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YEAR 12 *Trial Exam Paper*

2019

FURTHER MATHEMATICS

Written examination 2

Worked solutions

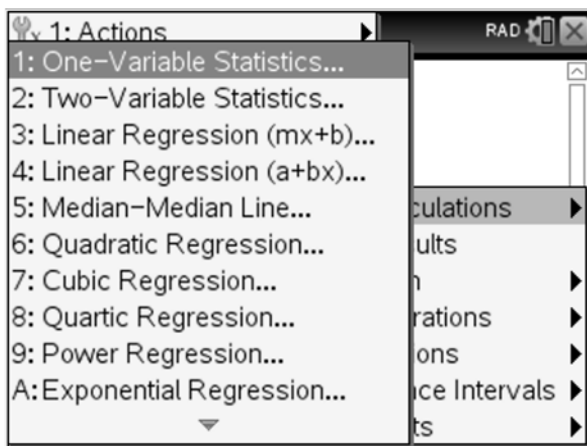**This book presents:**

➢ worked solutions
➢ mark allocations
➢ tips.

SECTION A – Core

Data analysis

Question 1a.

Worked solution

There are three numerical, discrete variables.

Note: Destination is not numerical.

Mark allocation: 1 mark

- 1 mark for correct answer

Question 1b.

Worked solution

$$\frac{14}{54} \times 100 = 25.9\%$$

Mark allocation: 1 mark

- 1 mark for correct answer

Question 1c.

Worked solution

Minimum	Q_1	Median	Q_3	Maximum
27	58.5	*105.5*	260	*384*

Explanatory note

Median can be calculated manually, by placing the data in ascending order, as shown below:

27   43   55 | 62   65   85 | 126   155   235 | 285   314   384

Q_1 Median Q_3

$$\frac{85+126}{2} = 105.5$$

Alternatively, the CAS calculator can be used to calculate the five-number summary.

Data is entered into a spreadsheet, and the summary obtained.

An example for the TiNspire is shown on the opposite page.

Step 1: Enter in spreadsheet.

Step 2: Obtain One-variable statistics.

Step 3: Read five-number summary from screen.

Mark allocation: 1 mark

- 1 mark for both correct answers

SECTION A

Question 1d.

Worked solution

minutes delayed
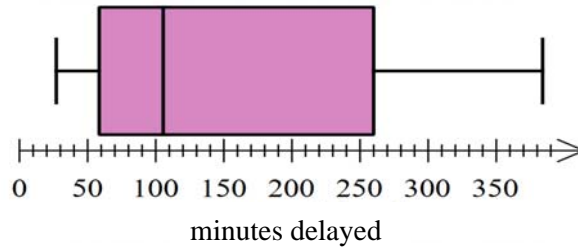
Mark allocation: 2 marks

- 1 mark for accurately marking the median, and general shape correct
- 1 mark for accurately marking Q_1 and Q_3, and whiskers accurately plotted

💡 **Tip**

- *Always remember to check that the boxplot does not have an outlier. A quick way to do this is to use your CAS to graph. If the graph does have outliers, remember that your whiskers will go to the last point inside of the lower and/or upper fences.*

Question 1e.

Worked solution

positively skewed

Mark allocation: 1 mark

- 1 mark for correct answer

Question 1f.

Worked solution

For the distribution of *minutes delayed*, the middle 50% of the data lies between **58.5** and **260** minutes.

Mark allocation: 1 mark

- 1 mark for correct answers

Question 1g.

Worked solution

Calculate the lower fence using the formula $Q_1 - 1.5 \times IQR$.

Lower fence $= 58.5 - 1.5 \times (260 - 58.5) = -243.75$

As 27 is not below the lower fence, it is not an outlier.

Mark allocation: 2 marks

- 1 mark for correct calculation of lower fence
- 1 mark for statement clarifying that 27 is not an outlier

Question 2a.

Worked solution

The explanatory variable is *wind speed*.

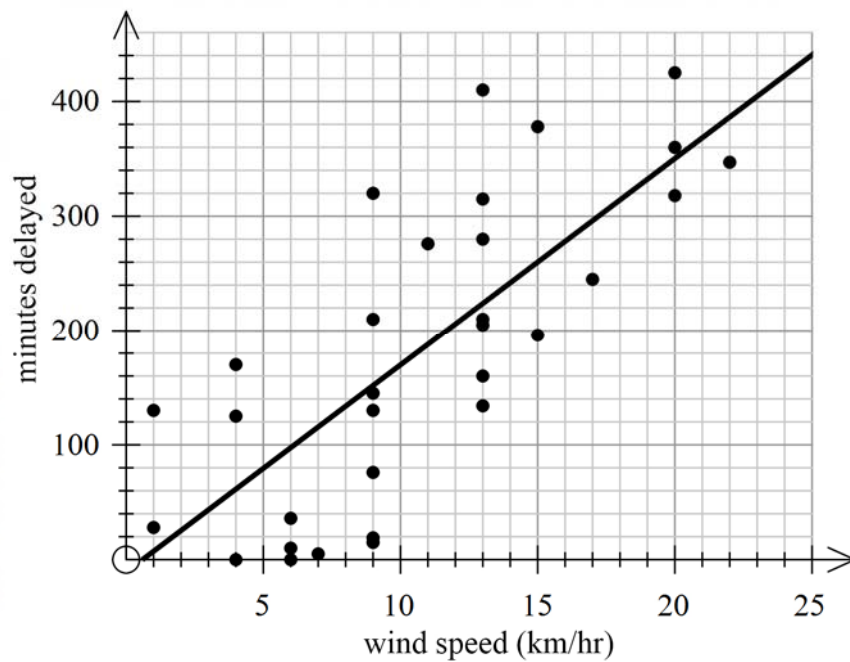*Mark allocation: 1 mark*

- 1 mark for correct answer

Tip

- *You can usually identify the explanatory variable by looking at the x-axis of your graph. Another way is to consider which variable you will be making a prediction from. In the sentence above, you are told that you are predicting the delay from the wind speed. This suggests that wind speed is the explanatory variable.*

Question 2b.

Worked solution

As the *wind speed* increases by one kilometre per hour, the *minutes delayed* can be expected to increase by 18.051 minutes, on average.

Mark allocation: 1 mark

- 1 mark for correct answer

　　　　　　　　　　　　　　　　SECTION A

Question 2c.

Worked solution

Mark allocation: 1 mark

- 1 mark for accurately drawn line with a ruler

Note: Two points on the line are (1, 7) and (25, 441), rounded to whole numbers.

Tip

- *Always identify two points on the graph that your line will pass through. This can be done by tracing values on your CAS, or by substituting two x-values into your equation to find their y-values.*

Question 2d.

