R26...Direct and Inverse Proportion Problems

OCR

(b) In this table y is directly proportional to x.

x	16	24
y	36	b

Calculate b.

(b) ....[2]

(b) In this table y is directly proportional to x.

x	16	24
y	36	b

Calculate b.

x y

$\div 2$ $\left(\begin{array}{c} 16 \\ 8 \end{array}\right.$: $\left.\begin{array}{c} 36 \\ 18 \end{array}\right) \div 2$

$\times 3$ $\left(\begin{array}{c} 8 \\ 24 \end{array}\right.$: $\left.\begin{array}{c} 18 \\ 54 \end{array}\right) \times 3$

54

(b) ....54...........................[2]

9 **(a)** Convert 485 cm to metres.

(a) .... m**[1]**

(b) (i) Zara says

10 litres = 18 pints.

Use Zara's conversion to convert 25 litres into pints.

(b)(i) ....pints**[2]**

(ii) Jacob says

5 miles = 8 kilometres.

Use Jacob's conversion to convert 44 kilometres into miles.

(ii) ....miles**[2]**

9　(a)　Convert 485 cm to metres.

$100 \, cm = 1m$

(a) ....4.85....... m[1]

(b)　(i)　Zara says

10 litres = 18 pints.

Use Zara's conversion to convert 25 litres into pints.

$$\begin{array}{c} \div 2 \left(\begin{array}{c} 10L = 18p \\ 5L = 9p \\ 25L = 45p \end{array} \right) \div 2 \\ \times 5 \qquad \qquad \times 5 \end{array}$$

(b)(i) ....45....... pints[2]

(ii) Jacob says

5 miles = 8 kilometres.

Use Jacob's conversion to convert 44 kilometres into miles.

÷2 $\Big($ 5 miles = 8 Km $\Big)$ ÷2

2.5 miles   4 Km

×11

44 Km ×11

(ii) ....27.5........miles[2]

2.5 miles × 11

×10 = 25 miles
+ 1 = 2.5 miles

(b) y is inversely proportional to x.
$x = 5$ when $y = 12$.

Work out y when $x = 20$.

(b) .... **[2]**

(b) y is inversely proportional to x.
$x = 5$ when $y = 12$.

Work out y when $x = 20$.

$$x \qquad y$$

$$\times 4 \left(\begin{array}{c} 5 = 12 \\ \\ 20 = 3 \end{array} \right) \div 4$$

(b) ....3................. **[2]**

7 (a) Write the following ratios in their simplest form.

   (i)   6 : 8

(a)(i) .... : .... [1]

   (ii) 600 m : 1.5 km

(ii) .... : .... [3]

(b) 64 pens cost £5.76.

   How much would 80 of these pens cost?

(b) £ .... [2]

7   (a)   Write the following ratios in their simplest form.

      (i)   6 : 8

(a)(i)   3 : 4   [1]

      (ii)   600 m : 1.5 km

$$600\,m : 1500\,m$$
$$6 : 15$$
$$2 : 5$$

(ii)   2 : 5   [3]

  (b)   64 pens cost £5.76.

How much would 80 of these pens cost?

$$64\,pens = £5.76$$
$$1\,pen = £0.09$$
$$80\,pens =$$

(b)   £ 7.20   [2]

5   (a) (i)   Three people type 3600 labels in 8 hours.

How many hours should it take four people to type 3600 labels?

(a)(i)   .... hours [2]

(ii)   Give a reason why it may take a different time than you found in part (a)(i) to type the 3600 labels.

....

.... [1]

5 (a) (i) Three people type 3600 labels in 8 hours.

How many hours should it take four people to type 3600 labels?

$$\div 3 \begin{cases} 3 \text{ people} = 8 \text{ hours} \\ 1 \text{ person} = 24 \text{ hours} \\ 4 \text{ people} = 6 \text{ hours} \end{cases} \begin{matrix} \times 3 \\ \div 4 \end{matrix}$$

(a)(i) .... 6 ✓ .... hours **[2]**

(ii) Give a reason why it may take a different time than you found in part **(a)(i)** to type the 3600 labels.

Not everyone works at same rate.

.... **[1]**

8   (a) Harry needs dollars to go on holiday.
          He can buy $50 for £40.

          How much will $720 cost at the same rate?

                                                    (a)   £ .... [2]

(b) Tony returns from holiday with these notes.

Note	Number of notes
€50	2
€20	4
€10	9
€5	12

The exchange rate is £1 = €1.17.

Work out how much he will get in total when he changes these notes.

(b) £ .... **[4]**

8   (a) Harry needs dollars to go on holiday.
         He can buy $50 for £40.

         How much will $720 cost at the same rate?

$$\div 50 \begin{Bmatrix} \$50 = £40 \\ \$1 = £0.80 \\ \$720 = £576 \end{Bmatrix} \div 50$$

$\times 720$ ... $\times 720$

(a)   £ .... 576 .... [2]

(b) Tony returns from holiday with these notes.

Note	Number of notes	
€50	2	$= €100$
€20	4	$= €80$
€10	9	$= €90$
€5 ×	12	$= €60$

$€330$

The exchange rate is £1 = €1.17.

Work out how much he will get in total when he changes these notes.

×1·17

£1 = €1·17

÷1·17

€ 330 ÷ 1·17

282·05 ✓

(b) £ .... **[4]**

11 (a) Grapes cost £2 per kilogram.

Calculate the cost of 380 g of grapes.

(a) £ .... [2]

1000g

11 **(a)** Grapes cost £2 per kilogram.

Calculate the cost of 380 g of grapes.

$\div 1000$ $\Big($ £2 $=$ 1000 g $\Big)$ $\div 1000$

£0.002 $=$ 1 g

$\times 380$ $\Big($ £0·76 $=$ 380g $\Big)$ $\times 380$

0·76

(a) £ ....0·76... **[2]**

17 (a) The scale of a map is 1 cm represents 25 m.

    (i) The length of a path is 240 m.

        Work out the length, in centimetres, of the path on the map.

                (a)(i) ....cm **[1]**

    (ii) The scale 1 cm represents 25 m can be written in the form $1:k$.

        Find the value of k.

                (ii) $k =$ .... **[1]**

17 (a) The scale of a map is 1 cm represents 25 m.

   (i) The length of a path is 240 m.

   Work out the length, in centimetres, of the path on the map.

$\times 9.6 \left(\begin{array}{c} \text{1 cm} = 25\text{m} \\ = 240\text{m} \end{array} \right) \times 9.6$

9.6

(a)(i) ....9.6................................cm **[1]**

   (ii) The scale 1 cm represents 25 m can be written in the form 1 : k.

100 cm = 1m

   Find the value of k.

1 cm = 2500 cm

(ii) k = ...2500.............................. **[1]**

16 Donald swims 3 lengths of a swimming pool in 93 seconds.

(a) Use this information to show that he could swim 100 lengths in under 55 minutes.   **[4]**

(b) What assumption did you make in part (a)?

....

.... **[1]**

(c) Donald tries to swim the 100 lengths in under 55 minutes.

Suggest one reason why he might not achieve this.

....

.... **[1]**

16 Donald swims 3 lengths of a swimming pool in 93 seconds.

$60 \text{ sec} = 1 \text{ min}$

(a) Use this information to show that he could swim 100 lengths in under 55 minutes. **[4]**

$\div 3 \left\{ \begin{array}{l} 3 \text{ lengths} = 93 \text{ seconds} \\ 1 \text{ length} = 31 \text{ seconds} \end{array} \right\} \div 3$

$\times 100 \left\{ 100 \text{ lengths} = 3100 \text{ seconds} \right.$

$\dfrac{3100}{60} = 51.\dot{6} \text{ min}$

$51.\dot{6} \text{ min} < 55 \text{ min}$

(b) What assumption did you make in part (a)?

.... That each length was swam at same pace ....

.... **[1]**

(c) Donald tries to swim the 100 lengths in under 55 minutes.

Suggest one reason why he might not achieve this.

.... He may get tired the more he does ....

.... **[1]**

(b) 80 employees travel to work by car.

Work out the number of employees who cycle to work and the number of employees who walk to work.

