



Please note that these worked solutions have neither been provided nor approved by Pearson Education and may not necessarily constitute the only possible solutions. Please refer to the original mark schemes for full guidance.

Any writing in blue indicates what must be written in order to answer the questions and get the marks. The worked solutions have been designed to show the smallest amount of work which needs to be done to answer the question.

Anything written in green in a cloud doesn't have to be written in the exam.

Anything written in orange in a rectangle doesn't have to be written in the exam and is there to show what should be put into a calculator or measured using a ruler or protractor.

If you find any mistakes or have any requests or suggestions, please send an email to [curtis@cgmaths.co.uk](mailto:curtis@cgmaths.co.uk)

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Write down two factors of 18

Factors of 18 are whole numbers which 18 can be divided by without giving a decimal. 18 can be divided by both 1 and 18 so these are both factors of 18

..... 1 ..... , ..... 18 .....

(Total for Question 1 is 1 mark)

2 Write 0.9 as a fraction.

Putting 0.9 into the calculator converts it into a fraction

.....  $\frac{9}{10}$  .....

(Total for Question 2 is 1 mark)

3 Change 7 metres to centimetres.

There are 100 centimetres in a metre. So multiplying 7 by 100 converts it into centimetres.  $7 \times 100 = 700$

..... 700 ..... centimetres

(Total for Question 3 is 1 mark)

4 Write down a square number that is between 10 and 50

$4^2 = 4 \times 4 = 16$ , so 16 is a square number between 10 and 50

..... 16 .....

(Total for Question 4 is 1 mark)

5 Work out 50% of 240

50% as a fraction is  $\frac{1}{2}$ . To find  $\frac{1}{2}$  of a number, it can be divided by 2.  $240 \div 2 = 120$

..... 120 .....

(Total for Question 5 is 1 mark)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



6 Lydia works for 4 hours.  
She is paid £50

How much is Lydia paid per hour?

50 ÷ 4

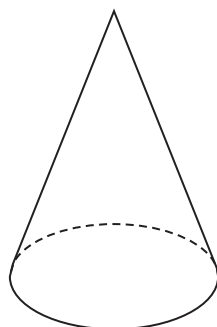
Per means to divide. So pay per hour is the amount paid divided by the hours worked

£12.5 is £12.50

£.....12.50

(Total for Question 6 is 2 marks)

7 Here is a 3-D shape.

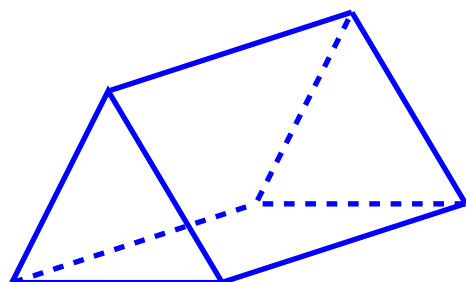


(a) Write down the name of this 3-D shape.

Cone

(1)

(b) In the space below, draw a sketch of a triangular prism.



(1)

(Total for Question 7 is 2 marks)

8 Curtis needs to buy some items for his sports club.

Here are the prices.

Item	Price
Footballs	£9.50 each
Hockey sticks	£30 for 2
Cricket bats	£23 each
Tennis balls	£5 for 4

Curtis needs to buy

- 5 footballs
- 6 hockey sticks
- 2 cricket bats
- 4 tennis balls.

Curtis has £200 to spend.

Show that Curtis can buy all the items he needs.

$$\underline{9.50 \times 5} + \underline{30 \times 3} + \underline{23 \times 2} + \underline{5} = 188.50$$

4 tennis balls are £5

The cost of 2 cricket bats

The cost of 6 hockey sticks. 6 is 3 lots of 2 so 3 lots of 2 need to be bought

The cost of 5 footballs

Adding all of the costs together gives £188.50, which is less than £200 so Curtis can buy all the items he needs

(Total for Question 8 is 4 marks)

- 9 Harris is buying a shirt and a tie.  
He has a choice of three colours of shirt and a choice of three styles of tie.

