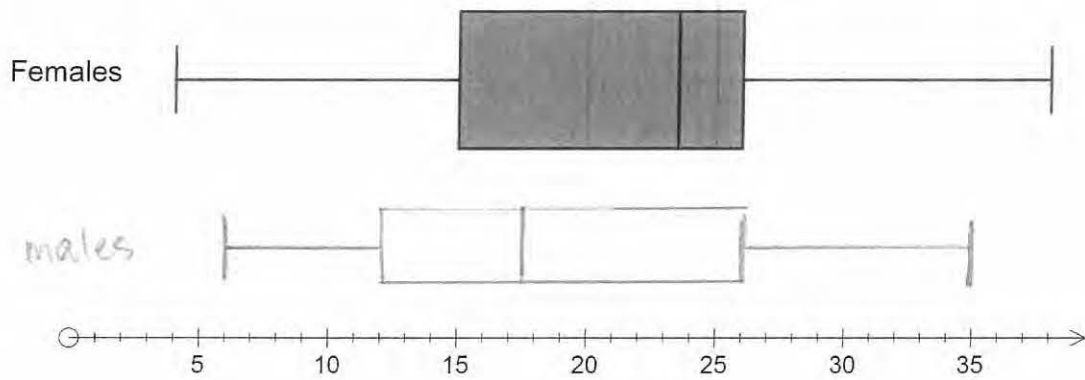c) i) decrease of $12. ✓ 1

ii) $0.3 \times 6250 = \$1875$ ✓ 2
she must earn $1942 ✓
∴ her application would
be rejected.

Answer sheet to Question 27 c) iv) 2)

Attach this sheet to your Question 27 Answer Booklet

Marks in a Mathematics Test

Answer sheet to Question 28 b ii

Cost ($)

Number of Medical Consultations (n)