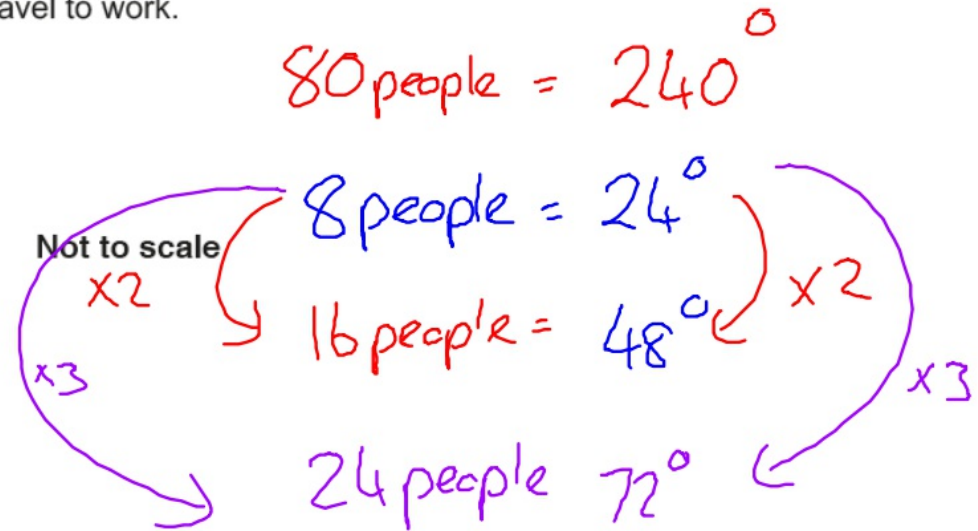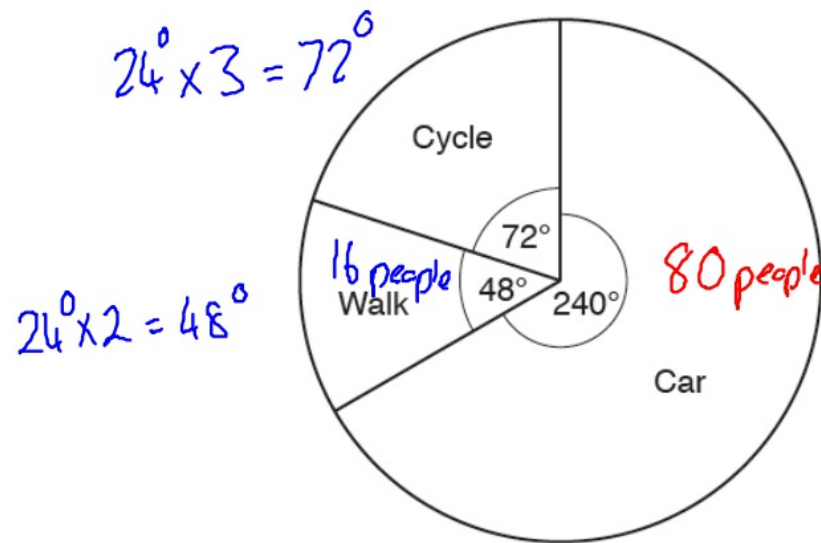This pie chart shows how the employees of a business travel to work.

Not to scale
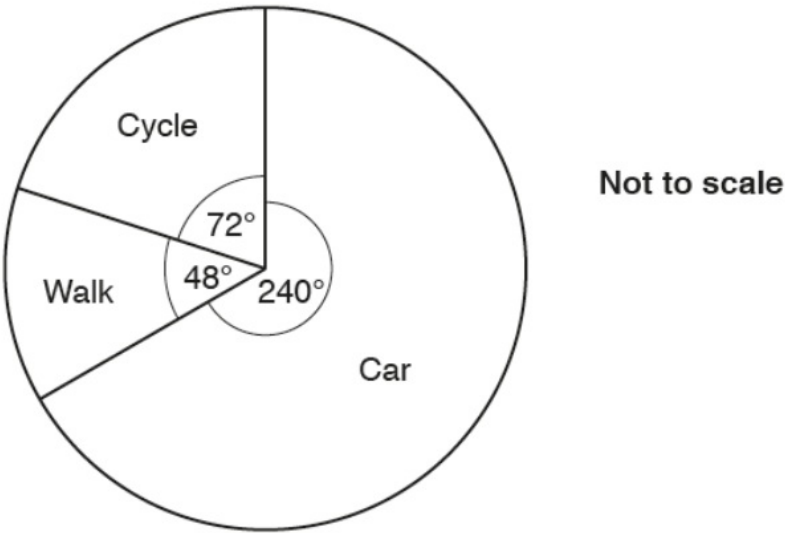
(b) cycle ....

walk .... **[3]**

(b) 80 employees travel to work by car.

Work out the number of employees who cycle to work and the number of employees who walk to work.

This pie chart shows how the employees of a business travel to work.

$24^{\circ} \times 3 = 72^{\circ}$

$24^{\circ} \times 2 = 48^{\circ}$

Cycle

72°

16 people
Walk 48° 240°

80 people

Car

Not to scale

$\times 2$

$\times 3$

80 people $= 240^{\circ}$

8 people $= 24^{\circ}$

16 people $= 48^{\circ}$ $\times 2$

24 people 72° $\times 3$

(b) cycle ....24..........

walk ....16.......... **[3]**

11 (a) Georgia is 4 feet 2 inches tall.
There are 12 inches in a foot.

Use the conversion, 1 inch = 2.5 centimetres, to convert Georgia's height into metres.

(a) .... m [3]

(b) Owen weighs 6 stones 4 pounds.
There are 14 pounds in a stone.

Use the conversion, 2.2 pounds = 1 kilogram, to convert Owen's weight into kilograms.

(b) .... kg **[3]**

11 (a) Georgia is 4 feet 2 inches tall.
There are 12 inches in a foot.

Use the conversion, 1 inch = 2.5 centimetres, to convert Georgia's height into metres.

4 feet 2inches

4 x 12inches

48inches + 2inches

Georgia = 50inches

$\times 50$ ($\times 5$ (1 inch = 2.5 cm

10 inches = 25cm) $\times 5$) $\times 50$

50inches = 125cm

100cm = 1m

(a) .... 1.25 .... m [3]

(b) Owen weighs 6 stones 4 pounds.
There are 14 pounds in a stone.

Use the conversion, 2.2 pounds = 1 kilogram, to convert Owen's weight into kilograms.

Owen

6 stones   4 pounds

$\swarrow$ ×14

84 pounds + 4 pounds

= 88 pounds

$\begin{array}{r} 14 \\ \times\ 6 \\ \hline 84 \end{array}$

×10 $\Big($ 2.2 pounds = 1 kg

22 pounds = 10 kg $\Big)$ ×4

×4 $\Big)$ 88 pounds = 40 kg ×4

40

(b) .... kg [3]

19 Ifsaw noticed this information on her car's dashboard at the end of her journey.

R2b She started her journey with a full tank of fuel and her miles travelled set to zero.

MILES TRAVELLED 165

FUEL

empty   full

(a) Work out how far Ifsaw's car can travel on a full tank of fuel.

(a) .... miles **[3]**

(b) What assumption have you made when answering part **(a)**?

....

.... **[1]**

R4B

R2b

Ifsaw noticed this information on her car's dashboard at the end of her journey.
She started her journey with a full tank of fuel and her miles travelled set to zero.

MILES TRAVELLED 165

FUEL

empty   full
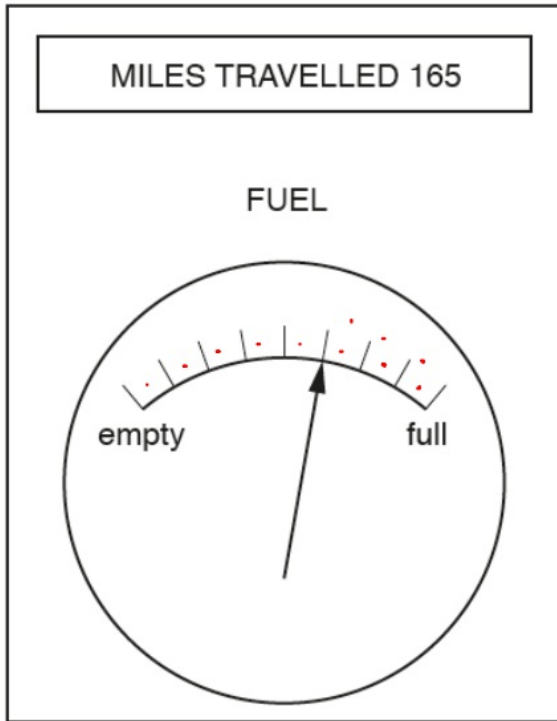
(a) Work out how far Ifsaw's car can travel on a full tank of fuel.

$\frac{3}{8}$ = 165 miles

$\frac{1}{8}$ = 55 miles $\Big)$ ×8

$\frac{8}{8}$ =

$3\overline{)165}$ → 55

55
× 8
440

440

(a) **440** ✓ .... miles [3]

(b) What assumption have you made when answering part (a)?

Fuel consumption remains constant eg fuel
is used at different rates on a motorway [1]
than in a town.

10 4 people take 3 hours to paint a fence.

R2b Assume that all people paint at the same rate.

(a) How long would it take one of these people to paint the same fence?

(a) .... hours [1]

10 4 people take 3 hours to paint a fence.

Assume that all people paint at the same rate.

