Barker College

Mathematics General 2

Staff Involved:

- JML*   • BHC*
- LAK   • AXD
- JWH   • GDH
- KJL   • DZP
- TE

Number of copies: 165

General Instructions

- Reading time - 5 minutes
- Working time - $2\frac{1}{2}$ hours
- Write using black or blue pen
  Black pen is preferred
- Board-approved calculators may
  be used
- A formulae and data sheet is provided at
  the back of this paper
- In Questions 26 – 30, show relevant
  mathematical reasoning and/or calculations

Total marks – 100

Section I   Page 2 – 10
25 marks
- Attempt Questions 1 – 25
- Allow about 35 minutes for this section

Section II   Pages 11 – 30
75 marks
- Attempt Questions 26 – 30
- Allow about 1 hours 55 minutes for this section

Section I

25 marks

Attempt Questions 1 – 25.

Allow about 35 minutes for this section.

Use the multiple-choice answer sheet for Questions 1– 25.

Choose the best response and fill in the response oval completely.

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1 In a grocery store every fifth bottle of milk is checked for a used-by-date.

What is the method of sampling?

(A) Census

(B) Random

(C) Stratified

(D) Systematic

2 A four litre tin of paint is made using a mixture of blue, white and green paint in the ratio of $3 : 5 : 2$.
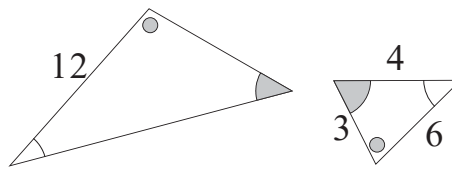
How much blue paint is needed per tin?

(A) 2000 mL

(B) 1200 mL

(C) 900 mL

(D) 300 mL

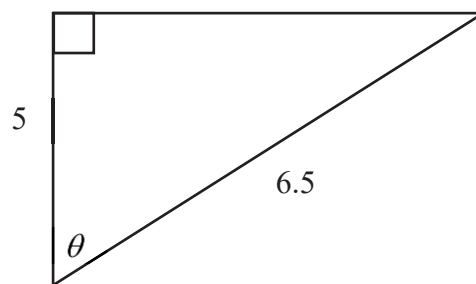**3** What is the population standard deviation of the data presented in the table below?

Score	Frequency
1	3
2	4
3	2
4	6
5	7
6	3

(A) 1·49

(B) 1·52

(C) 1·58

(D) 1·61

4 What is the scale factor for the following pair of similar figures?

(A) $\dfrac{1}{6}$

(B) $\dfrac{1}{4}$

(C) $\dfrac{1}{3}$

(D) $\dfrac{1}{2}$

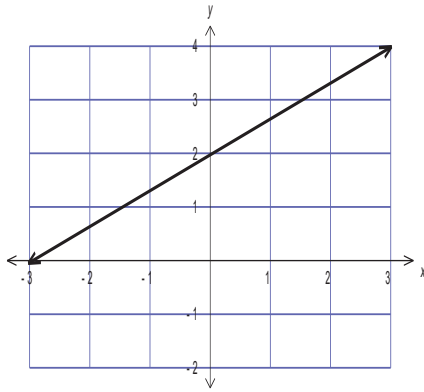**5** What is the size of θ ?   Answer correct to nearest degree.

(A) 38

(B) 39

(C) 40

(D) 50

6 A small town has 5000 people eligible to vote. There were 4500 people who voted at the last election.

What is the relative frequency of a person who did **not** vote at the last election?

(A) 10%

(B) 45%

(C) 50%
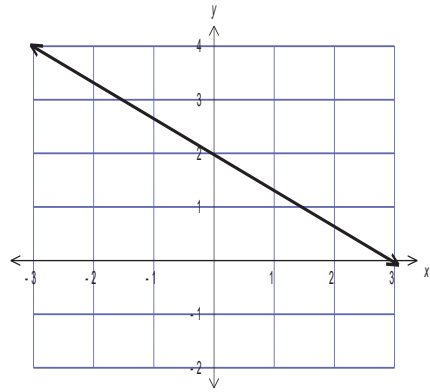
(D) 90%

7   Which graph represents the equation $y = \dfrac{2}{3}x + 2$?

(A)

(B)

(C)
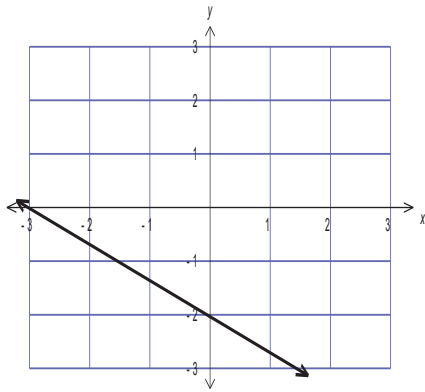
(D)
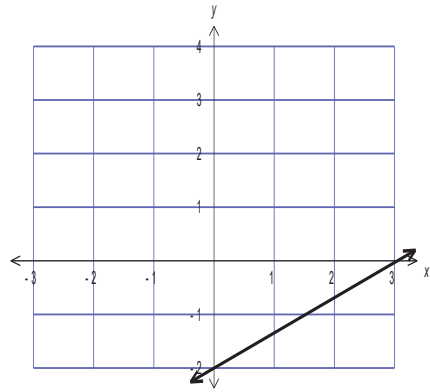
8   Michael works in a shop where the normal weekday rate of pay is *$12* per hour. On Saturdays he is paid time-and-a-half. How much did Michael earn in a week in which he worked for seven hours on Thursday and three hours on Saturday?

(A) $84

(B) $120

(C) $138

(D) $180

9 A car depreciates in value from $39 000 to $12 340 in four years using the declining balance method.

What is the annual rate of depreciation to the nearest whole percentage?