Shirt	Tie
White (W)	Plain (P)
Blue (B)	Striped (S)
Grey (G)	Checked (C)

Harris is going to choose one shirt and one tie.

List all the possible combinations Harris can choose.

WP, WS, WC, BP, BS, BC, GP, GS, GC

Using systematic listing

(Total for Question 9 is 2 marks)

- 10 There are 24 red counters and 40 blue counters in a bag.

Write down the ratio of the number of red counters to the number of blue counters in the bag.

Give your ratio in its simplest form.

The ratio is 24 : 40. This can be simplified by putting the fraction  $24/40$  into the calculator, which gives  $3/5$ . Ratios simplify in a similar way to fractions so the ratio must be 3 : 5

3:5

(Total for Question 10 is 2 marks)

11 Rima is going to roll a fair 6-sided dice.

- (a) Choose the word that best describes the probability that the dice will land on the number 3

impossible      unlikely      evens      likely      certain

There is some chance but it is less than half chance.  
So it must be unlikely. The probability is  $\frac{1}{6}$  as 1 out of the 6 possible outcomes are the number 3

unlikely

(1)

- (b) Choose the word that best describes the probability that the dice will land on an odd number.

impossible      unlikely      evens      likely      certain

3 out of the 6 possible outcomes are odd (1, 3, 5) so the probability is  $\frac{3}{6}$ , which simplifies to  $\frac{1}{2}$  so it is evens

evens

(1)

(Total for Question 11 is 2 marks)

12 A car travels at an average speed of 37 miles per hour for 3 hours.

Work out the distance that the car travels in the 3 hours.

$s^d_t$

Writing the distance, speed, time formula triangle

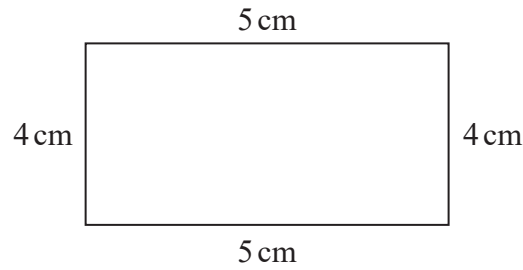
$37 \times 3$

From the formula triangle, distance = speed  $\times$  time

111 miles

(Total for Question 12 is 2 marks)

13 Milo is trying to find the area of this rectangle.



He writes,

“The area is  $400 \text{ cm}^2$  because  $5 \times 4 \times 5 \times 4 = 400$ ”

(a) Explain what is wrong with Milo’s method.

Should be  $5 \times 4$

Area of rectangle = length  $\times$  width

(1)

Anya works out the area of a shape.

Her answer is 86 cm.

(b) Explain why her answer cannot be fully correct.

The units are wrong

cm is a unit of length, not area. It could be  $\text{cm}^2$

(1)

(Total for Question 13 is 2 marks)



14 3 kg of flour costs £4.05  
5 kg of flour and 6 kg of sugar cost £11.85

Work out the cost of 2 kg of flour and 5 kg of sugar.

$4.05 \div 3$

Dividing the cost of 3 kg of flour by 3 works out that the cost of 1 kg of flour is £1.35

$1.35 \times 5$

Multiplying the cost of 1 kg of flour by 5 works out that the cost of 5 kg of flour is £6.75

$11.85 - 6.75$

Subtracting the cost of 5 kg of flour from the cost of 5 kg of flour and 6 kg of sugar works out that the cost of 6 kg of sugar is £5.10

$5.10 \div 6$

Dividing the cost of 6 kg of sugar by 6 works out that the cost of 1 kg of sugar is £0.85

$1.35 \times 2 + 0.85 \times 5$

Multiplying the cost of 1 kg of flour by 2 works out the cost of 2 kg of flour.  
Multiplying the cost of 1 kg of sugar by 5 works out the cost of 5 kg of sugar.  
Adding these together works out the cost of 2 kg of flour and 5 kg of sugar

£..... 6.95

(Total for Question 14 is 4 marks)

DO NOT

WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

15 Martha and Nabeel share £120

Martha gets 72% of the money.  
She spends 30% of the money she gets.

