**GUANGYANG SECONDARY SCHOOL, SINGAPORE**
2018 MID-YEAR EXAMINATION
Sec Two Normal (Technical)

CANDIDATE NAME

CLASS

REGISTER NUMBER

**MATHEMATICS SYLLABUS T**
Paper 1

**4 May 2018**
**1 hour 15 minutes**

Candidates answer on the Question Paper.

## READ THESE INSTRUCTIONS FIRST

Write your name, class and index number on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.

Answer **all** questions.
The number of marks is given in brackets [ ] at the end of each question or part question.

If working is needed for any question it must be shown with the answer.
Omission of essential working will result in loss of marks.
The total number of marks for this paper is 40.

The use of an approved scientific calculator is expected, where appropriate.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
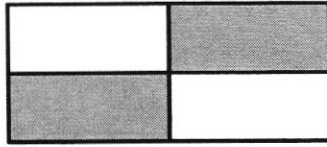For $\pi$, use either your calculator value or 3.142.

| Marks |
| --- |
|  |

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This question paper consists of **8** printed pages, inclusive of this cover page.

Answer **all** questions.

1



For the diagram above, write down

**(a)** the order of rotational symmetry,

*Answer* ....................................[1]

**(b)** the number of lines of symmetry.

*Answer* .................................. [1]

2 Use < , > or = to complete each of these statements.

**(a)** 0.1 ................ $\frac{1}{9}$ [1]

**(b)** $\frac{2}{3}$ ................ 66 % [1]

3
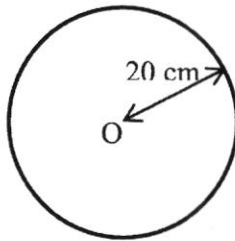


The radius of the circle is 20 cm.
Find the circumference of the circle.

*Answer* .....................................cm [2]

4    Audrey, Indah and Zoey shared $900 000 in the ratio of 5 : 7 : 3.
     Find the smallest share.

*Answer* $ ................................ [2]

5    5 painters took 20 days to finish a project.
     How long will it take 8 painters to complete the same project?

*Answer* ................................days [2]

**[Turn over**

**6** Express

**(a)** 15.6 kilograms in grams.

*Answer* ……………..……………g [1]

**(b)** 0.45 hours in minutes.

*Answer* ……………..……………min [1]

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**7** Expand and simplify $-x + 5(x - 2y)$.

*Answer* ……………..…………… [2]

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**8** *PQRS* is a trapezium.
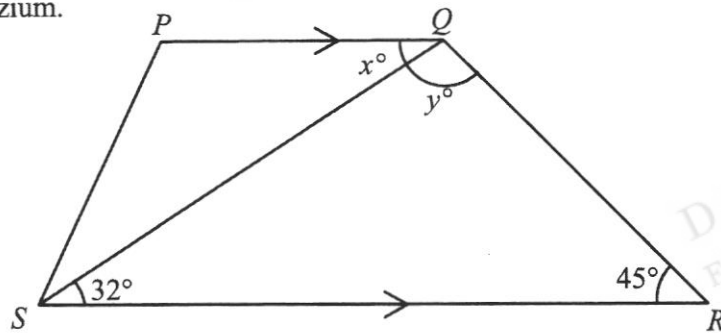


Find
**(a)** angle $x$,

*Answer* $x =$………………..…………… [1]

**(b)** angle $y$.

*Answer* $y =$………………..…………… [1]

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**9** Solve

**(a)** $4x = 35,$

*Answer x =* ................................. [1]

**(b)** $5x + 5 = 17 + 3x.$

*Answer x =* ................................. [2]

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**10**
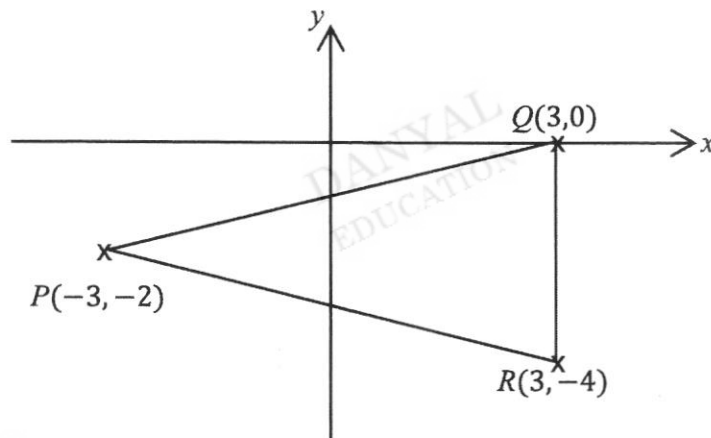


The coordinates of the three vertices are $P\,(-3,-2)$, $Q(3,0)$ and $R(3,-4)$.