(A) 17%

(B) 18%

(C) 25%

(D) 26%

10 Calculate the surface area of a closed hemisphere with a radius of 5m. Answer to the nearest square metre.

NOT TO SCALE

5 m
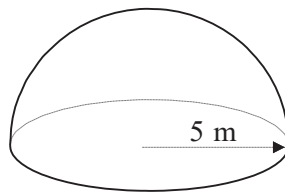
(A) 79

(B) 236

(C) 314

(D) 393

11 The compass bearing of *Y* from *X* is N32ºW.

NOT TO SCALE

Y   N

32º

W   E
      X

S
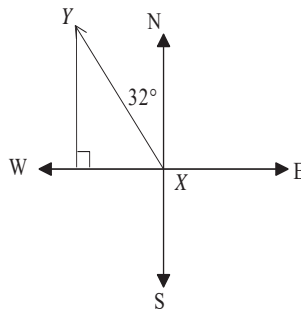
What is the compass bearing of *X* from *Y*?

(A) 032º

(B) S58ºW

(C) 302º

(D) S32ºE

12 There are 30 runners in a marathon race. How many different selections are possible for first and second place? (Assume there are not dead-heats.)

(A) 870

(B) 900

(C) 59

(D) 290

13 Which graph best represents $y = x^3$?

(A)

(B)

(C)

(D)
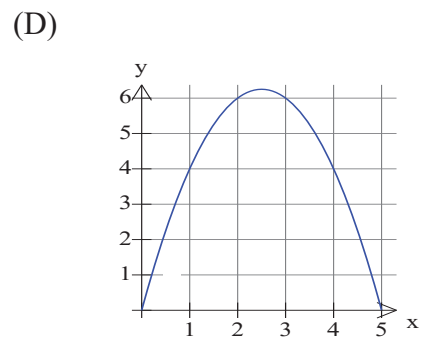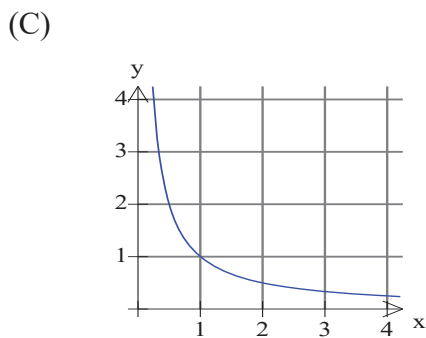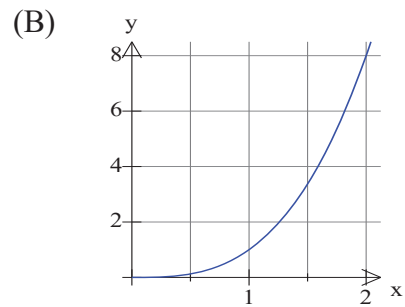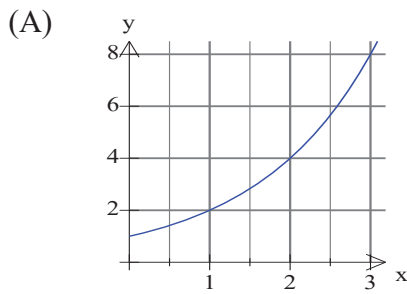
14 The number of people in a town is given by $N = 1000(2.5)^t$ where N is the number of people and t is the time in years. What is the population after 2 years?

(A) 1581

(B) 2500

(C) 5000

(D) 6250

15 Samantha plays a game in which she has a 20% chance of winning $50, 50% chance of winning $10 and a 30% chance of losing $5. The game entry fee is $10.

What is Samantha's financial expectation when playing this game?

(A) $3.50

(B) $6.50

(C) $13.50

(D) $45.00

16 Which of the following has a positive correlation between the variables?

(A) Age when married and running ability

(B) Number of police on the roads and the number of car breakdowns.

(C) The size of a person's foot and their intelligence.

(D) Distance travelled and the cost of a taxi

17 The smallest angle in this triangle is θ.

NOT TO SCALE

34 cm

24 cm

θ

24.3 cm
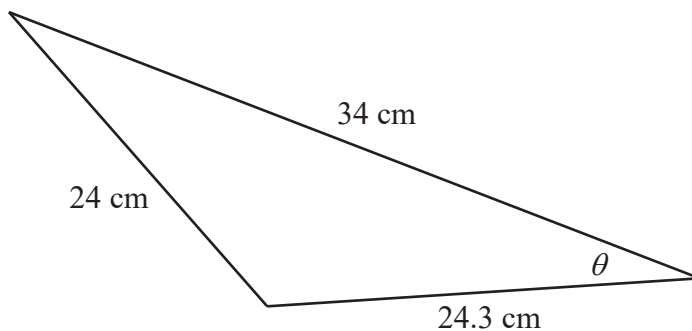
What is the value of θ to the nearest degree?

(A) 30º

(B) 45º

(C) 53º

(D) 82º

18 A car is travelling at 70 km/h. It takes the driver 3 seconds to react to a dangerous situation before applying the brakes.

Approximately how far will the car travel in this time?

(A) 4 m

(B) 58 m

(C) 210 m

(D) 350 m

19 Find the volume of a square pyramid with a height of 6 m and a base area of 25 m^2.
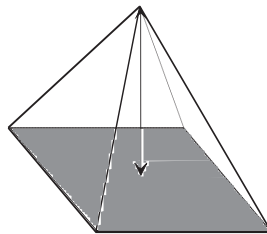
NOT TO SCALE

(A) 11m^3

(B) 25 m^3

(C) 50 m^3

(D) 150 m^3

20 What is the frequency of 40 as presented in the Cumulative Frequency Ogive?
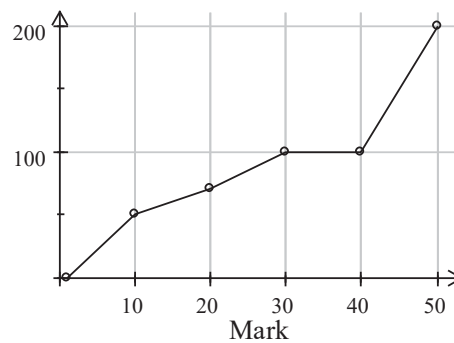
(A) 0

(B) 10

(C) 40

(D) 100

21 The diagram shows a spinner. When you spin, you can win either a $10 or a $5 prize.
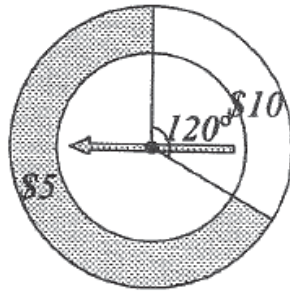
In two spins, what is the probability of winning a total of $15?