Worked solution

minutes delayed $= -10.745 + 18.051 \times wind\ speed$

minutes delayed $= -10.745 + 18.051 \times 14$

minutes delayed $= 241.969 = 242$ minutes

Mark allocation: 2 marks

- 1 mark for substitution into regression equation
- 1 mark for a calculation resulting in correct answer – this must be a number that rounds correctly to 242

SECTION A

Question 2e.

Worked solution

minutes delayed $= -10.745 + 18.051 \times$ *wind speed*

minutes delayed $= -10.745 + 18.051 \times 15$

minutes delayed $= 260$ km/h

residual $=$ *actual* $-$ *predicted*

residual $= 196 - 260$

residual $= -64.0$

Mark allocation: 2 marks

- 1 mark for calculation of predicted value using least squares equation
- 1 mark for calculation of residual value of –64.0.

Question 2f.

Worked solution

This is a strong relationship.

Mark allocation: 1 mark

- 1 mark for correct answer

   Note: 'Moderate' is also an acceptable answer.

Question 2g.

Worked solution

If $r = 0.747$, square this to find the coefficient of determination, r^2.

$r^2 = (0.747)^2 = 0.558$

Therefore, 56% of the variation in minutes delayed can be explained by the variation in wind speed.

Mark allocation: 1 mark

- 1 mark for the correct answer

Tips

- *The word 'variation' in conjunction with the phrase 'can be explained by' should help you to identify that this question is asking you to calculate the coefficient of determination.*
- *Be careful to answer this question in the correct form. It is not asking for r^2 as a decimal, but as a percentage.*

SECTION A

Question 3a.

Worked solution

The time series plot shows random variation only.

There is a possible increasing trend.

Mark allocation: 1 mark

- 1 mark for a description of variation (random) OR trend (possibly increasing), or both

Question 3b.i.

Worked solution

$$number\ of\ delays = 54.58 + 0.17 \times month$$
$$58 = 54.58 + 0.17 \times month$$
$$month = 20.1$$

Month 20 will be May 2019.

Mark allocation: 1 mark

- 1 mark for correct answer

Question 3b.ii.

Worked solution

An *r*-value of 0.04062 indicates that the least squares regression line is not suited to the time series plot, as there is little or no correlation.

Mark allocation: 1 mark

- 1 mark for correct answer

Question 3c.

Worked solution

To find the three-mean smoothed value, use the two values either side of the original September value.
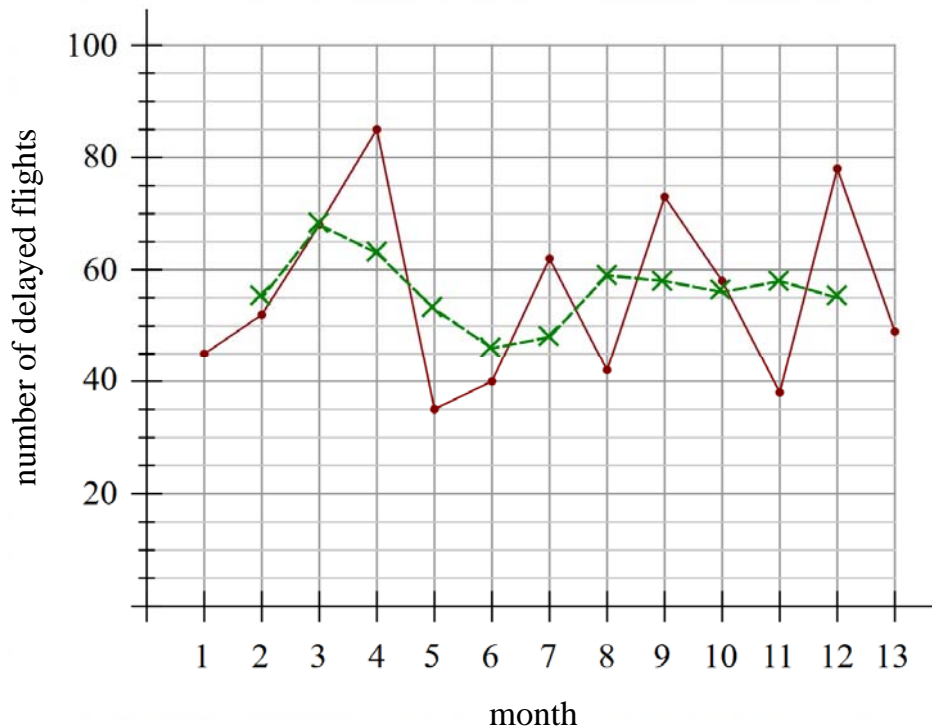
$$\frac{38 + 78 + 49}{3} = 55$$

The answer is 55.

Mark allocation: 1 mark

- 1 mark for correct answer

SECTION A

Question 3d.

Worked solution

month

Mark allocation: 1 mark

- 1 mark for correct answer

Note: If your answer to **part c.** was incorrect you can still get the mark for **part d.** by plotting your value for September 2018 correctly.

Question 3e.

Worked solution

The intercept for the line has already been given as 58.69.

Rounded to two significant figures this is 59.

The data from Table 4 should be entered into the CAS calculator to obtain the slope.

This is given as −0.345455. Rounded to two significant figures this value is −0.35.

Therefore, the equation is:

number of delays $= 59 - 0.35 \times month$

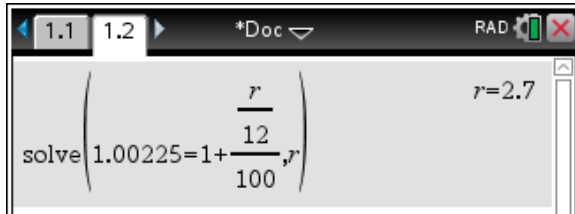*Mark allocation: 1 mark*

- 1 mark for completing the equation correctly

Recursion and financial modelling

Question 4a.

Worked solution

$$R = 1 + \frac{\left(r/12\right)}{100}$$

Use the CAS calculator to solve this equation for r.

| 1.1 | 1.2 | *Doc ⌄ | RAD 🔲❌ |

$$\text{solve}\left(1.00225 = 1 + \frac{\dfrac{r}{12}}{100}, r\right) \qquad r=2.7$$

The annual interest rate is 2.7%.

Mark allocation: 1 mark

- 1 mark for correct answer

Question 4b.i.

Worked solution

$$V_0 = 8000, \qquad V_{n+1} = 1.00225\, V_n$$

$$V_1 = 1.00225 \times V_0$$
$$V_1 = 1.00225 \times 8000$$
$$V_1 = 8018$$

$$V_2 = 1.00225 \times V_0$$
$$V_2 = 1.00225 \times 8018$$
$$V_2 = 8036.04$$

Mark allocation: 1 mark

- 1 mark for correct answer

Question 4b.ii.

Worked solution

We can continue to use recursion to find when the value of the investment first goes above $8500.

Use the CAS calculator for this.

This will occur after 27 months.

Mark allocation: 1 mark

- 1 mark for correct answer

Question 4c.