(b) How long would it take 5 people to paint the same fence? ›
Give your answer in hours and minutes.

(b) …….……… hours …….……… minutes **[4]**

10 4 people take 3 hours to paint a fence.

R2b Assume that all people paint at the same rate.

(a) How long would it take one of these people to paint the same fence?

$\div 4$ $\Big($ 4 people = 3 hours $\Big) \times 4$

1 person = 12 hr

12

(a) ....12........................... hours **[1]**

10 4 people take 3 hours to paint a fence.

Assume that all people paint at the same rate.

(b) How long would it take 5 people to paint the same fence? ˒
Give your answer in <u>hours and minutes</u>.

144 min

4 people = 3hrs

4 people = 180 min

÷4

1 person = 720 min } ×4

×5 5 people = 144 min } ÷5

= 2hrs 24 min

(b) ……2…….. hours …24….…. minutes **[4]**

22 Hector can run 400 metres in 66 seconds.

(a) Use this information to show that he could run 5 kilometres in less than 14 minutes. **[4]**

R26

(b) Hector tries to run 5 kilometres in less than 14 minutes.

Give one reason why he might not achieve this.

....

.... **[1]**

22 Hector can run 400 metres in 66 seconds.

5000 m

(a) Use this information to show that he could run 5 kilometres in less than 14 minutes. **[4]**

R26

$$÷4 \begin{cases} 400m = 66 \text{ seconds} \\ 100m = 16.5 \text{ sec} \end{cases}$$

$$×50 \begin{cases} \\ 5000m = \underline{825 \text{ sec}} \end{cases}$$

825 sec
= 13.75 min

13.75 < 14 min

(b) Hector tries to run 5 kilometres in less than 14 minutes.

Give one reason why he might not achieve this.

He may get tired and can't keep that pace

[1]

14   30 people choose their favourite sport.
      Matt wants to show their choices in a pie chart.

P10   4 of the people chose 'tennis'.

R26

      Work out the angle of the sector for 'tennis'.

....° [3]

14 30 people choose their favourite sport.
Matt wants to show their choices in a pie chart.
P10   4 of the people chose 'tennis'.
R26

Work out the angle of the sector for 'tennis'.

4 out of 30

$\frac{4}{30}$ of 360°

×

48°

.............................° [3]

23 This map shows part of a village.
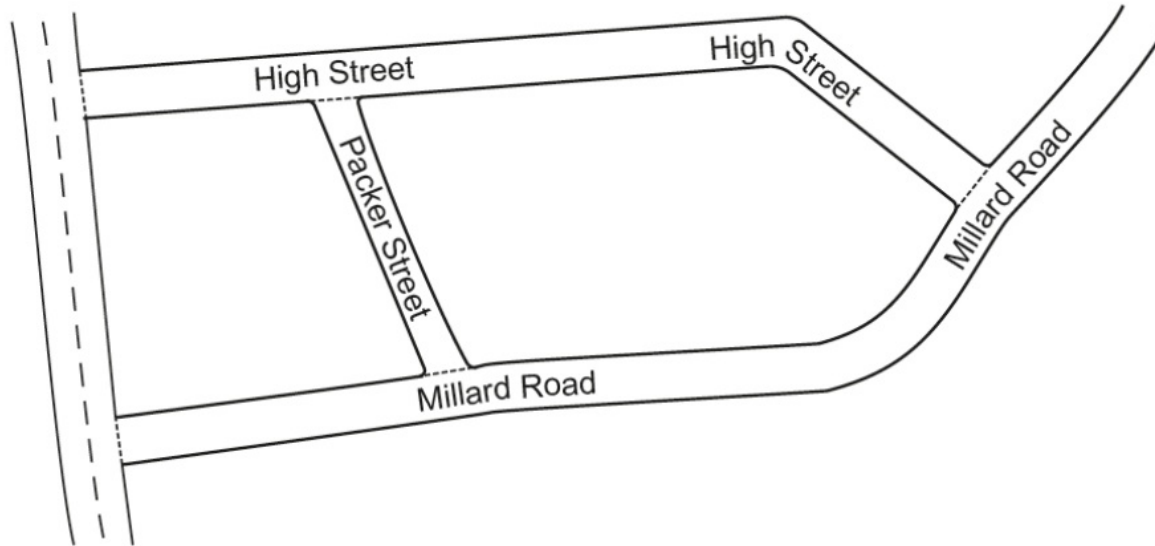
R16
R26

Neil knows that Packer Street is 180 m long in real life.

(a) Neil measures the map.

He says

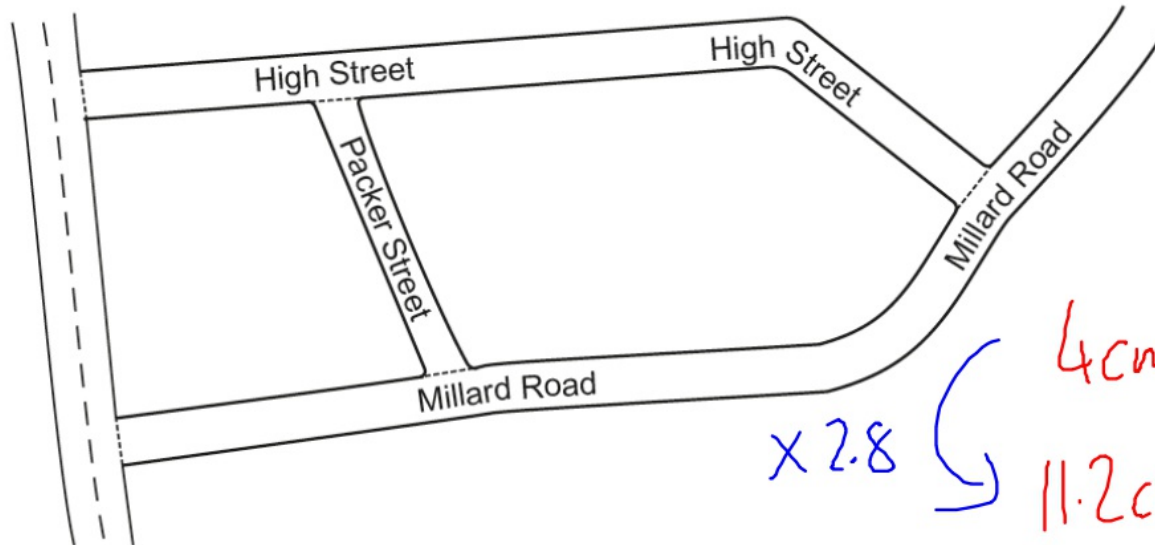> Packer Street is 3.5 cm long.
> High Street is 11.2 cm long.
>
> Therefore, I calculate that High Street is 576 m long in real life.

Use Neil's figures to show that the answer to his calculation is correct.   **[3]**

23 This map shows part of a village.
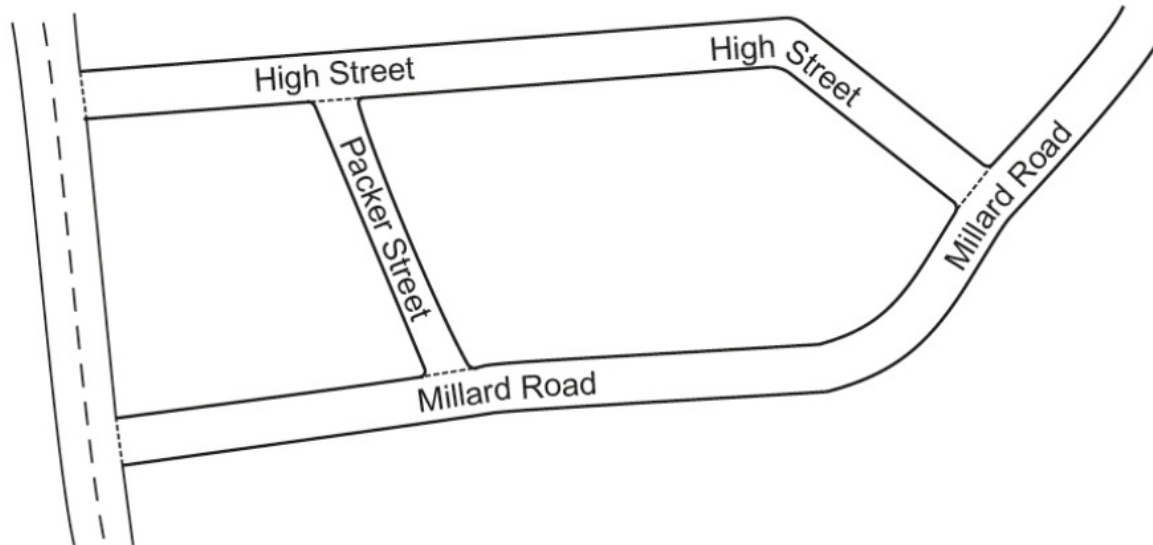
Neil knows that Packer Street is 180 m long in real life.