(A) $\dfrac{4}{9}$

(B) $\dfrac{2}{9}$

(C) $\dfrac{1}{9}$

(D) 1

22 Young's Rule is used to prescribe medicine for infants. The formula is:

$$\text{Dosage} = \frac{\text{Age of child (years)} \times \text{Adult dosage}}{\text{Age of child (years)} + 12}$$

The dosage for an 18 month old child if the adult dosage is 50 mg, would be closest to:

(A) 2.5 mg

(B) 5.5 mg

(C) 30 mg

(D) 66.7 mg

9

23 The birth weights and weights at age 21 of eight women are given in the table.

Birth weight	1·9	2·4	2·6	2·7	2·9	3·2	3·4	3·6
Weight at 21	47·6	53·1	52·2	56·2	57·6	59·9	55·3	56·7

What is the value of the correlation coefficient?

(A)   0.5360

(B)   0.6182

(C)   0.8232

(D)   0.7863

24 The graphs below show the relationship between a company's income and costs.
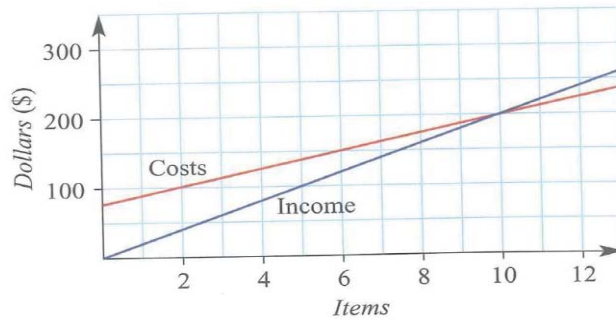
What is the loss for selling 5 items?

(A)   zero loss

(B)   less than $50

(C)   between $50 and $100

(D)   between $100 and $150

25 What amount needs to be invested now to be worth $30 095 in 8 years, with an interest rate of 6% p.a. compounded monthly? Answer to the nearest whole dollar.

(A) $48 578

(B) $28 918

(C) $18 882

(D) $18 645

End of Section I

2014
YEAR 12
TRIAL HSC
EXAMINATION

Mathematics General 2

Section II

75 marks

Attempt Questions 26 – 30

Allow about 1 hour and 55 minutes for this section.

Answer the questions in the spaces provided. Your responses should include relevant mathematical reasoning and / or calculations.

Extra writing space is provided on page 31. If you use this space, clearly indicate which question you are answering.

Please turn over

Question 26 (15 marks)

(a) Triangle *PQR* is shown. **2**

P ——— 10 cm ——— Q

25°

5 cm

R
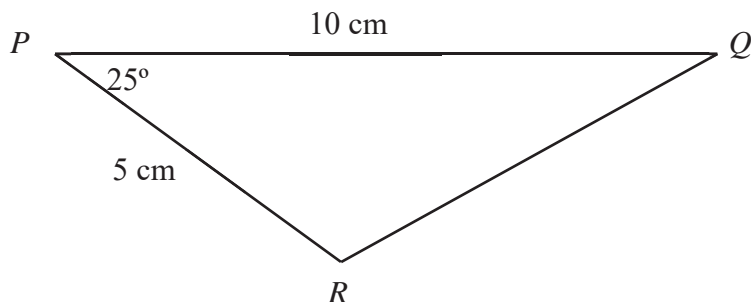
NOT TO SCALE

Calculate the length of *QR* to the nearest centimetre.

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(b) Tony has purchased twelve tickets in a lottery. He makes the comment that he has a $\dfrac{3}{20}$ chance of winning the first prize.

(i) How many tickets were sold in total? **1**

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(ii) If there are two prizes to be won in the lottery, what is the probability of Tony winning both prizes? **2**

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Question 26 (continued)

(c) The back-to-back ordered stem-and-leaf plot below shows the distribution of maximum temperatures (in º Celsius) of two towns, Beachside and Flattown, over 21 days in January.

Beachside		Flattown
9 8 7 5	1	8 9
4 3 2 2 1 1 0 0	2	
9 9 8 7 6 5	2	8 9
3 2	3	3 3 4
8	3	5 5 6 7 7 7 8 8
	4	0 0 1 2
	4	5 6

(i)   Classify the type of data variables.   **2**

Temperature: …………………..………   …………………..………

Town: …………………..………   …………………..………

(ii) For **Beachside**, calculate the range of the maximum temperatures recorded.   **1**

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(iii) For **Flattown**, the median of the distribution is: **1**

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(iv) Describe how the two data sets differ in terms of the spread and skewness of their distributions.   **2**

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Question 26 continues on page 14

13

(d) Rhonda has invested $8 800.
Interest is compounded half-yearly at a rate of 6% per annum.   **2**

Compounded values of $1

Period	Interest rate per period					
	1%	2%	3%	4%	5%	6%
1	1.010	1.02	1.03	1.04	1.05	1.06
2	1.020	1.040	1.061	1.082	1.103	1.124
3	1.030	1.061	1.093	1.125	1.158	1.191
4	1.041	1.082	1.126	1.170	1.216	1.262
5	1.051	1.104	1.159	1.217	1.276	1.338
6	1.062	1.126	1.194	1.265	1.340	1.419
7	1.072	1.149	1.230	1.316	1.407	1.504
8	1.083	1.172	1.267	1.369	1.477	1.594

Use the table above to calculate the value of her investment at the end of 3 years.

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(e) The body mass index (BMI) of an adult is $B = \dfrac{m}{h^2}$, where m is the mass in kilograms
and h is the height in metres.

If Don is 1.82m tall and has a BMI of 26.6, calculate his mass to the nearest kg.   **2**

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End of Question 26

Question 27 (15 marks)

(a) For her mobile phone plan, Tani pays \$38 per month plus other charges as shown below.   **3**

Rates (for use within Australia)

	Costs
Standard voice call flagfall	40c per call
Standard voice call rate	45c per 30 sec
SMS to standard Australian mobiles	25c per message
MMS to standard Australian mobiles	55c per message
Standard video call flagfall	35c per call
Standard video call rate	\$1 per min
Excess data rate	30c per MB

INCLUDED IN THE PLAN

250 two-minute calls
Unlimited SMS
1.5 GB data

In September, Tani:

- makes 280 two-minute voice calls
- sends 130 SMS messages
- uses 1.4 GB of data
- makes 8 five-minute video calls

What is the total amount of Tani's mobile phone bill for September?