Worked solution

a = the initial value, therefore $a = 8000$

$b = R$, in this case 1.00225

Therefore, the rule is $V_n = 8000 \times 1.00225^n$.

Mark allocation: 1 mark

- 1 mark for correct answer

Question 4d.

Worked solution

The interest that Alison's account has earned in 1 year is $8219 - 8000 = 219$.

$$I = \frac{Prt}{100}$$
$$219 = \frac{8000 \times r \times 1}{100}$$
$$\therefore r = \frac{219}{8000} \times 100$$
$$r = 2.74\%$$

Mark allocation: 1 mark

- 1 mark for correct answer

SECTION A

Question 5a.

Worked solution

$$R = 1 - \frac{r}{100}$$
$$R = 1 - \frac{18}{100}$$
$$R = 0.82$$

Mark allocation: 1 mark

- 1 mark for correct answer

Question 5b.

Worked solution

$$\text{Value} = 5000 \times (0.82)^5$$
$$\text{Value} = 1853.7$$

$$\text{Depreciation} = 5000 - 1853.7$$
$$\text{Depreciation} = \$3146.30$$

Mark allocation: 1 mark

- 1 mark for correct answer

Question 5c.

Worked solution

After one year, the photocopier has depreciated by $900.

In one year, the photocopier produces $35\,000 \times 12 = 420\,000$ pages.

The depreciation per unit is

$$\frac{900}{420\,000} = \$0.002143$$

This is 0.2 cents per copy.

Mark allocation: 1 mark

- 1 mark for correct answer

SECTION A

Question 6a.

Worked solution

Use the TVM solver.

The value of Alison's investment after 2 years is $841 825.35.

Mark allocation: 1 mark

- 1 mark for correct answer

Tip

- *When using the finance solver, remember to pay particular attention to entering negative or positive values. Values should be entered as positive if the money is being paid out to the investor. Negative values are those that are being put into the bank.*

Question 6b.

Worked solution

It will take 36 + 18 = 54 months in total for Alison's investment to reach $950 000.

Mark allocation: 1 mark

- 1 mark for correct answer

Question 6c.

Worked solution

Value at the end of third year = $874 552.

Value at the end of the fourth year = $926 869.57.
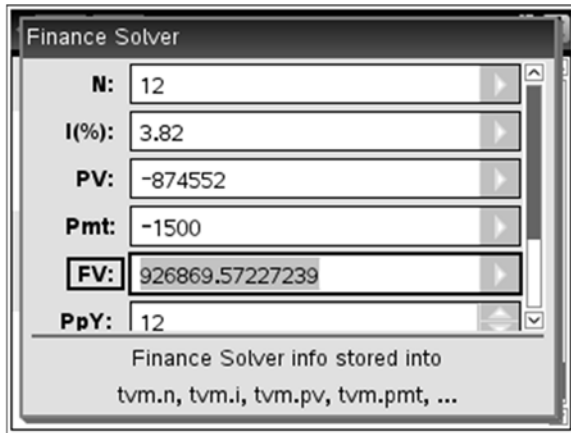
Amount of interest in the fourth year $= 926\,869.57 - 874\,552 - (12 \times 1500) = \$34\,317.60$, which rounds to $34 318 as required.

Mark allocation: 2 marks

- 1 mark for the value after three years shown
- 1 mark for a subtraction of third year from fourth year, which results in the correct answer required

Note: Working must include value for third year subtracted from fourth year, and it must also show that the payments have been deducted.

SECTION A

Module 1 – Matrices

Question 1a.

Worked solution

$9.78 per kg

Mark allocation: 1 mark

- 1 mark for correct answer

Question 1b.

Worked solution

The order of the matrix is 3×1.

Explanatory notes

This is because the matrix has 3 rows and 1 column.

Mark allocation: 1 mark

- 1 mark for correct answer

Question 1c.

Worked solution

$B = \begin{bmatrix} 1 & 0 & 2 \end{bmatrix}$

Explanatory notes

To find a total, we would require a matrix of order 1×1.

As matrix A is a 3×1 matrix, matrix B must be a 1×3 matrix.

Mark allocation: 1 mark

- 1 mark for correct answer

SECTION B – Module 1

Question 2a.

Worked solution

$$\frac{10}{100} \times 25 = 2.5$$
$$25 - 2.5 = 22.5 \approx 23$$

There will be 23 square metres of cherry tomatoes remaining.

Mark allocation: 1 mark

- 1 mark for correct answer as a whole number

Question 2b.

Worked solution

$$D = \begin{bmatrix} 0.9 & 0 & 0 \\ 0 & 0.9 & 0 \\ 0 & 0 & 0.9 \end{bmatrix}$$

Mark allocation: 1 mark

- 1 mark for correct answer

　　　　　　　　　　　　　　　　　SECTION B – Module 1

Question 3a.

Worked solution

20%

Mark allocation: 1 mark

- 1 mark for correct answer

Note: 0.2 is also acceptable, although it should be noted that this is a proportion not a percentage.

Question 3b.

Worked solution

$0.10 \times 3500 + 0.12 \times 3500 + 0.86 \times 3500 + 0.05 \times 3500$
$= 3955$

Mark allocation: 1 mark

- 1 mark for correct answer

Question 3c.

Worked solution

$$S_1 = \begin{bmatrix} 3605 \\ 3115 \\ 3955 \\ 3325 \end{bmatrix} \begin{matrix} A \\ B \\ C \\ D \end{matrix}$$

Mark allocation: 1 mark

- 1 mark for correct answer

SECTION B – Module 1
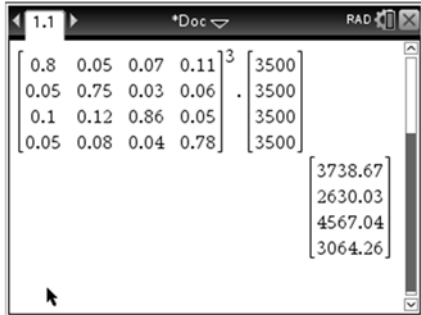
Question 3d.

Worked solution

The year 2021 can be calculated as the state matrix, S_3.

We can find this by calculating $S_3 = T^3 \times S_0$.

$$\begin{bmatrix} 0.8 & 0.05 & 0.07 & 0.11 \\ 0.05 & 0.75 & 0.03 & 0.06 \\ 0.1 & 0.12 & 0.86 & 0.05 \\ 0.05 & 0.08 & 0.04 & 0.78 \end{bmatrix}^3 \cdot \begin{bmatrix} 3500 \\ 3500 \\ 3500 \\ 3500 \end{bmatrix}$$

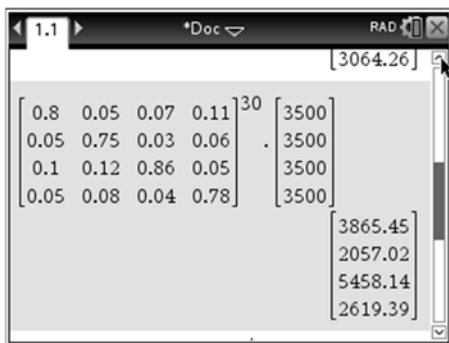$$\begin{bmatrix} 3738.67 \\ 2630.03 \\ 4567.04 \\ 3064.26 \end{bmatrix}$$

2630 grams of tomatoes will be purchased at supplier B by Johanna in 2021.