**(a)** Name the type of triangle formed by the points $P$, $Q$ and $R$.

*Answer* .................................triangle [1]

**(b)** Calculate the total area enclosed by the points $P$, $Q$ and $R$.

*Answer* ................................. units$^2$ [2]

11    The table shows cost of travelling in a taxi.

| Distance (km) | | Basic charge |
|---|---|---|
| More than | Up to | ($) |
| 0 | 1 | 2.80 |
| 1 | 1.4 | 3.00 |
| 1.4 | 1.8 | 3.20 |
| 1.8 | 2.2 | 3.40 |
| 2.2 | 2.6 | 3.60 |

There is an additional charge of 35% to the basic charge for journeys between 0730 to 0930.
Mr Lee took a taxi from his house to Changi Airport.
The distance between his house and Changi Airport is 2.5 km.
He started his trip at 08 00.
Calculate the total cost of his taxi fare, including his additional charges.

*Answer* $ ..............................  [3]

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12    Given a length of 72 cm,
   **(a)**    convert 72 cm into metres,

*Answer* ........................... m [1]

   **(b)**    express 72 cm as a percentage of 4 metres.

*Answer* ........................... % [2]

**[Turn over**

**13** **(a)** Draw the triangle *ABC* where *BC* = 5.5 cm and *AC* = 6 cm.
The line *AB* has been drawn for you. [2]

*Answer*

*A* _____ *B*

**(b)** Draw the perpendicular bisector of line *AB*. [2]

**(c)** **(i)** Draw the bisector of angle *ABC*. [1]
**(ii)** The perpendicular bisector in **part (b)** meets bisector of angle *ABC* at *M*. Measure and write down the distance *BM*.

*Answer BM* = ...................................cm [1]

**[Turn over**

14　Mr Tan drove 24 000 metres in 20 minutes.
　　Calculate his average speed in
　　**(a)**　　metres per second,

*Answer* ...........................m/s [2]

　　**(b)**　　kilometres per hour.

*Answer* ........................... km/h [2]

　　**(c)**　　The distance between town *A* and town *B* is 980 km.
　　　　　Mr Tan's car uses 1.09 litres of petrol for every 18 km he travels.
　　　　　Petrol costs $2.54 per litre.
　　　　　Find the costs of travel from town *A* and town *B*.
　　　　　Give your answer correct to the nearest cent.

*Answer* $ ........................... [2]

**End of paper**

## GUANGYANG SECONDARY SCHOOL, SINGAPORE
2018 MID-YEAR EXAMINATION
Sec Two Normal (Technical)

CANDIDATE NAME

CLASS

REGISTER NUMBER

## MATHEMATICS SYLLABUS T
Paper 2

**7 May 2018**
**1 hour 15 minutes**

Candidates answer on the Question Paper.

## READ THESE INSTRUCTIONS FIRST

Write your name, class and index number on all the work you hand in.
Write in dark blue or black pen.
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Answer **all** questions.
The number of marks is given in brackets [ ] at the end of each question or part question.

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The total number of marks for this paper is 40.

The use of an approved scientific calculator is expected, where appropriate.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
For $\pi$, use either your calculator value or 3.142.

| Marks |
|-------|
|       |

Answer **all** questions.

1   Put these numbers in order of size, largest first.

$$-\sqrt{7}, \quad 1.987, \quad 2\tfrac{1}{7}, \quad -5$$

Answer ..................... , ..................... , ..................... , ..................... [2]
$\qquad\quad$ *largest* $\qquad\qquad\qquad\qquad\qquad\qquad\qquad\quad$ *smallest*

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2   The flight time from Singapore to Auckland, New Zealand, is 9 hours 55 minutes.
New Zealand is 4 hours ahead of Singapore time.
The flight leaves Singapore at 0930.
Find the time in Auckland, New Zealand, when the flight arrives.