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Question 27 continues on page 16

Question 27 (continued)

(b)   Simplify fully:

    (i) $3 - 4(6x + 5)$ **2**

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    ……………………………………………………………………………………

    (ii) $28x^7 y^2 \div 4x^3 y^4$ **2**

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(c)   Meagan invests $38 000 in an account earning 3% p.a. interest compounded monthly for 4 years.

    (i)   Calculate the total amount of interest earned.   **2**

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    (ii)   Calculate the annual percentage rate of simple interest that would produce the same amount of interest. (Answer correct to 2 decimal places).   **2**

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Question 27 (continued)

(d)   The following box-and-whisker plot shows the weight (kg) of 600 people.
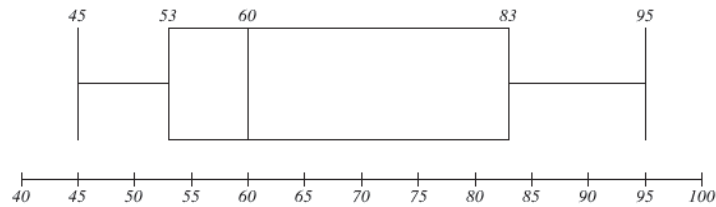
(i)   Determine the interquartile range of weight.   **1**

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(ii)   How many people weighed less than 83kg?   **1**

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17

Question 27 (continued)

(e)   The diagram shows a map of the Namoi catchment region in NSW. The shaded area has been designated for forestry conservation.
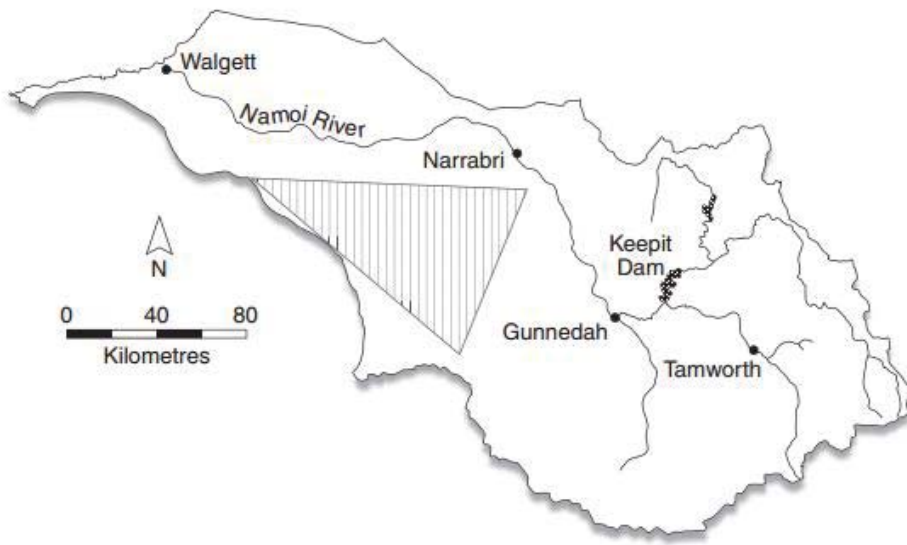
What is the shortest distance from Tamworth directly to the forestry conservation area? Give your answer to the nearest kilometre.   **2**

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End of Question 27

Question 28 (15 marks)

(a) The table shows the tax payable to the Australian Taxation Office for different taxable incomes.   **4**

Taxable income	Tax on this income
$0 – $18 200	Nil
$18 201 – $37 000	19c for each $1 over $18 200
$37 001 – $80 000	$3572 plus 32.5c for each $1 over $37 000
$80 001 – $180 000	$17 547 plus 37c for each $1 over $80 000
$180 001 and over	$54 547 plus 45c for each $1 over $180 000

Acknowledgment: © Australian Taxation Office for the Commonwealth of Australia

Robert has a gross salary of $65 000. He has tax deductions of $800 for work-related expenses. The Medicare levy that he pays is calculated at 1.5% of his taxable income.

Robert has already paid $14 200 in tax.

Will Robert receive a tax refund or will he owe money to the Australian Taxation Office? Justify your answer by calculating the refund or amount owed.

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Question 28 continues on page 20

Question 28 (continued)

(b) While waiting in a carpark, Rhonda notices that some of the cars entering the carpark have headlights on. For each car, Rhonda notes whether or not the lights are on, and whether the driver is male or female.

Her results are presented in the two-way table below. There are two missing numbers.

	Headlights on	Headlights off	Total
Male drivers	10	A	53
Female drivers	8	62	70
Total	B	105	

(i) Determine the values of A and B.　　　　　　　　　　　　　　　　　　　**2**

A = …………………………………..　　B = ……………………………….

(ii) What fraction of the cars had female drivers?　　　　　　　　　　　**1**

………………………………………………………………………………..

(iii) Of the cars driven by men, what percentage had headlights on?　　**1**

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(c) Solve the equation $\dfrac{3x-2}{4} = -2$.　　　　　　　　　　　　　　**2**

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Question 28 (continued)

(d) The volume of blood flowing through a blood vessel varies directly to the square of the internal diameter. A volume of 120mL flows through a 0.36cm blood vessel.

(i) Find the equation connecting volume (V) of a blood and diameter (d) of blood vessel. **2**

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(ii) What is the diameter of a blood vessel that has a volume of 100mL of blood flowing through it? **1**

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21

(e) Solve these equations simultaneously, showing all working. **2**

$$6x + 3y = 17$$
$$4x - 3y = 5$$

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End of Question 28

Question 29 (15 marks)

(a) The diagram shows a can of Jack's Jungle Juice, a drink containing alcohol.

John weighs 74kg and consumes five cans of Jack's Jungle Juice in two hours.