Mark allocation: 1 mark

- 1 mark for correct answer
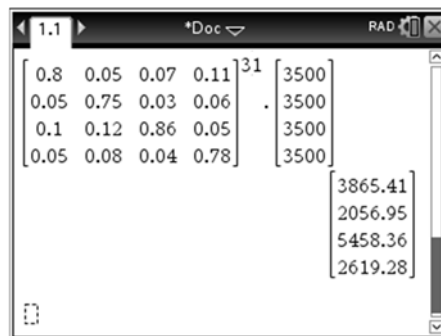
Question 3e.

Worked solution

$S_{30} = T^{30} \times S_0$

$$\begin{bmatrix} 3064.26 \end{bmatrix}$$

$$\begin{bmatrix} 0.8 & 0.05 & 0.07 & 0.11 \\ 0.05 & 0.75 & 0.03 & 0.06 \\ 0.1 & 0.12 & 0.86 & 0.05 \\ 0.05 & 0.08 & 0.04 & 0.78 \end{bmatrix}^{30} \cdot \begin{bmatrix} 3500 \\ 3500 \\ 3500 \\ 3500 \end{bmatrix}$$

$$\begin{bmatrix} 3865.45 \\ 2057.02 \\ 5458.14 \\ 2619.39 \end{bmatrix}$$

$S_{31} = T^{31} \times S_0$

$$\begin{bmatrix} 0.8 & 0.05 & 0.07 & 0.11 \\ 0.05 & 0.75 & 0.03 & 0.06 \\ 0.1 & 0.12 & 0.86 & 0.05 \\ 0.05 & 0.08 & 0.04 & 0.78 \end{bmatrix}^{31} \cdot \begin{bmatrix} 3500 \\ 3500 \\ 3500 \\ 3500 \end{bmatrix}$$

$$\begin{bmatrix} 3865.41 \\ 2056.95 \\ 5458.36 \\ 2619.28 \end{bmatrix}$$

As $S_{30} = S_{31}$, a steady state has been reached.

2619.28 grams of tomatoes will be purchased at supplier D in the long term.

As a percentage of the total purchase, this is

$$\frac{2619.28}{14000} \times 100 = 18.7091\%$$

$$\approx 18.7\%$$

Mark allocation: 1 mark

- 1 mark for correct answer

SECTION B – Module 1

Question 4a.

Worked solution

4000 grams

Mark allocation: 1 mark

- 1 mark for correct answer

Question 4b.

Worked solution

In order for her purchases to remain consistent the state matrix must remain the same.

$$G = \begin{bmatrix} w \\ x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 100 \\ 560 \\ -420 \\ -240 \end{bmatrix}$$

Mark allocation: 1 mark

- 1 mark for correct answer

SECTION B – Module 1

Module 2 – Networks and decision mathematics

Question 1a.

Worked solution

$23 + 26 + 36 + 42 = 127$

Mark allocation: 1 mark

- 1 mark for correct answer

Note: The backwards edge, with a weight of 16, is not included in the total for the cut.

Question 1b.

Worked solution

The maximum flow is 70 litres per hour.

One way to calculate this is to use tracking through the network.
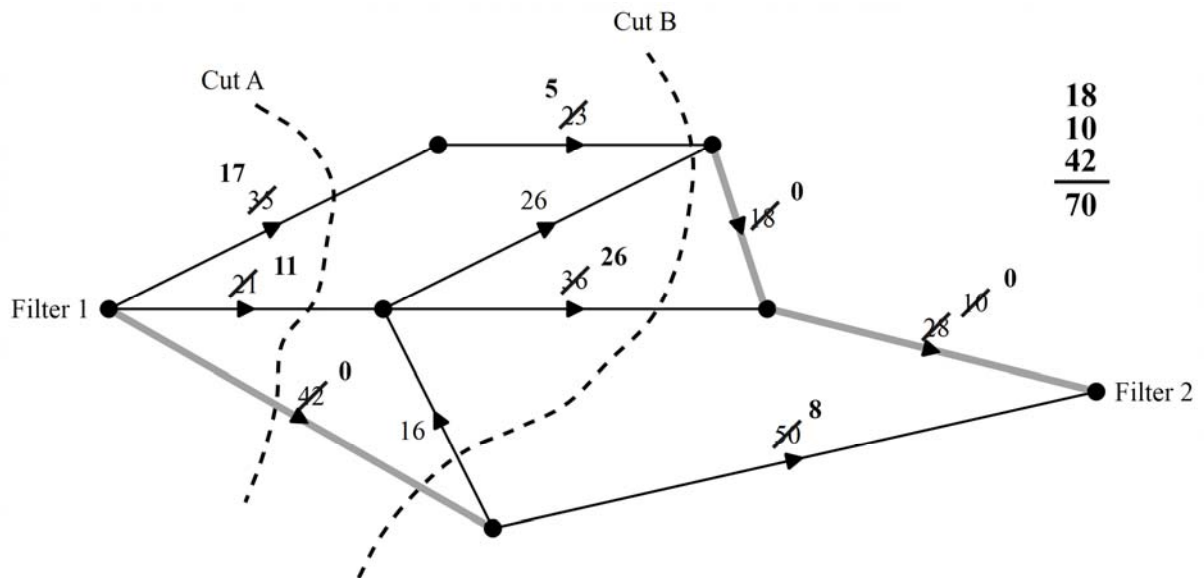
Mark allocation: 1 mark

- 1 mark for correct answer

Question 2a.

Worked solution

4 vertices have degree 3 – Filter 1, *D*, *C* and *E*.

Mark allocation: 1 mark

- 1 mark for correct answer

Question 2b.

Worked solution

The robot must follow an Euler trail. In order to do this, the network must have a maximum of two vertices with an odd degree.

Currently there are four vertices with an odd degree (Filter 1, *D*, *C*, *E*). Adding an edge between any pair of these would make the Euler trail possible.

Possible answers include:

Filter 1 to *D*   *D* to *C*

Filter 1 to *E*   *D* to *E*

Filter 1 to *C*   *E* to *C*

Mark allocation: 1 mark

- 1 mark for one of the possible correct answers

Question 2c.