Answer ..................................hours [2]

3    Jane changes 300 British Pounds (GBP) to Singapore Dollars (SGD).
The exchange rate is 1 GBP = 1.846 SGD
Find how many Singapore Dollars she receives.

*Answer* .........................…............ SGD [2]

4    Kenneth's monthly earnings is as follows:

basic pay of $1 500 + commission

The table shows the commission rate based on the total sales made.

| Total sales | Commission Rate (%) |
|---|---|
| $0 − $20 000 | 2 |
| $20 001− $50 000 | 2.5 |
| $50 001− $70 000 | 3 |
| Above $70 000 | 5 |

Kenneth's total sales for March is $ 35 000.
Calculate his earnings for March.

*Answer* $................................ [2]

5    Mr Lee typed 525 words in 10.5 minutes.
     Ms Tan typed 605 words in 11 minutes.
     Who types faster and by how much?

*Answer* ..................*types faster by* ................*words per minute* [2]

6    Mr Lim deposited $50 000 in a bank which pays a simple interest of 3% per annum
     for 5 years.
     **(a)**    Find the total amount of money Mr Lim will receive at the end of 5 years.

*Answer $*................................. [2]

   **(b)**    Find the amount of interest that Mr Lim will receive each year.

*Answer $*................................. [2]

**7**  **(a)**  Expand and simplify $2(5 + 2x) - 3(x - 2)$.

Answer ................................. [2]

**(b)**  Simplify $\dfrac{4x}{5} + \dfrac{x-7}{2}$.

Answer ................................. [3]

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**8**  A pencil cost $x$. A pen cost 3 times as much as the pencil.
The cost of one pen and five pencils is \$3.60.
**(a)**  Find an expression, in terms of $x$, the cost of a pen.

Answer \$ ................................. [1]

**(b)**  Write down an equation, in terms of $x$, to represent the total cost of one pen and five pencils.
Show that it reduces to $8x = 3.60$.
Answer [1]

**(c)**  Find the cost of a pen.

Answer \$ ................................. [2]

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**9** Ariq did a survey on how people travel to work for Apron company.
He illustrated his results in a pictogram.
He has drawn the pictogram for bus, MRT, walking and car.

| Method of travel | |
|---|---|
| Bus | ▢ ▢ |
| MRT | ▢ ▢ ▢ |
| Walking | ▢ ▢ ▢ ▢ ▢ ▯ |
| Cycle | |
| Car | ▢ ▢ ▫ |

key ▢ Represents 20 people

**(a)** There are 50 people who cycled to work.
Complete the pictogram. [1]

**(b)** In Ariq's sample,
**(i)** how many people travelled by MRT?

Answer ……………………………………… [1]

**(ii)** how many people walked?

Answer ……………………………………… [1]

**(c)** Find the total number of people interviewed in the survey.

Answer ……………………………………… [1]

**(d)** MRT and bus are considered as public transportations.
Find the percentage of people who goes to work by public transportations.

Answer …………………………………% [2]

**10** **(a)** Complete the table of values for $y = 2x + 3$.

| $x$ | $-3$ | $-2$ | $-1$ | $0$ |
|---|---|---|---|---|
| $y$ | $-3$ | | $1$ | $3$ |

[1]