How much money does Martha have left?

$$\frac{72}{100} \times 120$$

Percentage is out of 100 so putting the 72 over 100 converts it into a fraction. 'Of' means to multiply so multiplying this fraction by the £120 finds that 72% of the money is £86.40

$$\frac{70}{100} \times 86.40$$

100 - 30 = 70, so 70% of the money she gets is left. Putting the 70 over 100 converts it into a fraction. 'Of' means to multiply so multiplying this fraction by the £86.40 finds 70% of the money she gets and so works out what Martha has left

£ ..... 60.48

(Total for Question 15 is 3 marks)



16 160 people were asked to choose their favourite type of book.  
They each chose from romance or adventure or horror or thriller.

85 of these people were children.  
The rest were adults.

19 of the 33 people who chose romance were children.  
34 of the 76 people who chose adventure were adults.  
7 adults chose thriller.

The number of children who chose thriller was the same as the number of adults who chose horror.

Work out the total number of people who chose horror.  
You must show how you get your answer.

	R	A	H	T	
C	19	42		20	85
A	14	34	20	7	75
	33	76	24	27	160

Organising the information into a two-way table. C and A stand for children and adults. R, A, H and T stand for romance, adventure, horror and thriller. The totals are at the ends of the rows and columns. Filling in the known information then finding the missing information in any row or column until the total for horror is found. As soon as the number of adults who chose horror is found, the number of children who chose thriller is the same as this. There is no need to complete the whole table

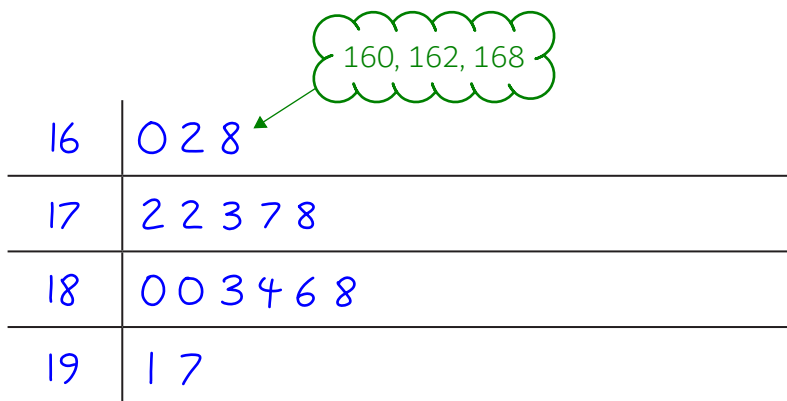
24

(Total for Question 16 is 4 marks)

17 Here are the heights, in cm, of 16 sunflowers.

168 173 172 180 162 191 183 160  
 178 184 197 177 172 186 188 180

Show this information in a stem and leaf diagram.



Key:

$$16|0 = 160$$

(Total for Question 17 is 3 marks)

Writing the numbers in the correct format in order from smallest to largest. Crossing them out with a pencil as they go

18 (a) Work out  $\frac{9.8 + 6.8}{4.2 \times 2.1}$

Give your answer as a decimal.

Write down all the figures on your calculator display.

Put it into the calculator exactly as it is above

1.882086168

(2)

(b) Write your answer to part (a) correct to 2 decimal places.

The 2 in the third decimal place causes the 8 in the second decimal place to round down then everything after the second decimal place is set to 0 and ignored

1.88

(1)

(Total for Question 18 is 3 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

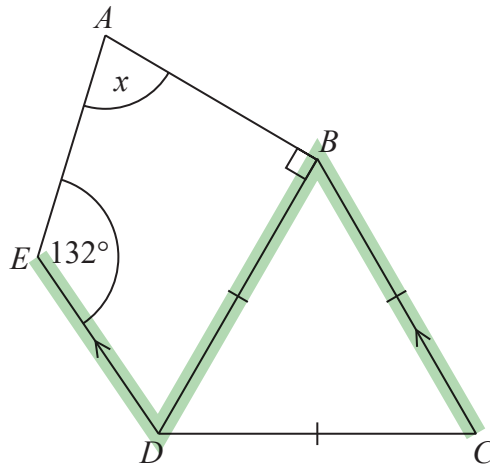


DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

19 The diagram shows a quadrilateral  $ABDE$  and an equilateral triangle  $BCD$ .



$CB$  is parallel to  $DE$ .