(b) Jodie measures the same map.

She says

> I think Packer Street is longer than Neil's measurement of 3.5 cm.
> Therefore, High Street must be longer than 576 m in real life.

Is Jodie's reasoning correct?
Show how you decide.

.... **[2]**

23 This map shows part of a village.
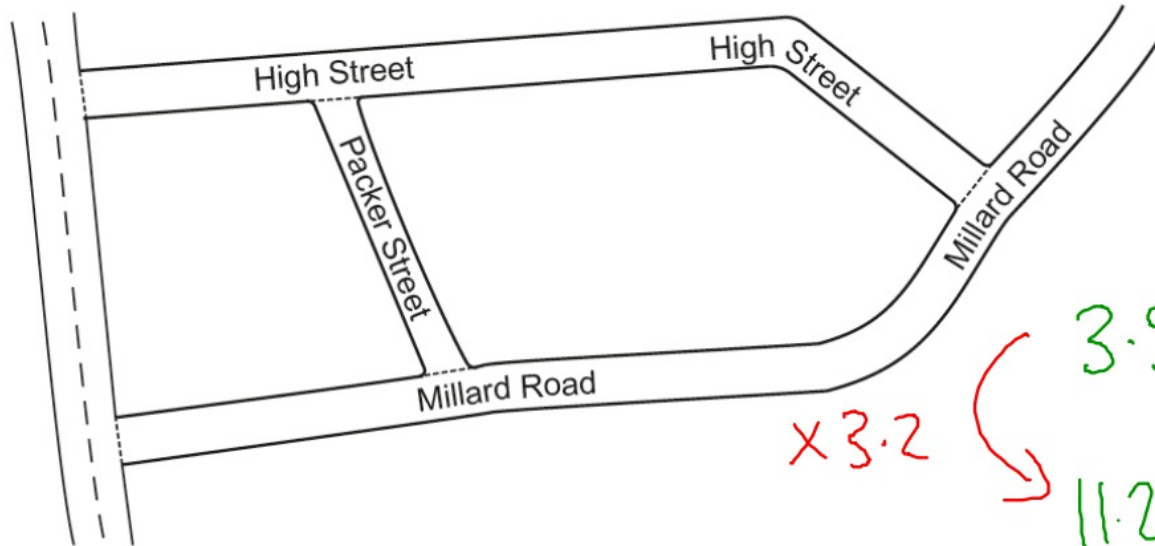
R16
R26

3.5 cm = 180 m
11.2 cm = 576 m
×3.2

Neil knows that Packer Street is 180 m long in real life.

(a) Neil measures the map.

He says

> Packer Street is 3.5 cm long.
> High Street is 11.2 cm long.
>
> Therefore, I calculate that High Street is 576 m long in real life.

Use Neil's figures to show that the answer to his calculation is correct. **[3]**

This map shows part of a village.

4cm = 180m

× 2.8

11.2cm = 504m ×2.8

✓

Neil knows that Packer Street is 180 m long in real life.

(b) Jodie measures the same map.

She says

> I think Packer Street is longer than Neil's measurement of 3.5 cm.
> Therefore, High Street must be longer than 576 m in real life.

Is Jodie's reasoning correct?
Show how you decide.

No, if it was longer than 3.5cm the multiplic would be smaller. High street would be less.

[2]

(b) q is directly proportional to r.
q is 68 when r is 20.

Work out q when r is 25.

(b) .... **[2]**

(b) q is directly proportional to r.
q is 68 when r is 20.

Work out q when r is 25.

$q \propto r$

$q = kr$

$68 = k20$

$\dfrac{68}{20} = k$

$3.4 = k$

$q = 3.4r$

$q = 3.4 \times 25 \div 20$

$q = 85$ ✓

$68 = €20$) $\div 20$
$€1$) $\div 20$
85 $€25$ $\times 25$

(b) .... 85 **[2]**

Edexcel

6   1 kg = 2.2 pounds

Change 319 pounds to kg.

.... kg

(Total for Question 6 is 2 marks)

6   1 kg = 2.2 pounds

Change 319 pounds to kg.

×145 (1Kg = 2·2 pounds) ×145   145 ✓ .... kg

145Kg   319 pounds

(Total for Question 6 is 2 marks)

10 400 g of raspberries and 300 g of strawberries cost a total of £7.46
500 g of strawberries cost £4.10

Work out the total cost of 200 g of raspberries and 200 g of strawberries.

£..

(Total for Question 10 is 4 marks)

10 400 g of raspberries and 300 g of strawberries cost a total of £7.46

500 g of strawberries cost £4.10

Work out the total cost of 200 g of raspberries and 200 g of strawberries.

$\div 5 \left(\begin{array}{l} 500g \ strawb = £4.10 \\ 100g \quad '' \qquad = £0.82 \end{array}\right) \div 5$

$\Big) \times 3$

400g R + 300g S = £7.46

£5.00 + £2.46 = £7.46

$\div 4 \left(\begin{array}{l} 400g R = £5.00 \\ 100g R = £1.25 \end{array}\right) \div 4$

200g R + 200g S

£2.50 + £1.64

= £4.14
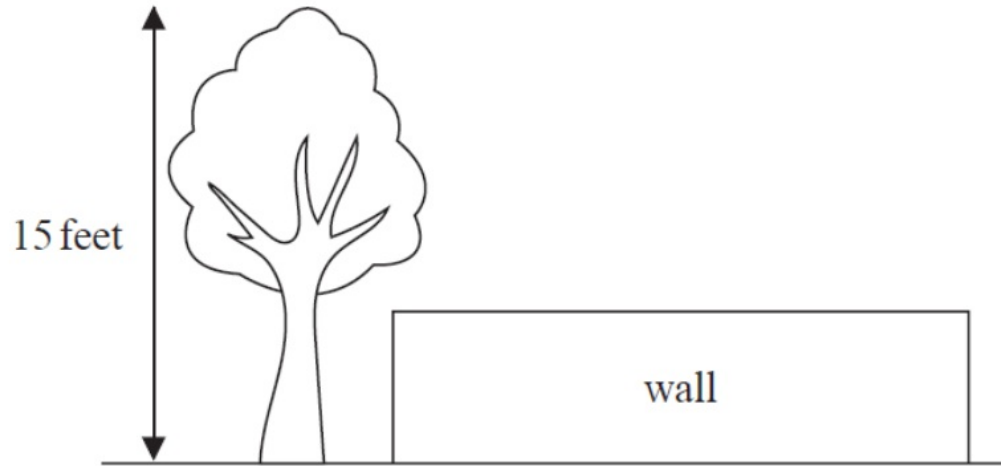
£ 4.14

(Total for Question 10 is 4 marks)

16 The accurate scale drawing shows a tree and a wall.

R26

15 feet

wall

The tree is 15 feet tall.
The tree and the wall are drawn to the same scale.

Find an estimate for the height, in feet, of the wall.

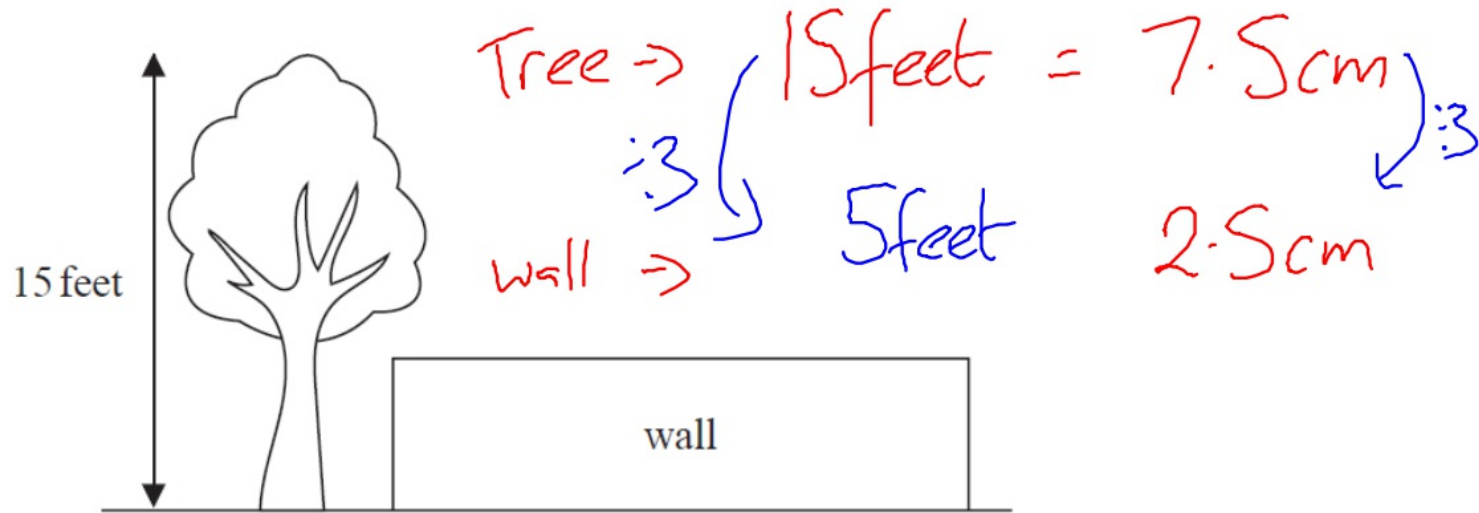.. feet

(Total for Question 16 is 2 marks)

16 The accurate scale drawing shows a tree and a wall.

R26

15 feet

wall

Tree → (15 feet = 7.5cm)÷3

÷3 (5 feet   2.5cm)

wall →

The tree is 15 feet tall.
The tree and the wall are drawn to the same scale.