(i) Calculate John's blood alcohol content (BAC)? **2**
(Answer correct to 2 significant figures)

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(ii) To roughly estimate how long it will take for a person's blood alcohol content (BAC) to reach zero after stopping drinking, this formula can be used.

$$\text{Number of Hours} = \frac{\text{BAC}}{0.015}$$
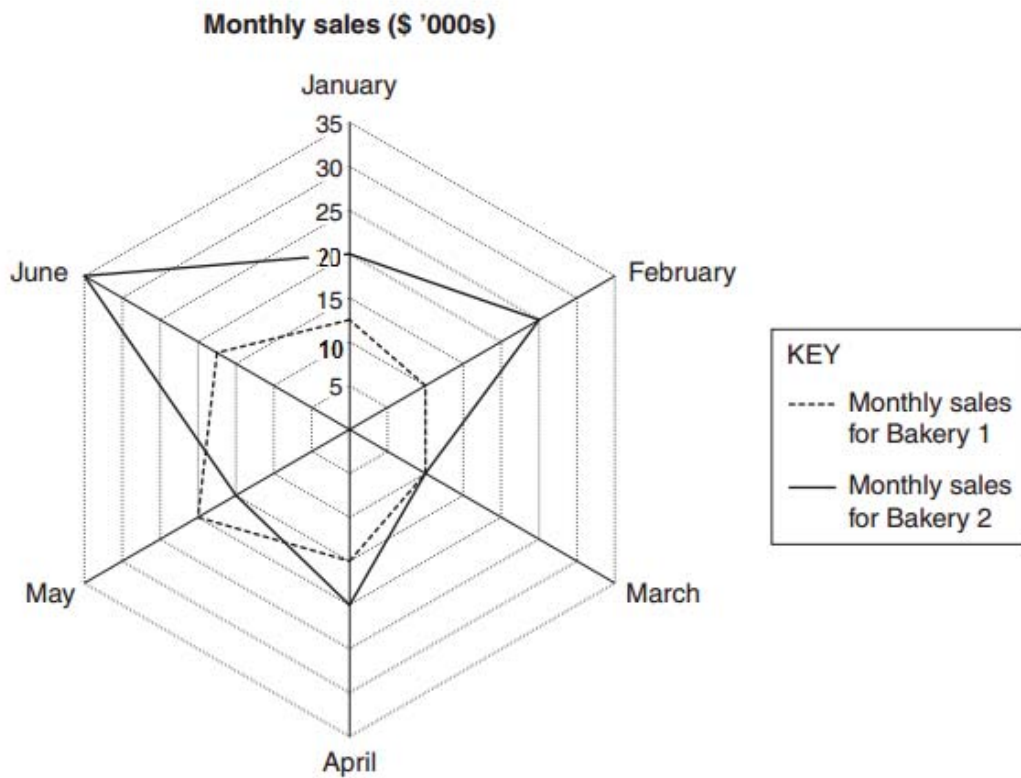
How long will it take for John's BAC to reach zero? **1**

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Question 29 continues on page 24

Question 29 (continued)

Monthly sales ($ '000s)

(b) Presented above are the monthly sales records for Bakery 1 and Bakery 2.

    (i)   What was the lowest monthly sales recorded for either bakery?   **1**

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    ....

    (ii)   What was the difference in sales in June between the two bakeries?   **1**

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    ....

(c) Complete the following:

    (i)   7 kB = ... B   **1**

    (ii) 3.4×10^4 kB = ... MB   **1**

Question 29 (continued)

(d)   The following notebook entry was made during a radial survey of a field.

D
304°   96 m
60 m   A
046°
NOT TO SCALE

O

53 m
85 m

C
214°
B
133°
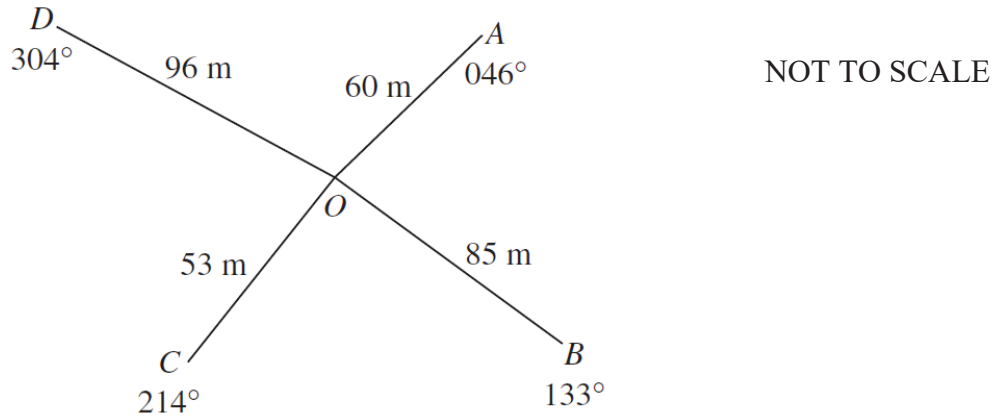
(i)   What is the size of $\angle AOD$?   **1**

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(ii)   Calculate the area of triangle *AOD*.   **2**
       (Answer correct to nearest square metre)

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(e)   Nathan has a credit card with a compound interest of 19.99% per annum.

(i)   What is the daily percentage interest rate?   **1**

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(ii)   Nathan has an outstanding balance of $6880 for a period of 30 days.
       How much interest, to the nearest cent, will he be charged?   **2**
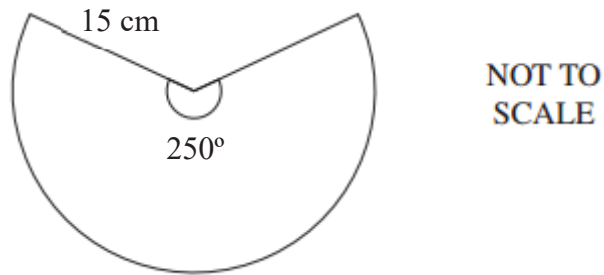
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Question 29 continues on page 26

Question 29 (continued)

(f)   The section shown has a radius of 15cm and an angle of 250º.