**(b)** Draw the graph of $y = 2x + 3$.
*Answer:*
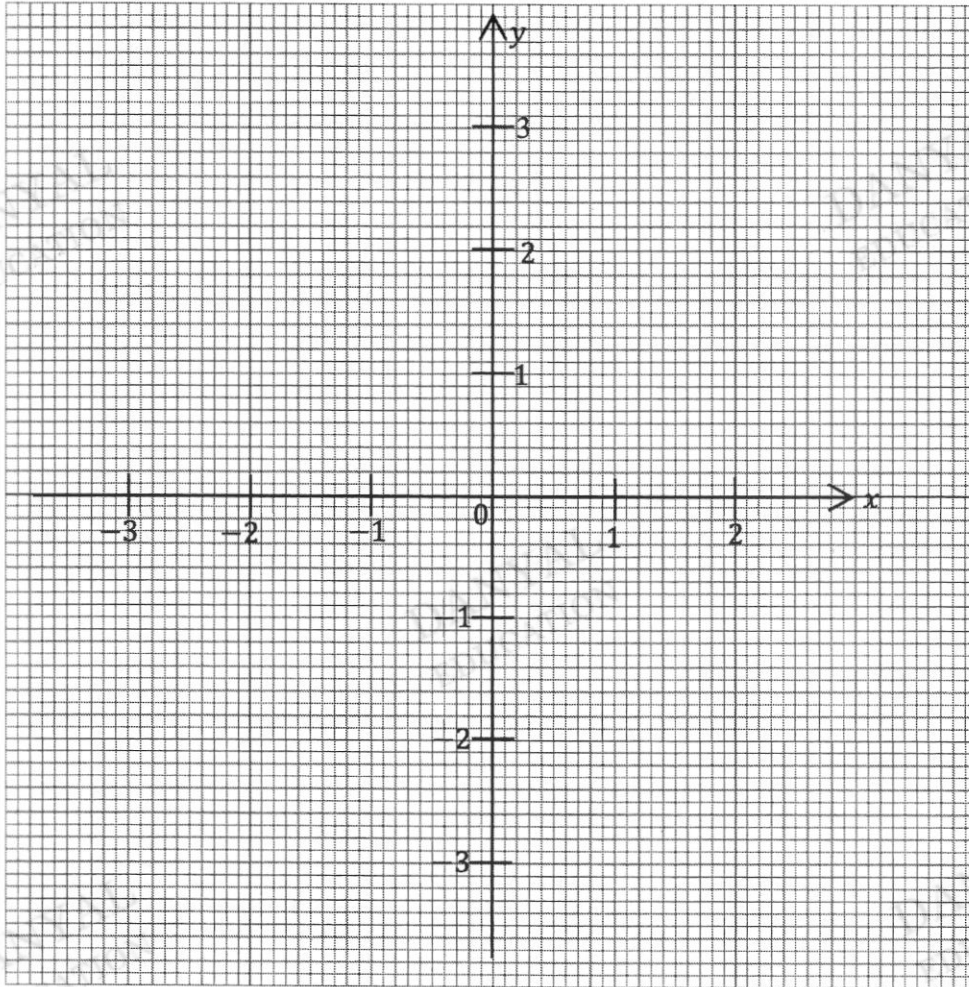


[2]

**(c)** Find the gradient of the graph of $y = 2x + 3$.

*Answer* ................................. [1]

**(d)** Use your graph to find the value of $x$ when $y = 1.8$

*Answer x =* ................................. [1]

**[Turn over]**

11    M Tell Hub is a mobile service provider.
      They charge mobile handphone users every month.
      There is a fixed charge, a charge for each minute of calls made during off-peak hours,
      and a charge for each minute of calls made during peak hours.