Find an estimate for the height, in feet, of the wall.

4 - 6 feet ✓

5

.... feet

(Total for Question 16 is 2 marks)

28 Cars are made in a factory for 24 hours every day.

N28 In the factory a car is made every 209 seconds.

R26
(a) Work out an estimate for the number of cars made in the factory in one year.
You must show how you get your answer.

....

(4)

(b) Is your answer to part (a) an underestimate or an overestimate?
Give a reason for your answer.

(1)

28 Cars are made in a factory for 24 hours every day.

N28 In the factory a car is made every ~~209~~ 200 seconds.

R26

round

(a) Work out an estimate for the number of cars made in the factory in one year.
   You must show how you get your answer.

sec in a day

$24 \times 60 \times 60$

$\begin{array}{c} 24 \\ \times \ 2\,6 \\ \hline 14\,4 \end{array}$
$\begin{array}{c} 144 \\ \times \ 2\,2\,6 \\ \hline 86400 \text{ sec} \\ \text{in a day} \end{array}$

$Day = \dfrac{86400}{200}$

1sf

$= 432$ cars in
a day $\times 365$

$\approx \underline{400 \text{ cars}} \times \underline{400 \text{ days}}$

160,000

160,000

(4)

100,000 - 200,000

(b) Is your answer to part (a) an underestimate or an overestimate?
   Give a reason for your answer.

It could be either as I rounded
432 cars down
and 365 days up ✓

(1)

14 Abi is going to buy ingredients to make 65 hot chocolate drinks.

She needs 12 g of chocolate powder and 5 marshmallows to make each drink.

Abi can buy

chocolate powder in 250 g jars at £2.99 per jar

R26

marshmallows in bags of 120 marshmallows at £1.45 per bag

N13

Work out the total cost of the chocolate powder and the marshmallows she needs to buy.

£.......................................

(Total for Question 14 is 4 marks)

14 Abi is going to buy ingredients to make 65 hot chocolate drinks.

She needs 12 g of chocolate powder and 5 marshmallows to make each drink.

Abi can buy

             chocolate powder in 250 g jars at £2.99 per jar

R26

             marshmallows in bags of 120 marshmallows at £1.45 per bag

N13

Work out the total cost of the chocolate powder and the marshmallows she needs to buy.

Choc Powder

$12g = 1 drink$) ×65

$780g = 65 drinks$ ×65

250
250
250
250

$4 × £2.99$
$= £11.96$

Marsh

$5m = 1 drink$) ×65

$325m = 65 drinks$ ×65

120
240
360

$3 bag × £1.45$
$= 4.35$

Total
$11.96 + 4.35$
$=$
£ __16.31__ ✓

(Total for Question 14 is 4 marks)

25 On Monday 4 bricklayers took 3 hours to lay a total of 4200 bricks.

On Tuesday there are only 2 bricklayers.

R26

Work out how many hours it will take the 2 bricklayers to lay a total of 3150 bricks.

.... hours

(Total for Question 25 is 3 marks)

25 On Monday 4 bricklayers took 3 hours to lay a total of 4200 bricks.

R26 On Tuesday there are only 2 bricklayers.

Work out how many hours it will take the 2 bricklayers to lay a total of 3150 bricks.

÷4 {
4 BL took 3hrs do 4200 bricks
1 BL took 3hrs do 1050 bricks
1 BL took 1hr do 350 bricks
}

1 BL = 1hr = 350 bricks
2 BL = 1hr = 700 bricks
      ↓   x4.5 ↓x
    x4.5 = 3150 bricks

1hr x 4.5hrs = 4.5hrs

.... 4.5 .... hours

(Total for Question   is 3 marks)

15 A tank contains 4500 litres of water.
Water flows out of the tank at a rate of 1.2 litres per second.

R26

How many minutes will it take for all the water to flow out of the tank?

......................................minutes

(Total for Question 15 is 3 marks)

15 A tank contains 4500 litres of water.
Water flows out of the tank at a rate of 1.2 litres per second.

R26

How many minutes will it take for all the water to flow out of the tank?

$$\frac{4500}{1.2} = 3750 \, sec$$

$$3750 \div 60 = min$$

.... **62.5** minutes

(Total for Question 15 is 3 marks)

17 5 tins of soup have a total weight of 1750 grams.
4 tins of soup and 3 packets of soup have a total weight of 1490 grams.

Work out the total weight of 3 tins of soup and 2 packets of soup.

.... grams

17 5 tins of soup have a total weight of 1750 grams.

4 tins of soup and 3 packets of soup have a total weight of <u>1490 grams</u>.

1400g

Work out the total weight of 3 tins of soup and 2 packets of soup.

1 tin $\dfrac{350}{5\overline{)1750}}$

1 tin = 350g

Packet

4 tins = 4 × 350

= 1400g

$\begin{array}{r} 350 \\ \times\ 4 \\ \hline 1400 \end{array}$

3 packets = 90g

1 packet = 30g

3 tins = $\begin{array}{r} 350 \\ 350 \\ +\ 350 \\ \hline 1050 \end{array}$

2 packets = 60g

$\begin{array}{r} 1050 \\ .60 \\ \hline 1110 \end{array}$ ✓

1110 ✓ grams

10 Suha is going to buy 150 envelopes.

Here is some information about the cost of envelopes in two shops.

Letters2send	Stationery World
Pack of 25 envelopes for £3.49	Pack of 10 envelopes for £2.10 Buy 2 packs get 1 pack free

Suha wants to buy the envelopes as cheaply as possible.

Which shop should Suha buy the 150 envelopes from?
You must show how you get your answer.

10 Suha is going to buy 150 envelopes.

Here is some information about the cost of envelopes in two shops.

Letters2send
Pack of 25 envelopes for £3.49

Stationery World
Pack of 10 envelopes for £2.10
Buy 2 packs get 1 pack free

Suha wants to buy the envelopes as cheaply as possible.

Which shop should Suha buy the 150 envelopes from?
You must show how you get your answer.

L2S

$\times 6 \left(\begin{array}{l} 25 = £3.49 \\ \\ 150 = £20.94 \end{array} \right) \times 6$

SW

10 envelopes = £2.10
20   "   = £4.20
$\times 5 \left(\begin{array}{l} 30 \quad " \quad = £4.20 \\ 150 \quad " \quad = £21 \end{array} \right) \times 5$

Should buy from L2S ✓

Jane wants to buy 15 tomatoes.
She asks for 1 kg of tomatoes at a shop.
Jane assumes that each tomato has a weight of 75 g.

(b) (i) If Jane's assumption is correct, will she get 15 tomatoes?
You must show how you get your answer.

(2)

(ii) If Jane's assumption is **not** correct, could she get 15 tomatoes?
Justify your answer.

(1)

(Total for Question 4 is 6 marks)

Jane wants to buy 15 tomatoes.
She asks for 1 kg of tomatoes at a shop.
Jane assumes that each tomato has a weight of 75 g.

$1 kg = 1000g$

(b) (i) If Jane's assumption is correct, will she get 15 tomatoes?
You must show how you get your answer.

$75g \times 15 = 1125g = 1.125kg$

15 tomatoes = 1.125kg

So 1kg will be less than 15 tomatoes

(2)

(ii) If Jane's assumption is **not** correct, could she get 15 tomatoes?
Justify your answer.

She may get 15 tomatoes if they weighed less than 75g   eg 65g = 15 tomatoes = 975g

(1)

(Total for Question 4 is 6 marks)

12 2.5 kg of apples cost £3.60

Work out the cost of 3.5 kg of apples.

£...