15 cm

NOT TO
SCALE

250º

What is the perimeter of the sector, to the nearest centimetre?   **2**

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End of Question 29

Question 30 (15 marks)

(a) A loan can be repaid by making either monthly or fortnightly repayments. The graph shows the loan balances over time using these two different methods of repayment.
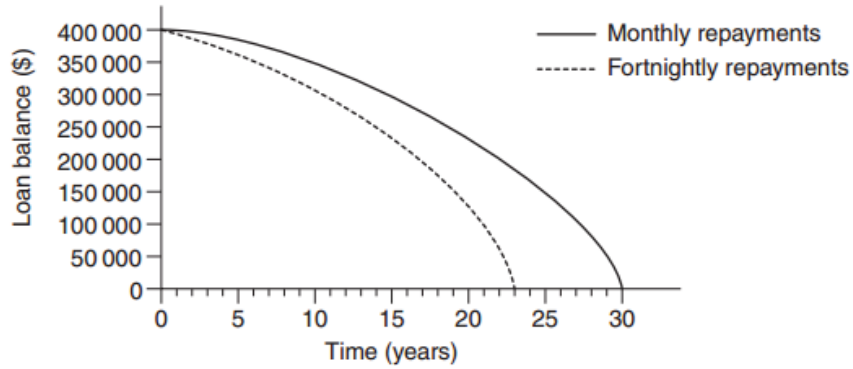
The monthly repayment is $2796.86 and the fortnightly repayment is $1404.76.

What is the difference in the total interest paid using the two different methods of repayment, to the nearest dollar? (Use 52 weeks = 1 Year.) **2**
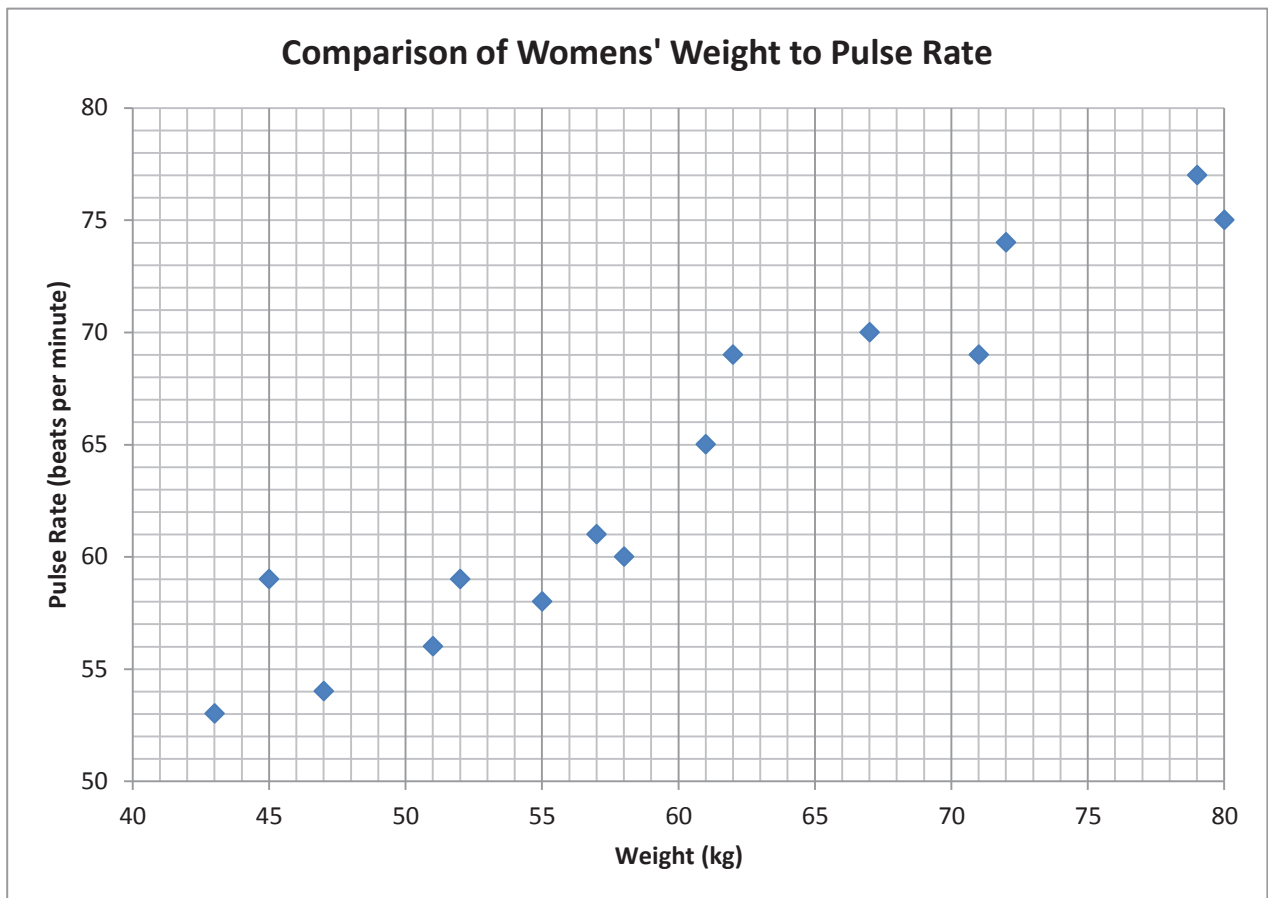
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Question 30 (continued)

(b) Jacqui investigated a comparison between the weight and pulse rate of 15 women.
Her results were recorded in the table below.

Weight (x)	58	51	43	55	62	79	61	52	47	71	80	57	45	67	72
Pulse Rate (y)	60	56	53	58	69	77	65	59	54	69	75	61	59	70	74

She used the data to produce the scatterplot below and to calculate the correlation coefficient
of **$r = 0.96$.**

Comparison of Womens' Weight to Pulse Rate

Question 30 (continued)

(i)   Calculate the mean and standard deviation for the weight and pulse rate values.   **4**

	Mean	**Standard Deviation**
Weight	$\bar{x} =$	$\sigma_x =$
Pulse Rate	$\bar{y} =$	$\sigma_y =$

(ii) Prove that the equation of the least squares line of best fit is:

$y = 0.64 x + 25.53$ **2**

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(iii) Use the equation to predict the pulse rate when the weight is 65kg.   **1**

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(iv) Use the equation to predict the weight when the pulse rate is 60 beats per minute.   **1**

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(v)   Sketch the least squares line of best fit onto the scatter plot presented on Page 28.   **1**

(vi) Comment on the reliability of using this line of best fit to predict the pulse rate of a 65kg male.   **1**

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Question 30 continues on page 30

Question 30 (continued)

(c) The diagram below shows the equally spaced cross-sectional areas of a water reservoir.