Angle  $AED = 132^\circ$

Work out the size of the angle marked  $x$ .

You must give a reason for each stage of your working.

$180 \div 3 = 60$

Angle  $DBC = 60^\circ$  as there are  $180^\circ$  in a triangle and angles in an equilateral triangle are equal

Angle  $EDB = 60^\circ$  as alternate angles are equal

Angles  $DBC$  and  $EDB$  are alternate as there is a z-shape between the parallel lines and the insides of the z-shape are equal

$360 - 132 - 90 - 60 = 78$

Angle  $x = 78$  as there are  $360^\circ$  in a quadrilateral

Subtracting the other angles in quadrilateral  $ABDE$  from  $360$  leaves angle  $x$

.....78°

(Total for Question 19 is 4 marks)



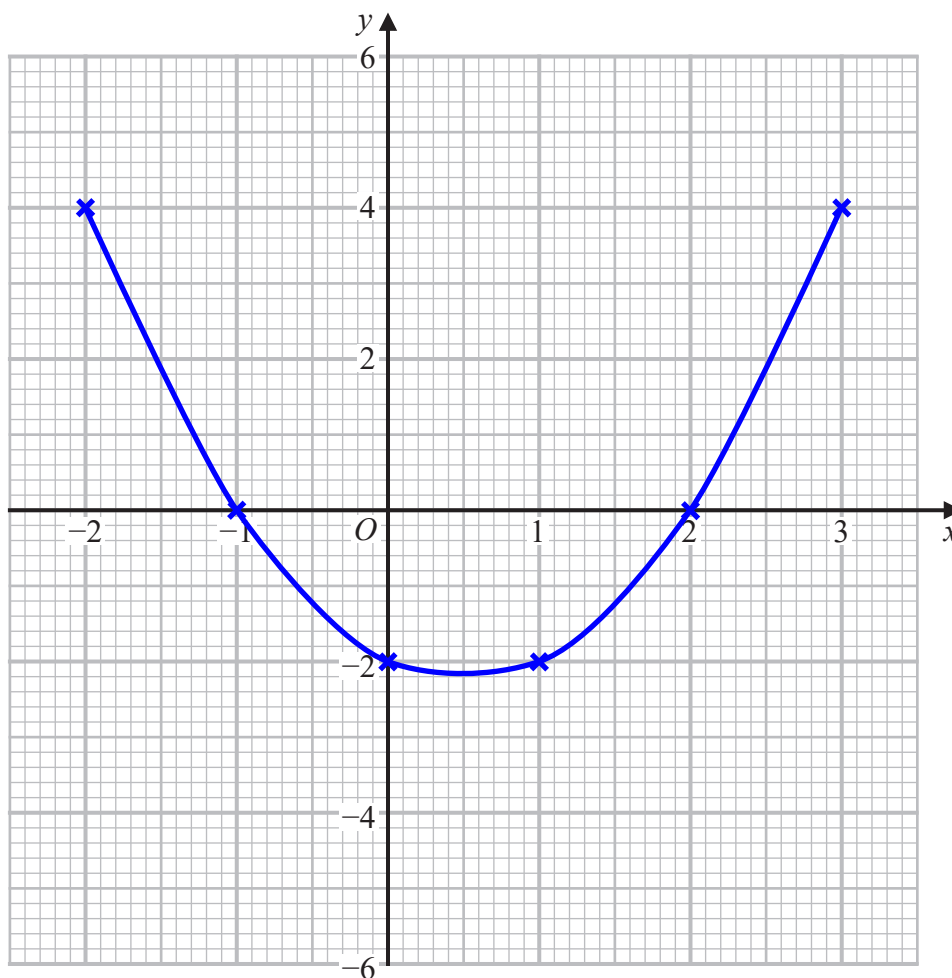
20 (a) Complete the table of values for  $y = x^2 - x - 2$