(Total for Question 12 is 2 marks)

12 2.5 kg of apples cost £3.60

Work out the cost of 3.5 kg of apples.

$$2.5\text{kg} = £3.60$$

$÷2.5$

$$1\text{kg} = £1.44$$

$÷2.5$

$×3.5$

$$3.5\text{kg} = £5.04$$

$×3.5$

£ 5.04

(Total for Question 12 is 2 marks)

8   3 kg of meat costs £54

R2b   Nina buys 2 kg of the meat.

Work out how much Nina pays.

£ ....

(Total for Question 8 is 2 marks)

8 3 kg of meat costs £54

R2b Nina buys 2 kg of the meat.

Work out how much Nina pays.

$$\begin{array}{r} 18 \\ 3\overline{)54} \end{array}$$

$$\div 3 \left\{ \begin{array}{l} 3kg = £54 \\ 1kg = £18 \\ 2kg = £36 \end{array} \right\} \div 3$$

£ 36 ✓

(Total for Question 8 is 2 marks)

6 Sue has 2 cats.

R4a Each cat eats $\dfrac{1}{4}$ of a tin of cat food each day.

R26

Sue buys 8 tins of cat food.

Has Sue bought enough cat food to feed her 2 cats for 14 days?
You must show how you get your answer.

(Total for Question 6 is 3 marks)

6 Sue has 2 cats.

R4a
R26 Each cat eats $\dfrac{1}{4}$ of a tin of cat food each day.

Sue buys 8 tins of cat food.

Has Sue bought enough cat food to feed her 2 cats for 14 days?
You must show how you get your answer.

2 cats .... ¼ tin each

¼ + ¼ = ½ tin each day

1 tin last 2 days

→ 1 tin = 2 days

8 tins = 16 days

Yes, Sue has bought enough for 14 days ✓

(Total for Question 6 is 3 marks)

23 It would take 120 minutes to fill a swimming pool using water from 5 taps.

(a) How many minutes will it take to fill the pool if only 3 of the taps are used?

R26

.... minutes

(2)

(b) State one assumption you made in working out your answer to part (a).

....

....

(1)

(Total for Question 23 is 3 marks)

23 It would take 120 minutes to fill a swimming pool using water from 5 taps.

(a) How many minutes will it take to fill the pool if only 3 of the taps are used?

R26

$\times 5$ $\Big($ 120min $=$ 5 taps $\Big)$ $\div 5$

600min $=$ 1 tap

$\div 3$ $\Big($ 200min 3 taps $\Big)$ $\times 3$

200 .... minutes

(2)

(b) State one assumption you made in working out your answer to part (a).

Is all taps pour water at the same speed.

(1)

(Total for Question   is 3 marks)

8   A map has a scale of 1 cm to 14 km.

On the map, the distance between Manchester and London is 18.8 cm.

R16

R26   What is the real distance, in km, between Manchester and London?

....km

(Total for Question 8 is 2 marks)

8 A map has a scale of 1 cm to 14 km.

R16
R26

On the map, the distance between Manchester and London is 18.8 cm.

What is the real distance, in km, between Manchester and London?

×18·8

$1cm = 14km$

$18.8cm = 263.2km$ ×18·8

263.2 .... km

(Total for Question 8 is 2 marks)

17 Adrian is going to make concrete.
He is going to use

R26
        180 kg of cement
        375 kg of sand
        1080 kg of stone

1 bag cement	1 bag sand	1 bag stone
25 kg	22.5 kg	50 kg

Cement, sand and stone are sold in bags.

Adrian already has

        10 bags of cement
        20 bags of sand
        20 bags of stone

Work out what bags he needs to buy to make the concrete.

(Total for Question 17 is 3 marks)

17 Adrian is going to make concrete.
He is going to use

R26

180 kg of cement ✓
375 kg of sand ✓
1080 kg of stone

1 bag cement	1 bag sand	1 bag stone
25 kg	22.5 kg	50 kg

×10 = 250 kg   ×20   ×20

= 450 kg   = 1000 kg

Cement, sand and stone are sold in bags.

enough   enough

Adrian already has

10 bags of cement
20 bags of sand
20 bags of stone

Work out what bags he needs to buy to make the concrete.

needs 80 kg

need 2 bags of stone

2 bags of stone

(Total for Question 17 is 3 marks)

8   2 pens cost £2.38
    5 folders cost £5.60

N13

R26 Ben wants to buy 20 pens and 20 folders.
    He only has £50

    Does Ben have enough money to buy 20 pens and 20 folders?
    You must show how you get your answer.

(Total for Question 8 is 4 marks)

8 2 pens cost £2.38
5 folders cost £5.60

N13

R26 Ben wants to buy 20 pens and 20 folders.
He only has £50

Does Ben have enough money to buy 20 pens and 20 folders?
You must show how you get your answer.

Pens .... 2 pens = £2.38 ×10

×10
20 pens = £23.80

Folders
5 folders = £5.60 ×4
×4 20 folders = £22.40

Total cost = £23.80
+ £22.40
£46.20

Yes Ben has enough
as £46.20 < £50

(Total for Question 8 is 4 marks)

24 Lara is a skier.

She completed a ski race in 1 minute 54 seconds.

R26 The race was 475 m in length.

Lara assumes that her average speed is the same for each race.

(a) Using this assumption, work out how long Lara should take to complete a 700 m race.
 Give your answer in minutes and seconds.

.... minutes .... seconds

(3)

Lara's average speed actually increases the further she goes.

(b) How does this affect your answer to part (a)?

....

....

(1)

24 Lara is a skier.

60

She completed a ski race in 1 minute 54 seconds.

R26 The race was 475 m in length.

Lara assumes that her average speed is the same for each race.

(a) Using this assumption, work out how long Lara should take to complete a 700 m race.
Give your answer in minutes and seconds.

÷475

×700

475m = 114 seconds ÷475

1m =

700m = 168 seconds

2min

.............2............. minutes ....48............. seconds

(3)

Lara's average speed actually increases the further she goes.

(b) How does this affect your answer to part (a)?

Quicker time ✓

(1)

9 Yesterday it took 5 cleaners $4\frac{1}{2}$ hours to clean all the rooms in a hotel.

There are only 3 cleaners to clean all the rooms in the hotel today.

Each cleaner is paid £8.20 for each hour or part of an hour they work.

How much will each cleaner be paid today?

£ ....

(Total for Question 9 is 3 marks)

9 Yesterday it took 5 cleaners $4\frac{1}{2}$ hours to clean all the rooms in a hotel.

There are only 3 cleaners to clean all the rooms in the hotel today.

Each cleaner is paid £8.20 for each hour or part of an hour they work.

How much will each cleaner be paid today?

$\div 5$ {
5 cleaners = 4.5 hrs
} $\times 5$

1 cleaner = 22.5 hrs

$\times 3$ {
3 cleaners = 7.5 hrs
} $\div 3$

Paid → £8.20 × 8 hrs =

£ 265.60

(Total for Question 9 is 3 marks)

AQA

19 (a)   Use   8 km/h = 5 mph   to convert 96 km/h to mph

R26

[2 marks]

_____

_____

_____

_____

_____

Answer _____ mph

19 (a) Use 8 km/h = 5 mph to convert 96 km/h to mph

[2 marks]

R26

$\times 12$ ⟨ 8 km/h = 5 mph ⟩ $\times 12$

96 km/h = 60 mph

$$12$$
$$8 \overline{|9^16}$$

Answer _____ 60 mph ✓ _____ mph

11

R26

A television channel shows 12 minutes of adverts in each half hour.

How many **minutes** of adverts does it show from 5 am to 11 pm?

[3 marks]

_____

_____

_____

_____

_____

Answer _____ minutes

11 A television channel shows 12 minutes of adverts in each half hour.

R26 How many **minutes** of adverts does it show from 5 am to 11 pm?

[3 marks]

$5am \rightarrow 11am = 6hrs$ $12min = \frac{1}{2}hr$

$11am - 11pm = 12hrs$ $24min = 1hr$

$18hrs$ $\times 18$ $432min = 18hr$ $\times 18$

Answer   **432**   minutes

15

5% of a number is 31

1% of the same number is 6.2

R26

Work out 13% of the number.

[3 marks]

Answer _____

15 5% of a number is 31

1% of the same number is 6.2

R26

Work out 13% of the number.

$62 \times 13 = 806$

$6.2 \times 13 = 80.6$

[3 marks]

$\div 5 \quad \begin{cases} 5\% \quad \text{is} \quad 31 \\ 1\% \quad \text{is} \quad 6.2 \end{cases} \div 5$

$\times 13 \quad \begin{cases} \\ 13\% \quad \text{is} \end{cases} \times 13$

$\begin{array}{r} 62 \\ \times 13 \\ \hline 186 \\ 620 \\ \hline 806 \end{array}$

Answer ___ 80.6 ✓

19   Use   2 gallons = 9 litres   to convert 17 gallons into litres.

[3 marks]

R26

_____

_____

_____

_____

_____

_____

Answer _____ litres

19   Use   2 gallons = 9 litres   to convert 17 gallons into litres.

[3 marks]

R26

2 gallons = 9 Litres

×8

16 gallons = 72 Litres +
1 gallon = 4.5 Litres

Answer _____ 76.5 _____ litres

5 2.5 kg of carrots cost £1.70

R26 Work out the cost of 3.25 kg of carrots.

N13
[3 marks]

_____

_____

_____

_____

Answer £ _____

5 2.5 kg of carrots cost £1.70

R26
N13

Work out the cost of 3.25 kg of carrots.

[3 marks]

$2.5 kg = £1.70$

÷2.5

$1 Kg = £0.68$

÷2.5

×3.25

$3.25 kg = £2.21$

×3.25

Answer £ _____ £2.21 ✓ _____

14   2 people working at the same rate will take 6 hours to paint a room.

14 (a)   Assuming that they **all** work at this rate,

R26   how long will it take 3 people to paint the room?

[2 marks]

Answer _____ hours

14 (b)   In fact, the **third** person works at a faster rate.

How does this affect the time to paint the room?

[1 mark]

_____

_____

14   2 people working at the same rate will take 6 hours to paint a room.

14 (a)   Assuming that they **all** work at this rate,

R26   how long will it take 3 people to paint the room?

[2 marks]

$$\div 2 \left\{ \begin{array}{l} 2 \text{ people} = 6 \text{ hrs} \\ 1 \text{ person} = 12 \text{ hrs} \end{array} \right\} \times 2$$

$$\times 3 \left\{ \begin{array}{l} \\ 3 \text{ people} = 4 \text{ hrs} \end{array} \right\} \div 3$$

4 hrs

Answer _____ 4 hrs _____ hours

14 (b)   In fact, the **third** person works at a faster rate.

How does this affect the time to paint the room?

[1 mark]

_____ less time to paint the room ✓ _____

_____

30 y is inversely proportional to x.

R26   Complete the table.

[2 marks]

x	12	6	
y		4	8

30

R26

y is inversely proportional to x.

Complete the table.

[2 marks]

x	12	6	3
y	2	4	8

✓

x

$\times 2 \left\{ \begin{array}{c} 6 \\ 12 \end{array} \right.$

$\div 2$

$\longrightarrow 3$

y

4

$2 \quad \left\{ \right. \div 2$

$8 \quad \longleftarrow$

$\times 2$
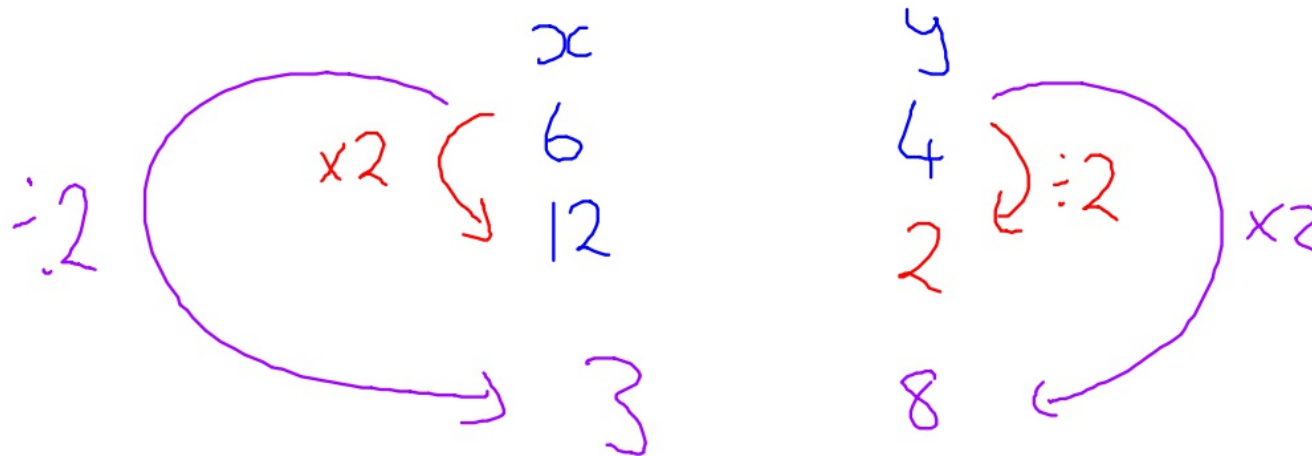
9   In this question, use

      1 foot = 12 inches

R26   1 inch = 2.5 centimetres

Change   5 feet 8 inches   to centimetres.

[3 marks]

Answer _____ cm

9

R26

In this question, use

    1 foot = 12 inches

    1 inch = 2.5 centimetres

Change   5 feet 8 inches   to centimetres.

[3 marks]

$\times 68$ $\Big\{$ $\Big($ 1 inch = 2.5 cm $\Big)$ $\times 68$

$\rightarrow$ 68 inches = 170 cm

5 feet $\rightarrow$ inches

$\times 12$ = 60 inches

5 feet   8 inches

60 inches + 8 inches

= 68 inches

Answer   **170** ✓   cm

6

The cost of 3 calendars is £18

R26

Work out the cost of 5 calendars.

[2 marks]

_____

_____

Answer £_____

6   The cost of 3 calendars is £18

R26   Work out the cost of 5 calendars.

[2 marks]

$\div 3 \binom{3 \text{ calenders} = £18}{1 \text{ calander} = £6}$ $5 \Rightarrow £6 \times 5$

Answer £ 30

7   A helicopter blade does 3206 full turns in 7 minutes.

      Work out the number of full turns per minute.

R26
N11   [2 marks]

                              Answer _____

7   A helicopter blade does 3206 full turns in 7 minutes.

Work out the number of full turns per minute.

R26
N11

[2 marks]

$\div 7 \left(\begin{array}{c} 3206 = 7\,min \\ 1\,min \end{array} \right) \div 7$

$$\begin{array}{r} 0458 \\ 7\overline{)3\,^32\,^44\,^56} \end{array}$$

Answer _____ 458 ✓

5

R26

Lucy works for 37 hours per week.

Her weekly wage is £303.40

She receives a pay increase of 25p per hour.

Work out her new weekly wage.

[2 marks]

Answer £_____

5

Lucy works for 37 hours per week.

Her weekly wage is £303.40

R26

She receives a pay increase of 25p per hour.

Work out her new weekly wage.

[2 marks]

$$\frac{£303.40}{37} = £8.20$$

$$+ \quad 0.25$$

$$£8.45 \times 37 =$$

Answer £ __312.65__ ✓

11 (b)   Convert 210 millilitres to fluid ounces.

Use   1 fluid ounce = 28.4 millilitres

R26

N26   Give your answer to 1 decimal place.

[2 marks]

_____

_____

_____

Answer _____ fluid ounces

11 (b)   Convert 210 millilitres to fluid ounces.

Use   1 fluid ounce = 28.4 millilitres

R26

N26   Give your answer to 1 decimal place.

[2 marks]

$\times 7.394 \left(\dfrac{1 \text{ ounce} = 28.4 \text{ ml}}{7.3943 \quad 210\text{ml}} \right) \times 7.3943$

7.3943

Answer 7.4 fluid ounces

24 The diagrams show the position of a tap when off and fully on.

The tap is fully on when the angle of turn is 180°   Off   Fully on

R26

180°

When fully on, water flows out of the tap at 14 litres per minute.

The rate at which water flows out is in direct proportion to the angle of turn.

The tap is turned 135°

135°
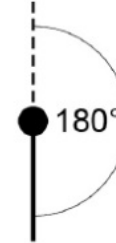
The water flows into a tank with a capacity of 79.8 litres.

Will it take **less than** $7\frac{1}{2}$ minutes to fill the tank?

You **must** show your working.   **[4 marks]**

24 The diagrams show the position of a tap when off and fully on.

The tap is fully on when the angle of turn is 180°

Off

Fully on

R26

180°

When fully on, water flows out of the tap at 14 litres per minute.

The rate at which water flows out is in direct proportion to the angle of turn.

The tap is turned 135°

135°

The water flows into a tank with a capacity of 79.8 litres.

Will it take **less than** $7\frac{1}{2}$ minutes to fill the tank?

You **must** show your working.   **[4 marks]**
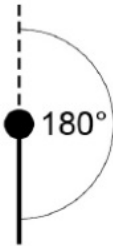
$\div 180 \left(\begin{array}{l} 14 \text{ Litre} = 180° \\ \\ = 1° \end{array} \right) \div 180$

$\times 135 \left(\begin{array}{l} \\ 10.5L = 135° \end{array} \right) \times 135$

10.5L per min

$10.5 \times 7.5 = 78.75$ Litres

in $7\frac{1}{2}$ min

No, it will take more time to fill.

16   Amal drives her car for work.

         She claims 40p per mile from her employer.

R26

             Amal's car travels 52 miles for each gallon of petrol.

             She pays £5.36 per gallon for petrol.

         On one journey Amal drives 260 miles.

         For this journey, how much **more** does she claim than she pays for petrol?

[4 marks]

Answer   £_____

16 Amal drives her car for work.

She claims 40p per mile from her employer.

R26

Amal's car travels 52 miles for each gallon of petrol.

She pays £5.36 per gallon for petrol.

On one journey Amal drives 260 miles.

For this journey, how much **more** does she claim than she pays for petrol?

[4 marks]

$$\frac{260}{52} = \text{Uses } 5 \text{ gallons}$$

Claims... $260 \times £0.40$

$= £104$

Uses $5 \times £5.36$

$= £26.80$

$104 - 26.80$

Answer £ _____77.20_____

17

R16

Here is a map of Cuba.

1.5 cm represents 200 km

Havana

Holguin

0   200 km

Work out the actual distance from Havana to Holguin.

[3 marks]

Answer _____ km

17 Here is a map of Cuba.

R16 1.5 cm represents 200 km

$1.5 cm = 200 km$

Havana

4.7cm   X 3.13

$4.7 cm =$ ✓

0   200 km
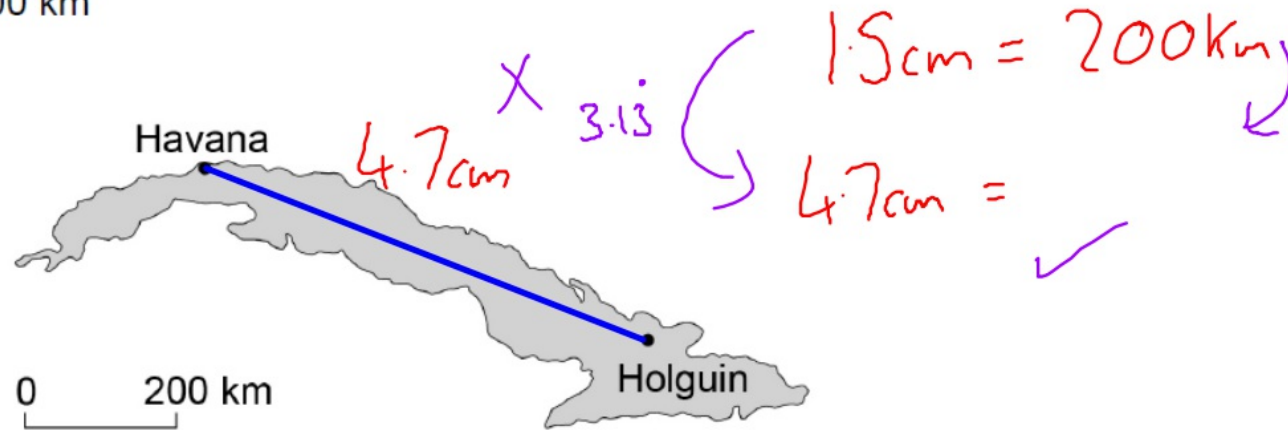
Holguin

Work out the actual distance from Havana to Holguin.

[3 marks]

600   640

626.6 ✓

Answer ___626.6 ✓___ km

14

R26

In this question, use

1 kilogram = 2.2 pounds

1 stone = 14 pounds

Change 70 kilograms into stones.

[3 marks]

_____

_____

_____

_____

_____

Answer _____ stones

14   In this question, use

R2b

    1 kilogram = 2.2 pounds

    1 stone = 14 pounds

×11 $\Big($ 1 stone = 14 pounds $\Big)$ ×11

                154 pounds

Change 70 kilograms into stones.

[3 marks]

×70 $\Big($ 1 Kg = 2.2 po $\Big)$ ×70

    70 Kg = 154 pounds

Answer _____11_____ stones

6

The cost of 3 calendars is £18

R26

Work out the cost of 5 calendars.

[2 marks]

_____

_____

Answer £_____

6   The cost of 3 calendars is £18

R26   Work out the cost of 5 calendars.

[2 marks]

3 calenders = £18

1 calander = £6

$\div 3$

$5 \rightarrow £6 \times 5$

Answer £ 30

12

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

A force of 40 Newtons is applied to an area of 3.2 square metres.

Work out the pressure.

Give the units of your answer.

[2 marks]
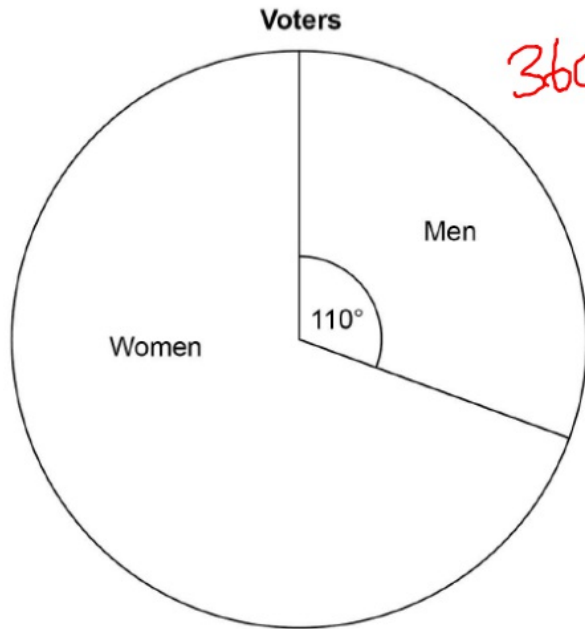
$$\text{Pressure} = \frac{40}{3.2}$$

Answer ___ $12.5 \, n/m^2$ ___

10

The pie chart shows information about voters in an election.

P11
R26

Voters

Women

110°

Men

$360°$

Men $= 110°$

Women $= 250°$

More $\Rightarrow 140° = 3360$ votes $\Big) \div 14$

$\div 14 \Big\downarrow$

$10° =$

$\times 36 \Big\downarrow$

$360° = 8640$ $\Big) \times 36$

3360 **more** women voted than men.

Work out the total number of voters.

[3 marks]

Answer _____ 8640 ✓

17 Liam drives his car.

R21

R26

He drives the first 9 miles in 9 minutes.

He then drives at an average speed of 70 miles per hour for 1 hour 36 minutes.

He finds this information about his car.

Average speed	Miles travelled per gallon
65 miles per hour or less	50
More than 65 miles per hour	40

Use the information to show that his car uses less than 3 gallons of petrol for the drive.

**[5 marks]**

17   Liam drives his car.

R21
R26

He drives the first 9 miles in 9 minutes.

He then drives at an average speed of 70 miles per hour for 1 hour 36 minutes.

per hr

He finds this information about his car.

Average speed	Miles travelled per gallon
65 miles per hour or less	50
More than 65 miles per hour	40

Use the information to show that his car uses less than 3 gallons of petrol for the drive.

D
S T

112 miles

70   × 1·6hrs
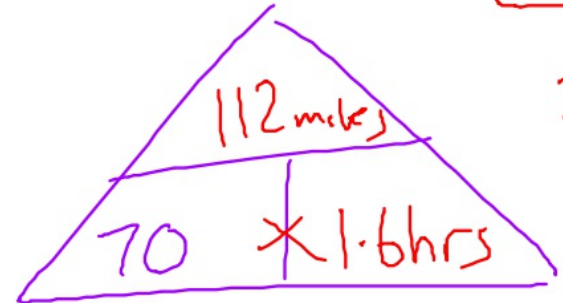
36min = decimal
60min = 1hr
6min = 0·1
36min = 0·6

1st part   Speed = 9miles = 9min

60miles = 60min

60mph

:50 (50miles = 1 gallon) :50

1mile =

x9 (9miles = 0·18g) x9

:40 (40miles = 1 gallon) :40

1mile =

x12 (112miles = 2·8gallons) x12

1hr 36min

1·6hrs

Total journey = 2·8g + 0·18g = 2·98g

[5 marks]

2·98 < 3 ✓

25

15 machines work at the same rate.

Together, the 15 machines can complete an order in 8 hours.

R26

3 of the machines break down after working for 6 hours.

The other machines carry on working until the order is complete.

In total, how many hours does **each** of the other machines work?

[3 marks]

Answer _____ hours

25   15 machines work at the same rate.

Together, the 15 machines can complete an order in 8 hours.

R26

3 of the machines break down after working for 6 hours.   → 2hrs left

The other machines carry on working until the order is complete.

In total, how many hours does **each** of the other machines work?

[3 marks]

÷15   15 machines = 2 hrs

1 machine = 30 hrs   ×15 $\frac{30}{12} = 2\frac{6}{12}$

×12   12 machines =   ÷12 $= 2\frac{1}{2}$ hrs

6 hrs + 2½ hrs

Answer _____ 8½ _____ hours