Worked solution
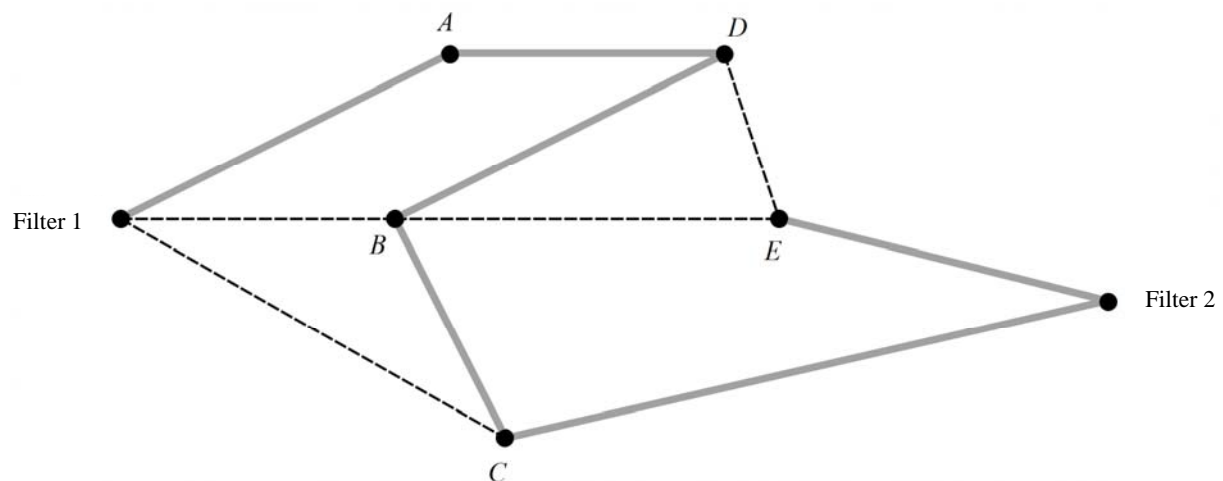
Mark allocation: 1 mark

- 1 mark for correct answer

Note: Other possible solutions exist.

Tip

- *Remember, a Hamiltonian path must pass through each vertex exactly once. A circuit would start and end at the same point.*

Question 3a.

Worked solution

Possible paths include:

Filter 1 – A – D – E – Filter 2 = 3 + 5 + 2 + 5 = 15

Filter 1 – B – D – E – Filter 2 = 4 + 4 + 2 + 5 = 15

Filter 1 – B – E – Filter 2 = 4 + 3 + 5 = 12

Filter 1 – C – B – D – E – Filter 2 = 6 + 3 + 4 + 2 + 5 = 20

Filter 1 – C – B – E – Filter 2 = 6 + 3 + 3 + 5 = 17

Filter 1 – C – Filter 2 = 6 + 8 = 14.

The shortest path is: Filter 1 – B – E – Filter 2.

Mark allocation: 1 mark

- 1 mark for correct answer

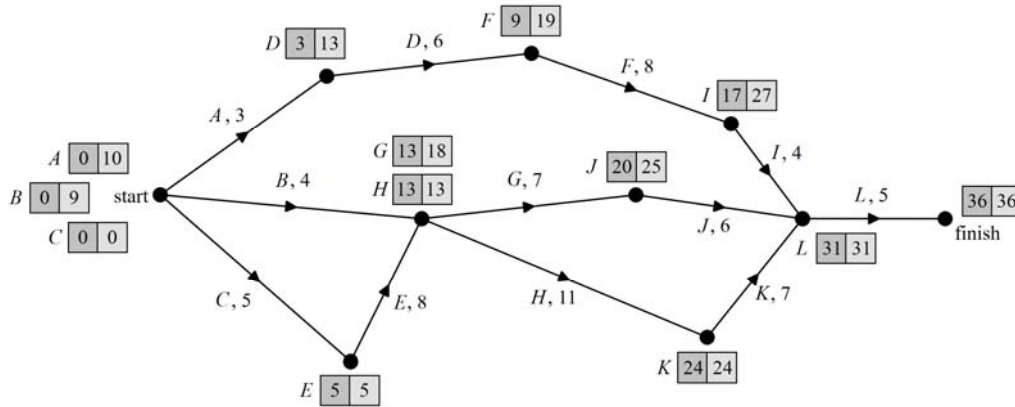**Question 3b.**

Worked solution

Mark allocation: 1 mark

- 1 mark for correct answer

　　　　　　　　　　　　　SECTION B – Module 2
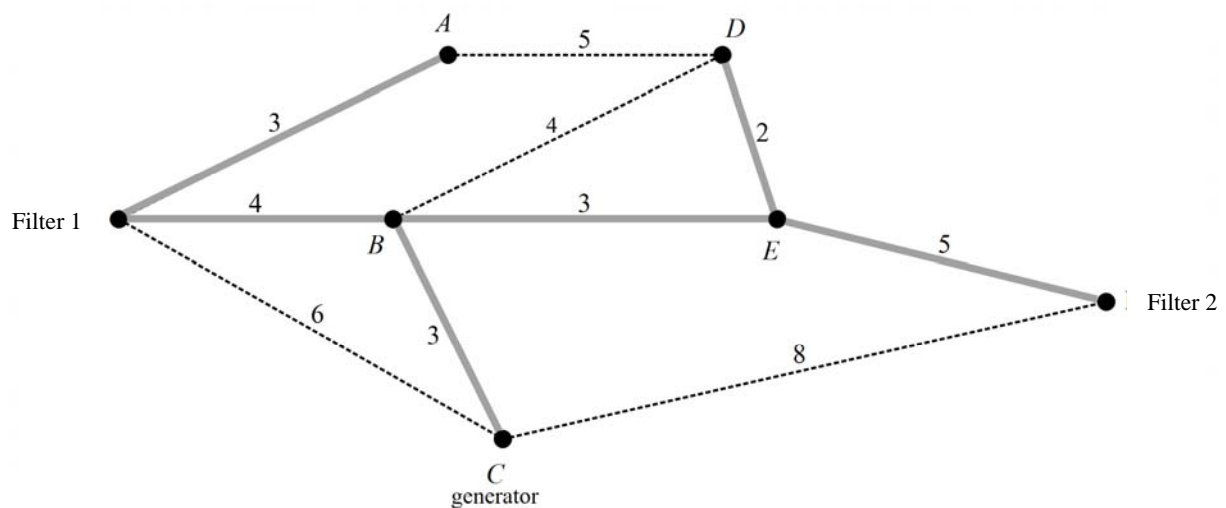
Question 4a.

Worked solution

Earliest start time for activity J is 20.

Mark allocation: 1 mark

- 1 mark for correct answer

Question 4b.

Worked solution

Critical path is $C - E - H - K - L$.
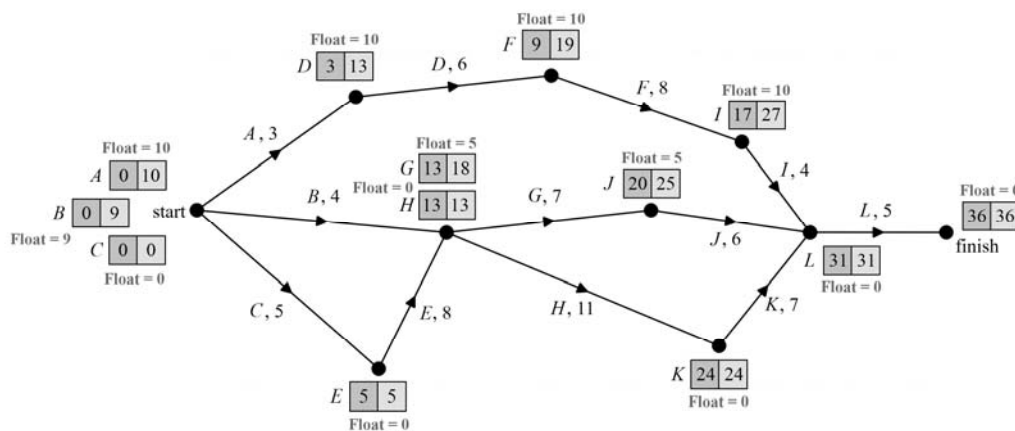
Note: See worked solution for **part a.** above.

Mark allocation: 1 mark

- 1 mark for correct answer

Question 4c.

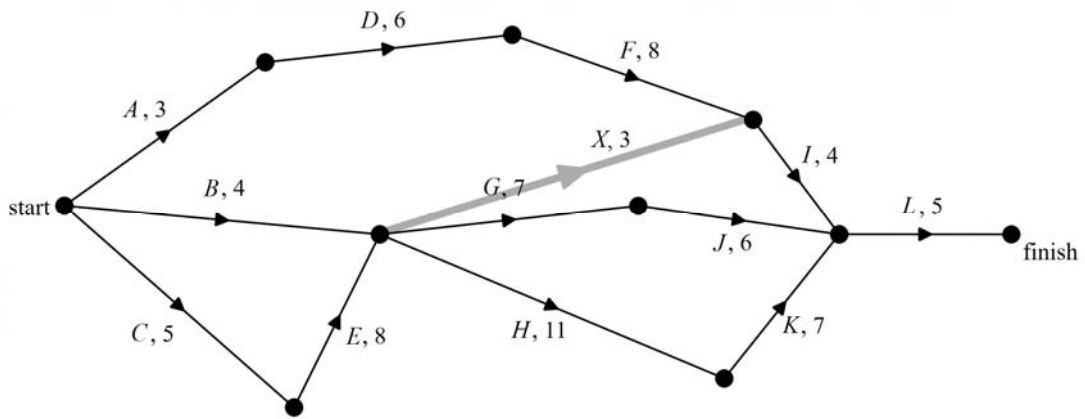## Worked solution

Float times shown on network below.

Four activities have a float time of 10 days.

Mark allocation: 1 mark

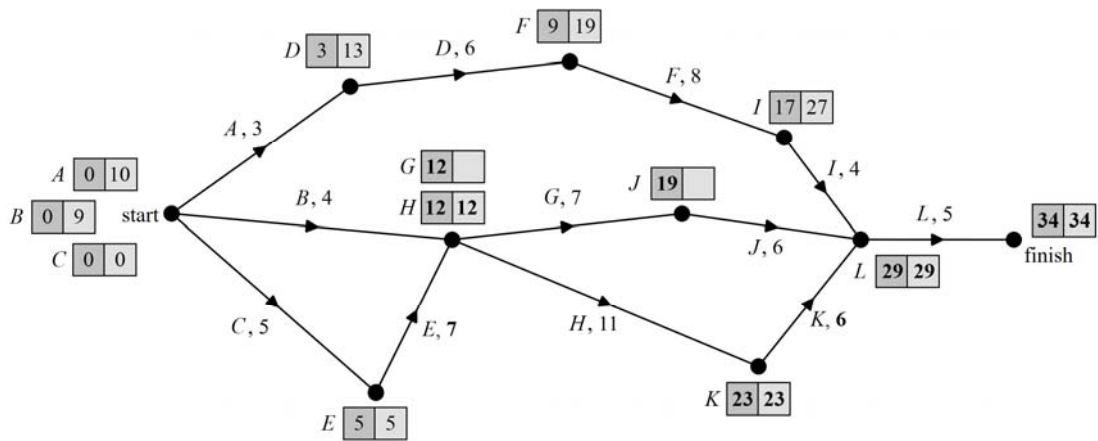- 1 mark for correct answer

Question 4d.

Worked solution

Mark allocation: 1 mark

- 1 mark for correct answer

Question 4e.

Worked solution

34 days

Mark allocation: 1 mark

- 1 mark for correct answer

SECTION B – Module 2

Module 3 – Geometry and measurement

Question 1a.

Worked solution

Use Heron's formula to calculate the area.

$$A = \sqrt{s(s-a)(s-b)(s-c)}, \text{ where } s = \frac{a+b+c}{2}$$

$$s = \frac{6.5 + 7.6 + 9.6}{2} = 11.85$$

$$A = \sqrt{11.85 \times (11.85 - 6.5) \times (11.85 - 7.6) \times (11.85 - 9.6)}$$

$$A = 24.62 \text{ m}^2$$

Mark allocation: 2 marks

- 1 mark for use of Heron's formula
- 1 mark for calculation resulting in 24.62

Tip

- *When finding the area of a triangle, you must consider which formula to use. If you are given a right-angled triangle: $A = \frac{1}{2} \times base \times height$ (of course this will work for any triangle where it is possible to identify the base and height). If you are given side lengths and an angle: $A = \frac{1}{2} bc \sin A$ (or its variations). When you have a triangle such as that in this question, where you are not given any angles, it is appropriate to use Heron's formula.*

Question 1b.

Worked solution

Area of garden = total area – area of grass

Area of grass:

This is a right-angled triangle; therefore, use Pythagoras' theorem to find the height of the triangle.

$$c^2 = a^2 + b^2$$
$$(5.4)^2 = (4.2)^2 + b^2$$
$$b = \sqrt{(5.4)^2 - (4.2)^2}$$
$$b = 3.39411$$

$$area = \frac{1}{2} \times base \times height$$
$$area = \frac{1}{2} \times 4.2 \times 3.39411$$
$$area = 7.127631$$

Area of garden = $24.62 - 7.13 = 17.49 \approx 17$ m^2

Mark allocation: 1 mark

- 1 mark for correct answer

Question 1c.

Worked solution

$$A = \pi \times r^2$$
$$A = \pi \times 1.15^2$$
$$A = 4.15476 \text{ m}^2$$
$$\text{Cost} = 4.15476 \times 35 = \$145.42$$

Mark allocation: 1 mark

- 1 mark for correct answer

Question 2a.

Worked solution

Nathan lands at 6.35 pm in Tokyo.

Two hours after this is 8.35 pm.

There is a two-hour time difference, with Melbourne being 2 hours ahead of Tokyo.

Nathan will therefore call Melbourne at 10.35 pm.

Mark allocation: 1 mark

- 1 mark for correct answer

Question 2b.

Worked solution

$r = 6400 \times \cos 36 = 5177.71 \approx 5178$ km

Mark allocation: 1 mark

- 1 mark for correct answer

Question 2c.

Worked solution

$$\text{distance} = \frac{140 - 24}{360} \times 2 \times \pi \times 5178$$
$$= 10483.3 \approx 10483 \text{ km}$$

Mark allocation: 1 mark

- 1 mark for correct answer

Note: This answer relies on a correct answer for **part b.** If the answer is not correct, but accurate substitution has been shown, this mark can still be awarded.

Question 3a.

Worked solution

Start by identifying the angle of depression and its corresponding angle within the triangle given. This is marked with *x* below.
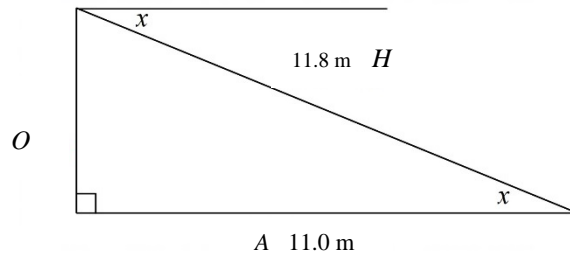
Using cosine:

$$\cos\theta = \frac{A}{H}$$

$$\cos x = \frac{11.0}{11.8}$$
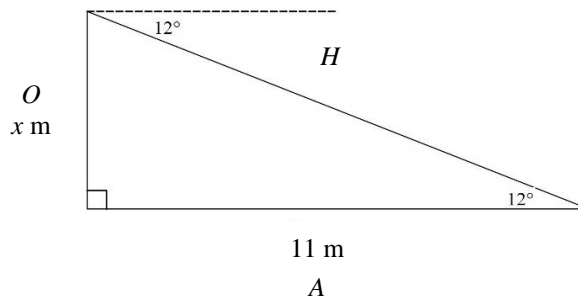
$$x = \cos^{-1}\left(\frac{11.0}{11.8}\right)$$

$$x = 21.2191°$$

$$x = 21°$$

Mark allocation: 1 mark

- 1 mark for correct answer

Question 3b.

Worked solution

$$\tan\theta = \frac{O}{A}$$

$$\tan 12 = \frac{x}{11.0}$$

$$x = 11.0 \times \tan 12$$

$$x = 2.338 \approx 2.34 \text{ m}$$

Mark allocation: 1 mark

- 1 mark for correct answer

SECTION B – Module 3

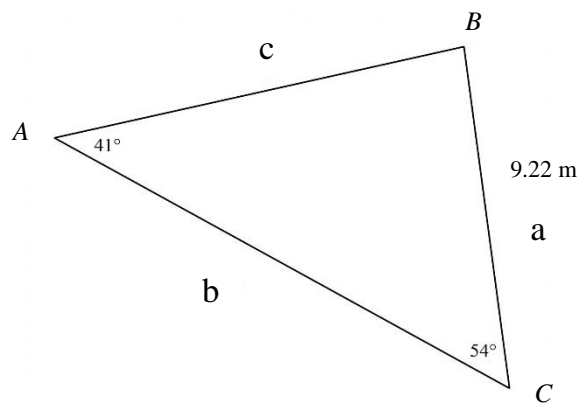**Question 3c.**

Worked solution

$180 - 54 - 41 = 85°$

Mark allocation: 1 mark

- 1 mark for correct answer

Question 3d.

Worked solution

Using the sine rule:

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

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

$$\frac{9.22}{\sin 41} = \frac{c}{\sin 54}$$

$$c = \sin 54 \times \frac{9.22}{\sin 41}$$

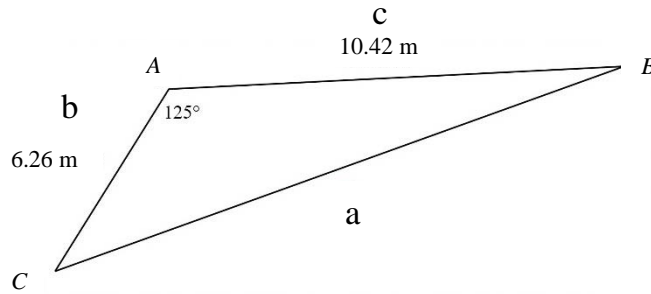$$c = 11.3696 \approx 11.37 \text{ m}$$

Mark allocation: 1 mark

- 1 mark for correct answer

Question 3e.

Worked solution

Use the cosine rule.

$$a^2 = b^2 + c^2 - 2bc\cos A$$

$$a^2 = b^2 + c^2 - 2bc\cos A$$

$$\therefore a = \sqrt{(6.26)^2 + (10.42)^2 - 2 \times 6.26 \times 10.42 \times \cos(125)}$$

$$a = 14.9195 \approx 15 \text{ m}$$

Mark allocation: 1 mark

- 1 mark for correct answer

SECTION B – Module 3

Module 4 – Graphs and relations

Question 1a.

Worked solution

day 3

Mark allocation: 1 mark

- 1 mark for correct answer

Question 1b.

Worked solution

The smallest increase, or 'slope', occurs between days 9 and 10 and days 10 and 11.

Mark allocation: 1 mark

- 1 mark for correct answer

Question 2a.

Worked solution

Using the point $(500, 553.5)$

$weight\ of\ sauce\ (g) = M \times capacity\ (mL)$

$553.5 = M \times 500$

$\therefore M = \dfrac{553.5}{500}$

$M = 1.107$

Mark allocation: 1 mark

- 1 mark for correct answer

Question 2b.

Worked solution

$weight\ of\ sauce\ (g) = 1.107 \times capacity\ (mL)$

$weight\ of\ sauce\ (g) = 1.107 \times 150$

$weight\ of\ sauce\ (g) = 166.05\ g$

Mark allocation: 1 mark

- 1 mark for correct answer

Note: This answer relies on a correct answer for **part a.** If the answer is not correct, but accurate substitution has been shown, this mark can still be awarded.

Question 2c.

Worked solution

$cost = 0.0015 \times weight(g) - 10$

$cost = 0.0015 \times (450 \times 18) - 10$
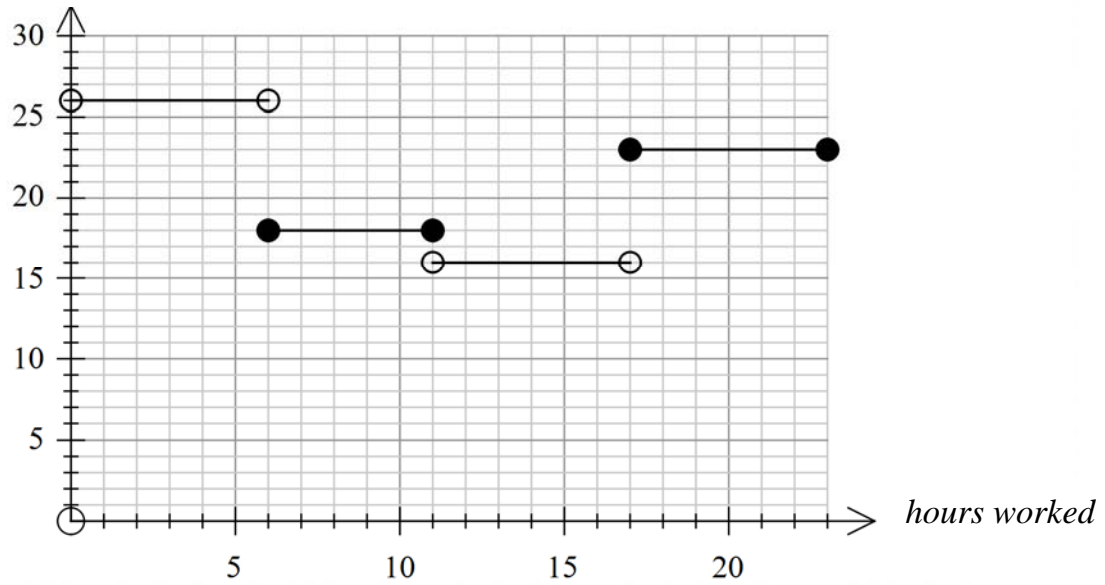
$cost = 2.15 \approx \$2$

Mark allocation: 2 marks

- 1 mark for correct substitution of 450×18 into equation
- 1 mark for calculation resulting in rounded answer of \$2

Question 3a.

Worked solution
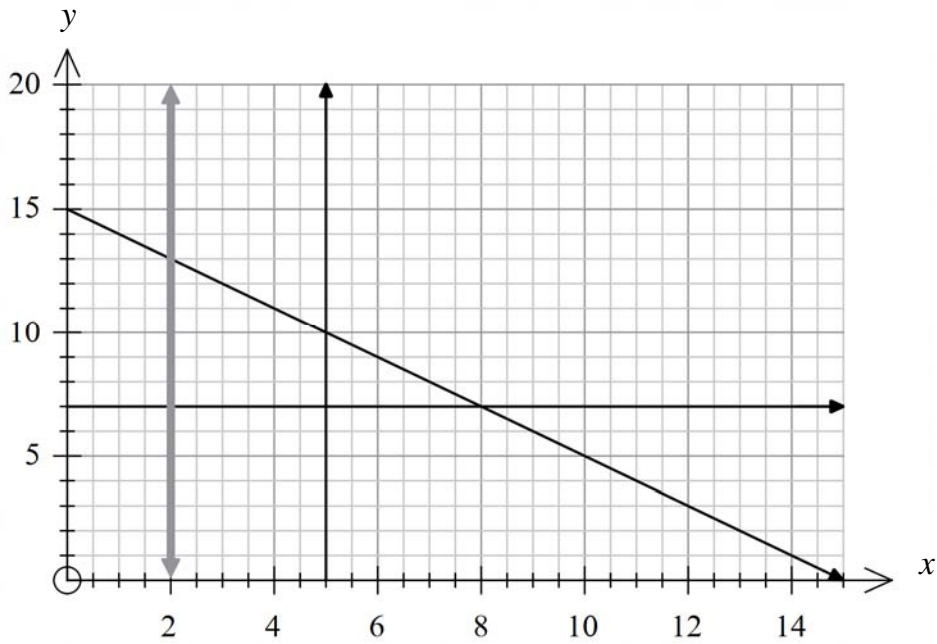
wages ($ per hour)

Mark allocation: 2 marks

- 1 mark for correct line
- 1 mark for open circles at each end of the line

Question 3b.

Worked solution
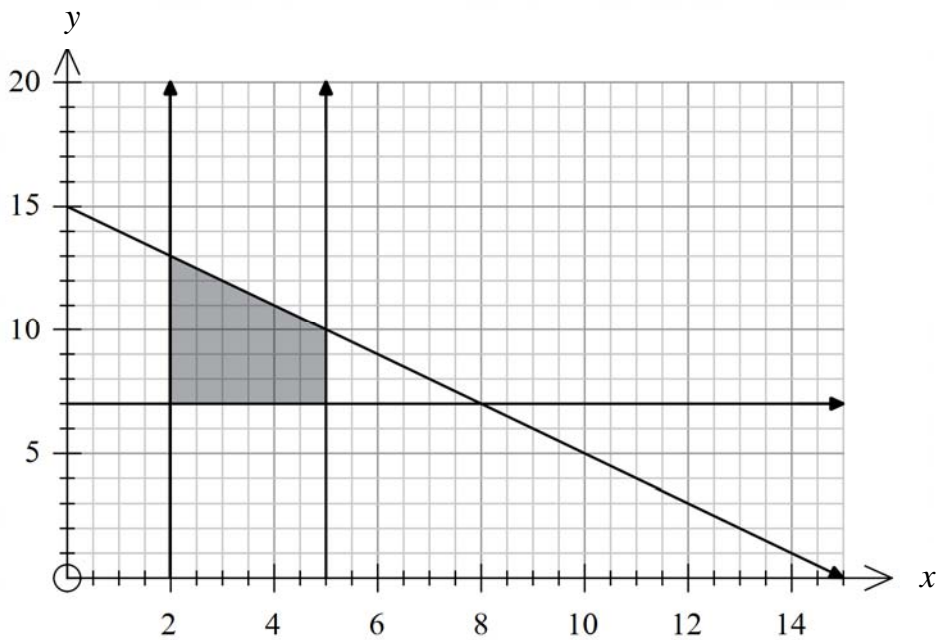
$2 \times 16 + 3 \times 23 = \$101$

Mark allocation: 1 mark

- 1 mark for correct answer

　　　　　　　SECTION B – Module 4

Question 4a.

Worked solution

Mark allocation: 1 mark

- 1 mark for correct answer

Question 4b.

Worked solution

Mark allocation: 1 mark

- 1 mark for correct answer

　　　　　　　　SECTION B – Module 4

Question 4c.

Worked solution

Consider the points (2, 13), (2, 7), (5, 7) and (5, 10):

$2 \times 5 + 13 \times 1 = 23$ cents

$2 \times 5 + 7 \times 1 = 17$ cents

$5 \times 5 + 7 \times 1 = 32$ cents

$5 \times 5 + 10 \times 1 = 25$ cents

Therefore, the minimum cost of these ingredients is 17 cents.

Mark allocation: 1 mark

- 1 mark for correct answer

END OF WORKED SOLUTIONS