Using table mode on the calculator, set  $f(x) = x^2 - x - 2$ .  
For the table range, set start to -2, end to 3 and step to 1

x	-2	-1	0	1	2	3
y	4	0	-2	-2	0	4

(2)

(b) On the grid, draw the graph of  $y = x^2 - x - 2$  for values of  $x$  from -2 to 3



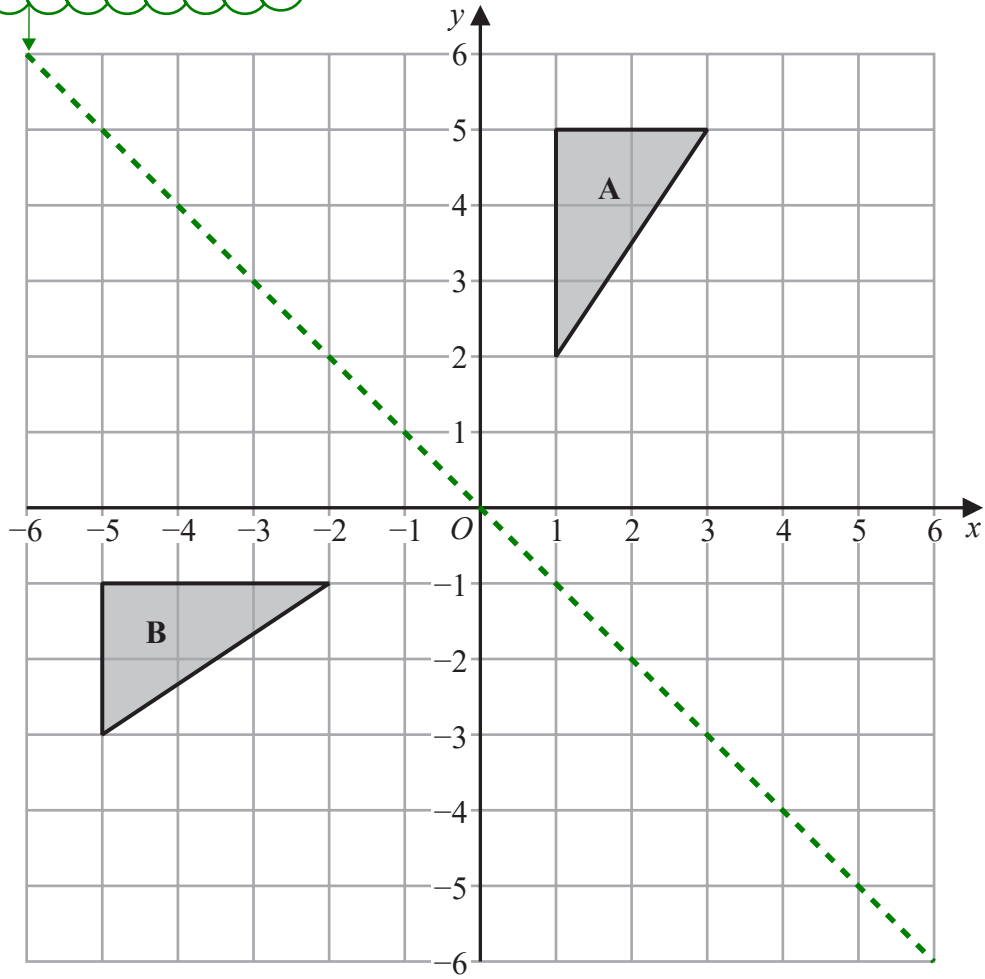
(2)

(Total for Question 20 is 4 marks)

Plotting the points from the table of values then joining them up with a curve

21

This is the line of  $y = -x$



Describe fully the single transformation that maps triangle A onto triangle B.