Number of minutes
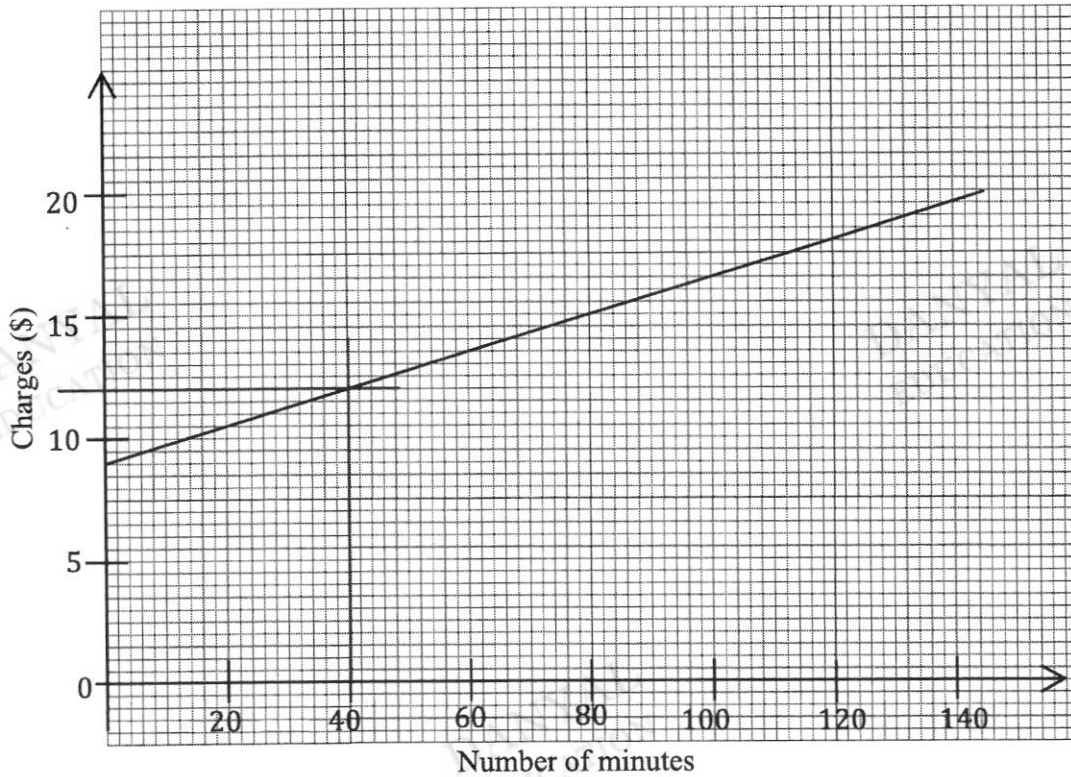
(a)    Indah only uses her mobile phone in off-peak.
       The graph shows how Indah total monthly bill varies according to the
       length of time she uses the mobile phone.

       (i)     Indah's bill in one month was $12.
               For how many minutes did she use her mobile phone?

                                    Answer ................................... minutes [1]

       (ii)    Find the fixed charge.

                                    Answer $.................................... [1]

       (iii)   Find the charge per minute for off-peak hours.
               Give your answer corrects to 2 decimal places.

                                    Answer $.................................per minute [2]

**[Turn over]**

11  (b)  The company charges $0.15 per minute during peak hours.
        In one month, Audrey uses her mobile phone for 120 minutes in off-peak
        and 80 minutes in peak hours.
        Using your answers to part **(a)**, find Audrey's charges for the month.

*Answer* $.................................... [2]

**END OF PAPER**

| 1a | order rotational symmetry: | 2 | [B1] |
| 1b | lines of symmetry: | 0 | [B1] |

**2a**    $0.1 < \dfrac{1}{9}$          [B1]

**2b**    $\dfrac{2}{3} > 66\,\%$          [B1]

**3**

$$\begin{aligned} \text{Circumference} &= 2\pi r \\ &= 2 \times 3.142 \times 20 \quad &[M1] \\ &= 125.68 \text{ cm} \quad &[A1] \end{aligned}$$

**4**

$$\begin{aligned} \text{Smallest share} &= \frac{3}{3+5+7} \times \$900\,000 \quad &[M1] \\ &= \$180\,000 \quad &[A1] \end{aligned}$$

**5**    5 painters → 20 days

$$8 \text{ painters} \rightarrow \frac{5}{8} \times 20 \quad [M1]$$

$$= 12.5 \text{ days} \quad [A1]$$

**6a**    15.6 kg    $= 15\,600$ g          [B1]

**6b**

$$\begin{aligned} 0.45 \text{ hours} &= 0.45 \times 60 \\ &= 27 \text{ min} \quad [B1] \end{aligned}$$

**7**

$$\begin{aligned} -x + 5(x - 2y) &= -x + 5x - 10y \quad &[M1] \\ &= 4x - 10y \quad &[A1] \end{aligned}$$

**8a**    $x = 32°$ (alt ∠s, // lines)          [B1]

**8b**

$$\begin{aligned} y &= 180 - 45° - 32° \quad (\angle \text{ sum of } \triangle) \\ &= 103° \quad [B1] \end{aligned}$$

**9a**

$$\begin{aligned} 4x &= 35 \\ x &= 8.75 \text{ or } 8\tfrac{3}{4} \quad [A1] \end{aligned}$$

**9b**

$$\begin{aligned} 5x + 5 &= 17 + 3x \\ 5x - 3x &= 17 - 5 \\ 2x &= 12 \quad [M1] \\ x &= 6 \quad [A1] \end{aligned}$$