Two applications of Simpson's Rule, were used to calculate the approximate volume of the reservoir to be 189.8 km^3.
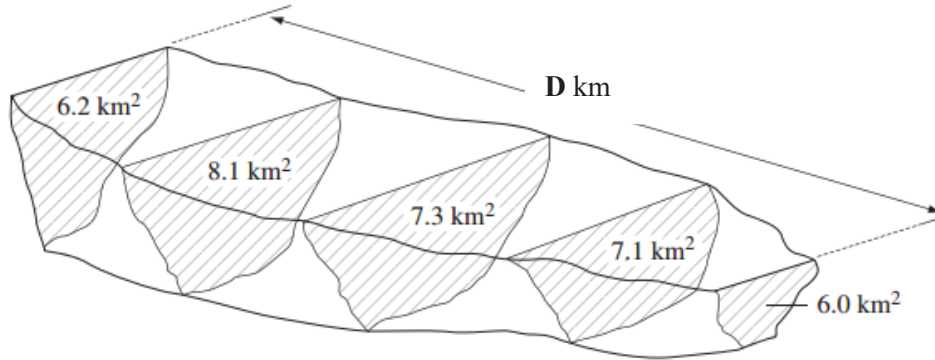
By making the appropriate substitutions into Simpson's Rule, determine the value of **D**.   **3**

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End of Paper

Students' Solutions for Year 12 General Mathematics Exam

Multiple Choice:

1. D   14. D
2. B   15. A
3. C   16. D
4. D   17. B
5. C   18. B
6. A   19. C
7. A   20. A
8. C   21. A
9. C   22. B
10. B   23. D
11. D   24. B
12. A   25. D
13. B

Q26:

(a) $QR^2 = 10^2 + 5^2 - 2 \times 10 \times 5 \times \cos 25°$

$QR^2 = 34.3692213$

$QR = 5.8652687$

$QR \approx 6$ cm

(b) (i) 80 tickets sold

(ii) $\frac{12}{80} \times \frac{11}{79} = \frac{33}{1580}$

(c) (i) continuous + quantitative

(ii) nominal + categorical

$\hookrightarrow 38° - 15° = 23°$

(iii) 37°

(iv) Spread: Flattown has a greater Range $(46° - 18° = 28°)$ than Beachside $(38° - 15° = 23°)$.

Q26 cont:

(iv) Skew:

Beachside is positively skewed.
Flattown is negatively skewed.

(d) $8800 \times 1.194 = \$10\,507.20$

(e) $26.6 = \frac{m}{1.82^2}$

$m = 1.82^2 \times 26.6$

$m = 88$ Kg

Q27: 30 two-minute voice calls cost

(a) $= 30 \times \$0.40 + 30 \times 4 \times \$0.45$

$= \$66$

8 five-minute video calls cost

$= 8 \times \$0.35 + 8 \times 5 \times \$1$

$= \$42.80$

Total cost $= \$38 + \$66 + \$42.80 = \$146.80$

(b) (i) $\frac{3 - 24x - 20}{4} = -17 - 24x$

(ii) $\frac{7x}{y^2}$

(c) (i) $A = \$38000 (1.0025)^{48}$

$= \$42\,838.46$

Interest earned $= \$42\,838.46 - \$38000$

$= \$4\,838.46$

(ii) Solve $\$4838.46 = 38000 \times R \times 4$

$R = 0.03183$

$R = 3.18\%$

(d) (i) $83 - 53 = 30$ kg

(ii) $\frac{3}{4} \times 600 = 450$ people

Q27 (cont.)

(e) Distance on the map is 3.5 cm.

The scale is 2.4 cm = 80 Km.

So 1 cm on map $= \frac{80}{2.4} = 33.\dot{3}$ Km

So Tamworth is $3.5 \times 33.\dot{3}$ Km

ie, 117 Km from the conservation area.

Q28:

(a) Taxable income $= \$65000 - \$800$

$= \$64\,200$

Medicare Levy $= 1.5\% \times \$64200$

$= \$963$

Income Tax $= \$3572 + 0.325(64200 - 37000)$

$= \$12\,412$

Total taxes $= \$12412 + \$963 = \$13\,375$

$\therefore$ Robert will receive a refund of

$\$14200 - \$13\,375 = \$825$

(b) (i) $A = 43$ $B = 18$

(ii) $\frac{70}{123}$

(iii) $\frac{10}{53} = 18.9\%$

(c) $3x - 2 = -8$

$3x = -6$

$x = -2$

Q28 (cont.)

(d) (i) $V = kd^2$

$120 = k \times 0.36^2$

$k = 925.93$

$\therefore V = 925.93 \, d^2$

(ii) Solve

$100 = 925.93 \, d^2$

$d^2 = 0.1079995$

$d \doteq 0.329$ cm

(e) Add the 2 equations together, then

$10x = 22$

$x = 2.2$

$\therefore 3y = 17 - 6x$

$3y = 17 - 6 \times 2.2$

$3y = 3.8$

$y = 1.2\dot{6}$

Q29:

(a) (i) $BAC_m = \frac{10 \times 5 \times 1.5 - 7.5 \times 2}{6.8 \times 74}$

$= 0.11924 \approx 0.12$

(ii) $0.11924 \div 0.015 = 7.9$ hrs

ie, approximately 8 hours

Q29 (cont.)

(b) (i) $10 000 in March for both

(ii) Bakery 2 sold $35000 while Bakery 1 sold $17500. The difference was $17500.

(c) (i) 7168 B

(ii) 33.2 MB

(d) (i) $\angle AOD = 56° + 46°$
$= 102°$

(ii) Area $= \frac{1}{2} \times 96 \times 60 \times \sin 102°$
$= 2817 \ m^2$

(e) (i) $19.99 \div 365$
$= 0.054767\%$

(ii) $A = \$6880 (1 + 0.00054767)^{30}$
$= \$6993.94$

∴ interest $= \$113.94$

(f) Perimeter
$= 15 + 15 + \frac{250}{360} \times (2 \times \pi \times 15)$
$= 30 + 65.4498$ cm
$= 95.4498$ cm
≈ 95 cm

Q30. (a) The interest paid for monthly repayments is
$(\$2796.86 \times 12 \times 30) - \$400000$
$= \$606 869.60$
The interest paid for fortnightly repayments is
$(\$1404.76 \times 26 \times 23) - \$400 000$
$= \$440 046.48$
The difference is $\$166 823.12$

(b) (i) $\bar{x} = 60$ $\quad \sigma_x = 11.39$
$\bar{y} = 63.93$ $\quad \sigma_y = 7.63$

(ii) $m = R \times \left(\frac{\sigma_y}{\sigma_x}\right) = 0.96 \times \frac{7.63}{11.39} = 0.64$
$b = \bar{y} - m\bar{x} = 63.93 \times 0.64 \times 60$
$= 25.53$
∴ $y = 0.64x + 25.53$ as required.

(iii) $y = 0.64 \times 65 + 25.53 = 67$ beats

(iv) Solve $60 = 0.64x + 25.53$
$x = \frac{60 - 25.53}{0.64}$
weight $= x = 53.86$ kg

(vi) Not Reliable as the original data concerns women, not men.

Q30 (cont.)

(c) 1st application:

$V = \frac{h}{3} \left[6.2 + 4 \times 8.1 + 7.3\right]$
$= \frac{h}{3} \times \frac{459}{10}$
$= 15.3 h$

2nd application:

$V = \frac{h}{3} \left[7.3 + 4 \times 7.1 + 6.0\right]$
$= \frac{h}{3} \left[\frac{417}{10}\right]$
$= 13.9 h$

But $189.8 = 15.3 h + 13.9 h$
$189.8 = 29.2 h$
∴ $h = \frac{189.8}{29.2} = 6.5$

∴ $D = 4 \times 6.5$ km
$D = 26$ km.

END.

How To Do The Multiple Choice Questions:

Q1. Choosing every 5th bottle of milk is a systematic sampling method.

Q2. $3 + 5 + 2 = 10$ parts

4 litres $\div 10 = 400$mL per part.

Blue is 3 parts, so

$3 \times 400 = 1200$mL

Q3. Use calculator.

Q4. $12 \to 6$

$\therefore$ Scale factor $= \frac{1}{2}$

Q5. $\cos \theta = \frac{5}{6.5}$

$\therefore \theta = \cos^{-1}\left(\frac{5}{6.5}\right)$

$\theta = 40°$

Q6. 500 did not vote.

$\frac{500}{5000} = \frac{1}{10} = 10\%$.

Q7. when $x = 0$, $y = 2$

$\therefore (0, 2)$ is y-intercept.

when $y = 0$,

$0 = \frac{2}{3}x + 2$

$-2 = \frac{2}{3}x$

$2x = -6$

$x = -3$

$\therefore (-3, 0)$ is x-intercept

Q8. $(7 \times \$12 + 3 \times 1.5 \times \$12) = \$138$

Q9. Solve $12\,340 = \$39000\left(1 - \frac{R}{100}\right)^4$

$0.31641 = \left(1 - \frac{R}{100}\right)^4$

$1 - \frac{R}{100} = \sqrt[4]{0.31641} = 0.75$

$\frac{R}{100} = 0.25 \qquad R = 25\%$

Q10. Area $=$ base $+$ hemisphere

$= \pi \times 5^2 + \frac{1}{2}\left(4\pi \times 5^2\right)$

$= 235.62 \text{ m}^2$

Q11.

S 32° E
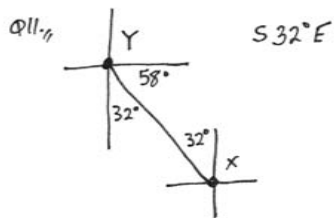
Q12. 30×29

$= 870$

Q13. when $x = 0$, $y = 0$ $\therefore (0,0)$ is on graph

when $x = 2$, $y = 8$ $\therefore (2, 8)$ on graph

Q14. $N = 1000(2.5)^2$

$N = 6250$

Q15. $20\% \times \$50 + 50\% \times \$10 + 30\% \times \$5$

$= \$10 + \$5 - \$1.50 = \$13.50$

Less the cost of the game $= \$3.50$

Q16. Positive correlation means as one thing increases, another related thing also increases.

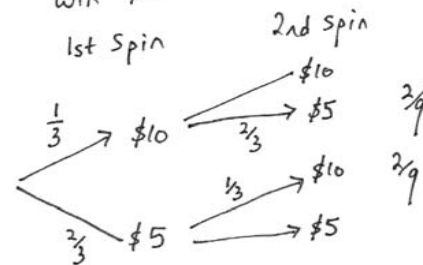**Q17.** $\cos \theta = \frac{34^2 + 24.3^2 - 24^2}{2 \times 34 \times 24.3} = 0.708$

$\theta = \cos^{-1}(0.708) = 45°$

Q18. 70 Km/hr

$= 70\,000 \text{ m}/60 \times 60 \text{ secs}$

$= 70\,000 \text{ m}/3600 \text{ s}$

$= 19.\dot{4} \text{ m/sec}$

in 3 seconds car goes

$3 \times 19.\dot{4} = 58.\dot{3} \text{ m}$

Q19. $V = \frac{1}{3} Ah$

$= \frac{1}{3} \times 25 \times 6$

$= 50 \text{ m}^3$

Q20. There were 100 students who had a mark of 30, or less.

There were 100 students who had a mark of 40, or less.

So nobody got 40 marks.

Q21. To win $15, I must win $10 and $5.

$\frac{1}{3} \times \frac{2}{3} = \frac{2}{9}$

$\frac{2}{9} + \frac{2}{9} = \frac{4}{9}$

Q22. Dosage $= \frac{1.5 \times 50}{1.5 + 12} = 5.5 \text{ mg}$

Q23. Use calculator

Q24. when 5 items are sold, we generate an income of $100, but costs one just less than $150. So we incur a loss of less than $50.

Q25. Solve $30\,095 = P\left(1 + \frac{6/12}{100}\right)^{8 \times 12}$

$30\,095 = P(1.005)^{96}$

$P = \frac{30\,095}{(1.005)^{96}}$

$P = \$18644$