Reflection on the line  $y = -x$

(Total for Question 21 is 2 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA





22 (a) Expand and simplify  $3(2y - 5) + 7(y + 2)$

$$6y - 15 + 7y + 14$$

← Expanding the brackets

Simplifying by collecting like terms.  $6y + 7y = 13y$  and  $-15 + 14 = -1$

$$13y - 1$$

(2)

(b) Factorise fully  $6x^2 + 15x$

3 is the highest common factor of 6 and 15.  $x$  is the highest common factor of  $x^2$  and  $x$ . So the highest common factor of  $6x^2$  and  $15x$  is  $3x$ . Bringing this out as a factor and dividing both terms by  $3x$  and leaving the result in a bracket

$$3x(2x + 5)$$

(2)

(c) Make  $g$  the subject of the formula  $f = 3g + 11$

$$f - 11 = 3g$$

← Subtracting 11 from both sides eliminates the +11 on the right and gets the  $g$  term on its own

Dividing both sides by 3 eliminates the 3 on the right and gets  $g$  on its own

$$g = \frac{f - 11}{3}$$

(2)

(Total for Question 22 is 6 marks)

23 Karen is organising a party for a charity.

She spends

£100 on food

£120 on a hall

£80 on a DJ.

Karen sells 54 tickets for the party.

Each ticket costs £7.50

Work out the percentage profit Karen makes for the charity.

$$100+120+80=300$$

Adding up the £100 on food, £120 on a hall and £80 on a DJ works out that she spends £300

$$54 \times 7.50$$

Multiplying the 54 tickets by the £7.50 works out that her income is £405

$$405 - 300$$

Subtracting what she spent from her income works out that she made £105 profit

$$\frac{105}{300} \times 100$$

Putting the profit over the amount spent expresses the profit as a fraction. Multiplying this by 100 converts it into a percentage

..... 35 .....

%

(Total for Question 23 is 4 marks)

- 24 Andrew invests £4500 in a savings account for 2 years.  
The account pays compound interest at a rate of 3.4% per year.

Calculate how much Andrew has in this savings account at the end of the 2 years.

$$4500 \times \left( \frac{100 + 3.4}{100} \right)^2$$

100 + 3.4 expresses the percentage it increases to each year.  
Putting this over 100 converts it into a fraction. Multiplying by this fraction to the power of 2 increases the £4500 by 3.4% 2 times

48811.202 is rounded to the nearest penny

£ ..... 4811.20

(Total for Question 24 is 2 marks)

- 25 Solve  $5x - 14 = 52 - x$

$$6x - 14 = 52$$

Adding  $x$  to both sides eliminates the  $-x$  on the right to get all the  $x$  on the same side

$$6x = 66$$

Adding 14 to both sides eliminates the  $-14$  on the left and gets the  $x$  term on its own

Dividing both sides by 6 eliminates the 6 on the left and gets  $x$  on its own

$x = \dots\dots\dots 11$

(Total for Question 25 is 3 marks)

- 26 Chris, Debbie and Errol share some money in the ratio 3:4:2  
Debbie gets £120

Chris then gives some of his share to Debbie and some of his share to Errol.  
The money that Chris, Debbie and Errol each have is now in the ratio 2:5:3

How much money did Chris give to Errol?

$$120 \div 4$$

Dividing the £120 Debbie gets by the 4 parts in the first ratio which represent what Debbie gets works out that 1 part of the first ratio is worth £30

$$30 \times 3 = 90$$

Multiplying the value of 1 part of the first ratio by the 3 parts which represent what Chris gets works out that Chris gets £90

$$30 \times 2 = 60$$

Multiplying the value of 1 part of the first ratio by the 2 parts which represent what Errol gets works out that Errol gets £60

$$120 + 90 + 60 = 270$$

Adding the amount Chris gets, the amount Debbie gets and the amount Errol gets works out that there was £270 in total

$$2 + 5 + 3$$

There is still £270 in total for the second ratio. Adding up the parts in the second ratio works out that there are 10 parts in total in the second ratio

$$270 \div 10$$

Dividing the total of £270 by the 10 parts which represent it works out that 1 part of the second ratio is worth £27

$$27 \times 3$$

Multiplying the value of 1 part of the second ratio by the 3 parts which represent what Errol now has works out that Errol now has £81

$$81 - 60$$

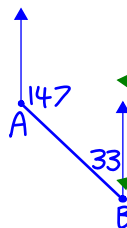
Subtracting the original £60 Errol gets from the £81 Errol now has works out that Chris gives Errol £21

£..... 21 .....