**10a**    isosceles triangle      [B1, 1 letter missing still give 1 mark.]

**10b**

$$\begin{aligned} \text{Area of triangle} &= \frac{1}{2} \times 4 \times (3 + 3) \quad &[M1] \\ &= 12 \text{ units}^2 \quad &[A1] \end{aligned}$$

11  Total cost of his taxi fare  $= \$3.60 + \frac{35}{100} \times \$3.60$  [M1]

$= \$4.86$  [A1]

12a  72 cm into metres  $= 0.72$ m  [B1]

12b  $\frac{72}{400} \times 100\%$  [M1]

$= 18\%$  [A1]

13  refer to attachment

14a  Average speed $= \overline{\phantom{20\times60 s}}$  [M1]
$\phantom{= } 20\times60\ s$

$= 20$ m/s  [A1]

14b  Avg. speed in km/h  $= 20 \div \overline{\phantom{3600}}$  [M1]
$\phantom{Avg. speed in km/h = 20 \div } 3600$

$= 72$ km/h  [A1]

14c  amount of petrol  $= \frac{980}{18} \times 1.09\ l$

$= 59\frac{31}{90}\ l$  [M1]

Cost of petrol $= 59\frac{31}{90}\ l \times \$2.54$

$= \$150.73$  [A1]

The end.

1      $-\sqrt{7}$ = $-2.645\,75\ldots$

      $2\frac{1}{7}$ = $2.142\,857\ldots$

      $2\frac{1}{7},\ 1.987,\ -\sqrt{7},\ -5$                     [A2]

2      Arrival time in Auckland     = $(09\,30 + 9\,h\,55\,min) + 4$

                                    = $19\,25 + 4$             [M1]

                                    = $23\,25$ or 11.25 pm     [A1]

3      300 GBP to SGD      = $300 \times 1.846$         [M1]

                             = 553.80 SGD         [A1]

4      Total earnings for March     = $\$1\,500 + 2.5\%\ of\ \$35\,000$     [M1]

                                    = $\$1\,500 + \$875$

                                    = $\$2\,375$            [A1]

5      Mr Lee's typing rate: $525 \div 10.5$

                        = 50 words per minute

     Ms Tan's typing rate: $605 \div 11$

                        = 55 words per minute

                                  [M1 for either correct typing rate]

     Ms Tan types faster by 5 words per minute.        [A1]

6a     P = $\$50\,000$

       R = $3\ \%$ p.a.

       T = 5 years

       Interest, I      = $\dfrac{\phantom{xxxx}}{100}$

                     = $\dfrac{\phantom{xxxxxx}}{100}$

                     = $\$7500$           [M1]

       Total amount = $\$57\,500$           [A1]

6b     Amount of interest per year   = $\$7\,500 \div 5$       [M1]

                                    = $\$1\,500$ per year     [A1]

7a $\quad 2(5 + 2x) - 3(x - 2) = 10 + 4x - 3x + 6$ [M1]

$\qquad\qquad\qquad\qquad\qquad = x + 16$ [A1]

7b $\quad \dfrac{4x}{5} + \dfrac{x-7}{2} = \dfrac{2(4x)}{10} + \dfrac{5(x-7)}{10}$ [M1]

$\qquad\qquad\qquad = \dfrac{8x}{10} + \dfrac{5x-35}{10}$

$\qquad\qquad\qquad = \dfrac{8x+(5x-35)}{10}$

$\qquad\qquad\qquad = \dfrac{8x+5x-35}{10}$ [M1]

$\qquad\qquad\qquad = \dfrac{13x-35}{10}$ [A1]

8a $\quad$ Cost of a pen $= \$3x$ [B1]

8b $\quad$ total cost of 1 pen and 5 pencils $= \$3.60$

$\qquad\qquad 3x + 5 \times x = 3.60$

$\qquad\qquad\qquad\quad 8x = 3.60$ [B1]

8c $\qquad\qquad\qquad\quad 8x = 3.60$

$\qquad\qquad\qquad\quad\ x = \$0.45$ [M1]

$\qquad$ Cost of a pen $= 3 \times \$0.45$

$\qquad\qquad\qquad\quad = \$1.35$ [A1]

9a $\quad$ ▢ ▢ ◰ [B1]

9bi $\quad$ By MRT: 60 [B1]

9bii $\quad$ By walking: 110 [B1]

9c $\quad$ Total number of people

$\qquad = 40 + 60 + 110 + 50 + 45$

$\qquad = \quad 305$ [B1]

9d $\quad$ Percentage of people who goes by public transportation [M1]

$\qquad = \dfrac{100}{305} \times 100\%$

$\qquad = 32.8\ \%\ (3\ \text{s.f.})$ [A1]

10a $\quad y = 2x + 3$

$\qquad y = 2 \times (-2) + 3$

$\qquad y = -1$ [B1]

10b $\quad$ refer to attachment

10c $\quad$ Gradient of graph $= 2.$ [B1]

10d $\quad$ value of $x$ when $y = 1.8$, $x = -0.6$ [B1]

11ai    40 minutes                                                              [B1]

11aii   Fixed charge = $9                                                       [B1]

11aiii  Cost of making calls   = $12 − 9                                        [M1]
                               = $3
        Charge per minute      = $3 ÷ 40 *minutes*
                               = 0.075
                               = $0.08                                          [A1]

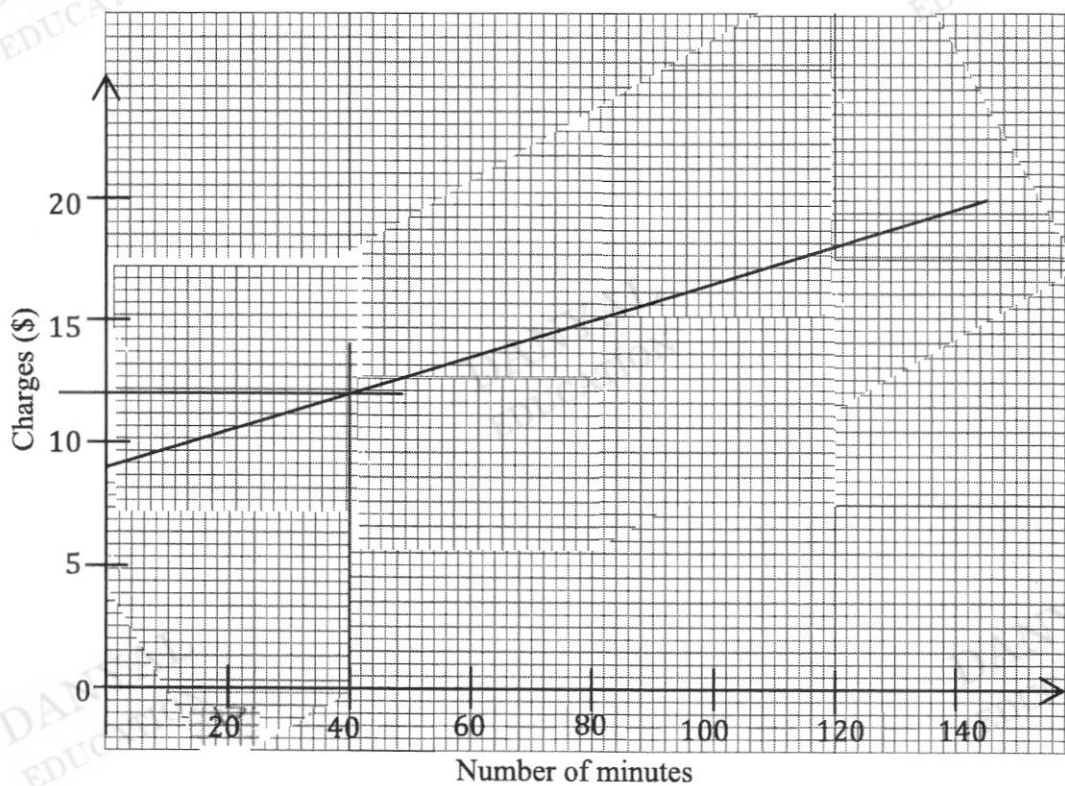11b     Cost for 120 min of off-peak calls   = $18
        Cost for 80 min of off-peak calls    = $0.15 × 80
                                             = $12
        Audrey's charges for the month       = $12 + 18                        [M1]
                                             = $30                             [A1]



End of paper.