(Total for Question 26 is 4 marks)

- 27 The bearing of port B from port A is  $147^\circ$

Work out the bearing of port A from port B.



Drawing a diagram. The bearing is the angle turned clockwise from north. So roughly drawing where B is relative to A. Drawing arrows going north from both A and B

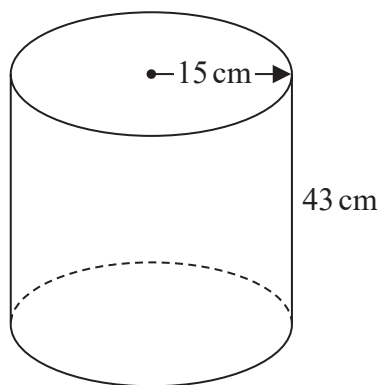
Co-interior angles add up to  $180^\circ$  so  $180 - 147$  works out that this angle is  $33^\circ$

Angles around a point add up to  $360^\circ$ . So  $360 - 33$  works out that the bearing of A from B is  $327^\circ$

..... 327 .....

(Total for Question 27 is 2 marks)

28 The diagram shows an empty tank in the shape of a cylinder.



The cylinder has radius 15 cm and height 43 cm.

Water flows into the tank at a rate of 0.47 litres per minute.

Calculate the number of minutes it will take to completely fill the tank.

Give your answer correct to the nearest minute.

$$\pi \times 15^2 \times 43$$

Area of circle =  $\pi \times \text{radius}^2$ . Multiplying this area by the height works out the volume of the cylinder in  $\text{cm}^3$

$$9675\pi \div 1000$$

Each  $\text{cm}^3$  is a millilitre. There are 1000 millilitres in litre. So dividing the volume in  $\text{cm}^3$  by 1000 converts it into litres. The volume needs to be in litres as this is involved in the rate the tank is filled

$$\frac{387}{40}\pi \div 0.47$$

Dividing the volume in litres by the rate it is filled in litres per minute works out how many minutes it will take to completely fill the tank

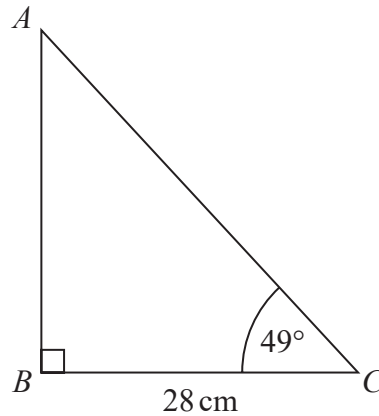
64.6... is rounded to the nearest minute

65

..... minutes

(Total for Question 28 is 4 marks)

29  $ABC$  is a right-angled triangle.



Calculate the length of  $AB$ .

Give your answer correct to 3 significant figures.

SOHCAHTOA

Right-angled trigonometry can be used. Writing SOH CAH TOA as formula triangles. Ticking O as we are looking for the opposite and ticking A as we have the adjacent. There are two ticks on the TOA formula triangle so this one can be used

$\tan 49 \times 28$

From the formula triangle: opposite = (tan of the angle) x adjacent

Rounding 32.21... to 3 significant figures

..... 32.2 ..... cm

(Total for Question 29 is 2 marks)

30 Solve the simultaneous equations

$$3x + y = -4.5$$

First equation

$$4x + 3y = -3.5$$

Second equation

$$9x + 3y = -13.5$$

Multiplying the first equation by 3 to make the number of y the same as the second equation. This forms the third equation

$$5x = -10$$

Subtracting the second equation from the third equation cancels out the y term and gets an equation just in terms of x

$$x = -2$$

Dividing both sides by 5 finds x

$$3x - 2 + y = -4.5$$

Substituting the value of x into the first equation

$$x = \dots\dots\dots -2$$

Subtracting  $3x - 2$  from both sides finds y

$$y = \dots\dots\dots 1.5$$

(Total for Question 30 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS