

Write your name here

Surname

Other names

**Pearson Edexcel**  
**Level 1/Level 2 GCSE (9 - 1)**

Centre Number

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Candidate Number

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# Mathematics

## Paper 2 (Calculator)

**Higher Tier**

Mock Set 2 – Spring 2017

**Time: 1 hour 30 minutes**

Paper Reference

**1MA1/2H**

**You must have:** Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

### Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided  
– *there may be more space than you need.*
- You must **show all your working**.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **Calculators may be used.**
- If your calculator does not have a  $\pi$  button, take the value of  $\pi$  to be 3.142 unless the question instructs otherwise.



### Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets  
– *use this as a guide as to how much time to spend on each question.*

### Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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Pearson

**Answer ALL questions.**

**Write your answers in the spaces provided.**

**You must write down all the stages in your working.**

**1** 100 adults were asked how they keep fit.

Each adult goes to the gym or runs or cycles.

45 of these adults are female.

30 of the 52 adults who go to the gym are female.

35 adults run.

9 males cycle.

How many females run?

.....  
**(Total for Question 1 is 3 marks)**

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2 On a school trip the ratio of the number of teachers to the number of students is 1 : 15

The ratio of the number of male students to the number of female students is 7 : 5

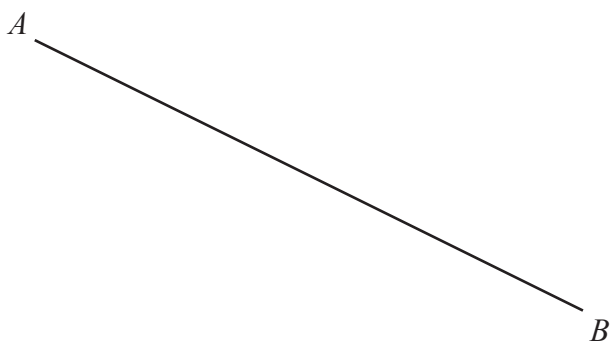
Work out what percentage of all the people on the trip are female students.

Give your answer correct to the nearest whole number.

.....%

(Total for Question 2 is 3 marks)

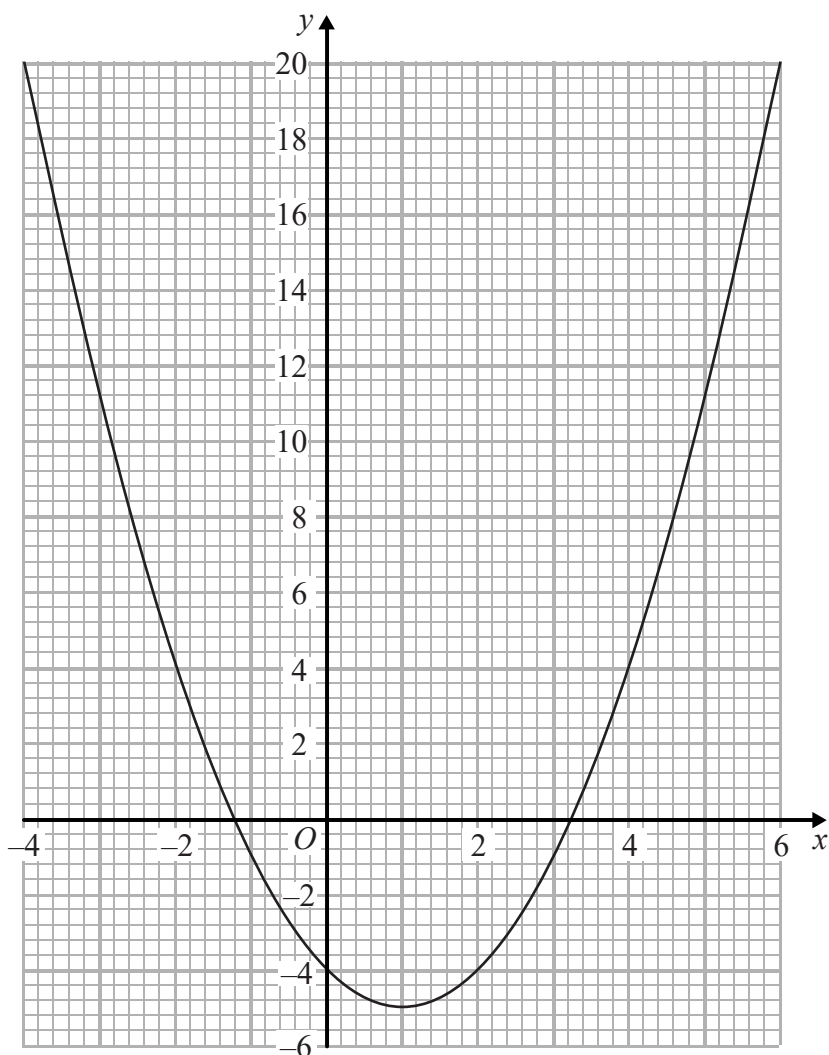
3 In the space below, use ruler and compasses to construct the perpendicular bisector of line *AB*.



(Total for Question 3 is 2 marks)



4 Here is the graph of  $y = x^2 - 2x - 4$



(a) Write down estimates for the roots of  $x^2 - 2x - 4 = 0$

.....  
(2)

(b) Write down the coordinates of the turning point of  $y = x^2 - 2x - 4$

(....., .....)  
(1)

(Total for Question 4 is 3 marks)

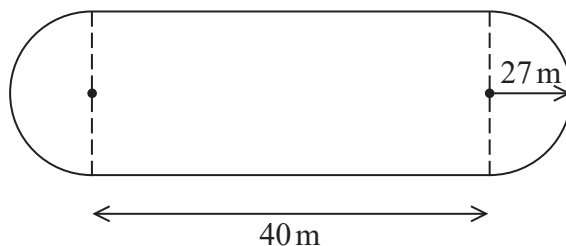


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5 The diagram shows a cycle track.



The track has two straight sides each of length 40 m.  
Each end of the track is a semicircle of radius 27 m.

The diameter of each wheel of Ian's bike is 590 mm.  
Ian is going to ride his bike around the track once.

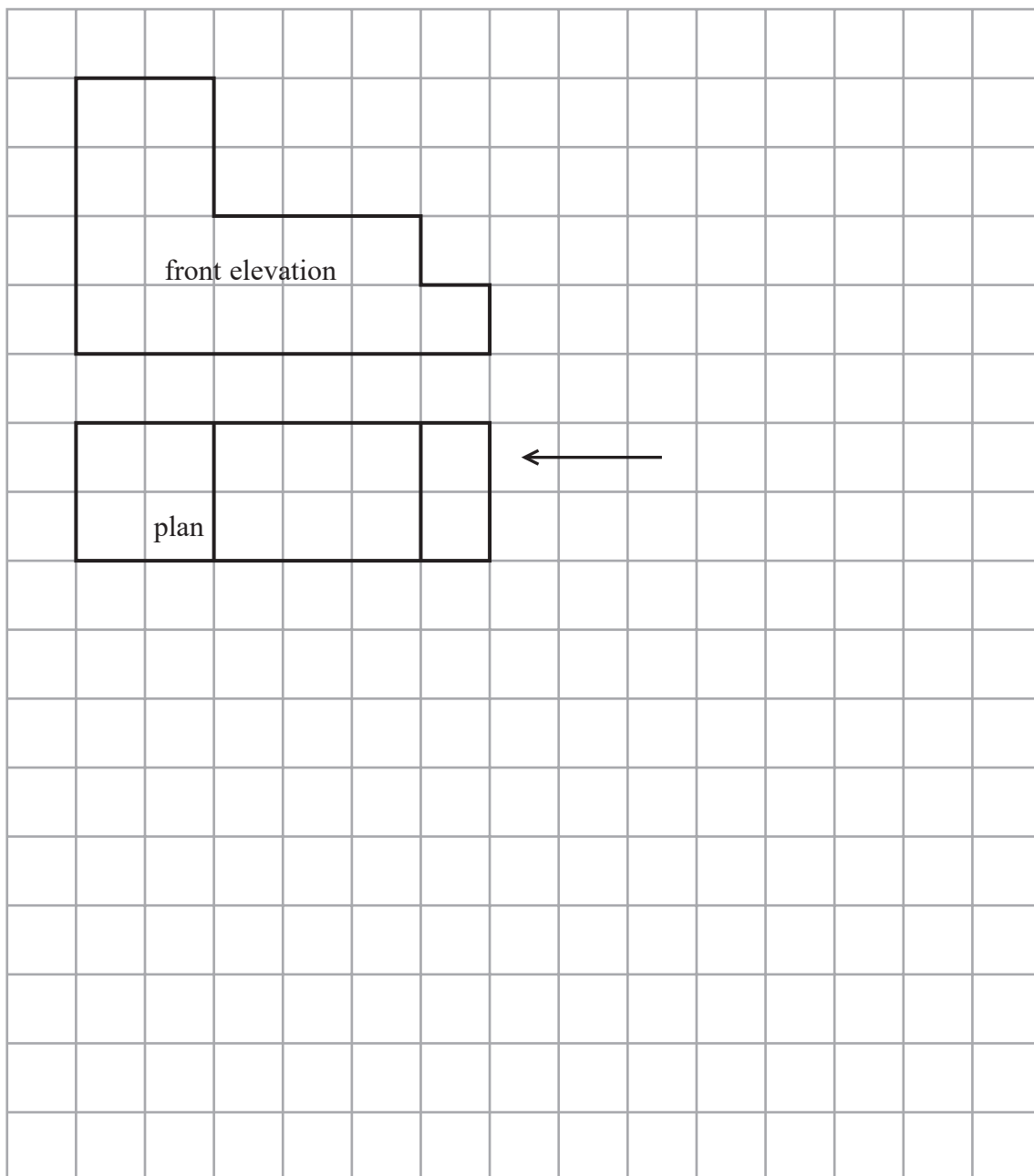
Calculate how many complete revolutions each wheel of his bike will make.

.....  
(Total for Question 5 is 5 marks)



6 The front elevation and plan of a solid are shown on the grid.

On the grid, draw the side elevation from the direction of the arrow.



(Total for Question 6 is 2 marks)

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7 The distance from the Earth to the Sun is  $1.496 \times 10^{11}$  metres.  
The speed of light is  $3 \times 10^8$  metres per second.

(a) Show that, correct to 3 significant figures, light will take 0.139 hours to travel from the Sun to the Earth.

(3)

1 googol is  $1 \times 10^{100}$

Danesh says,

“When I multiply  $1.496 \times 10^{11}$  by  $6.68 \times 10^9$  I get nearly 1 googol because  $1.496 \times 10^{11} \times 6.68 \times 10^9 = 9.99 \times 10^{99}$ ”

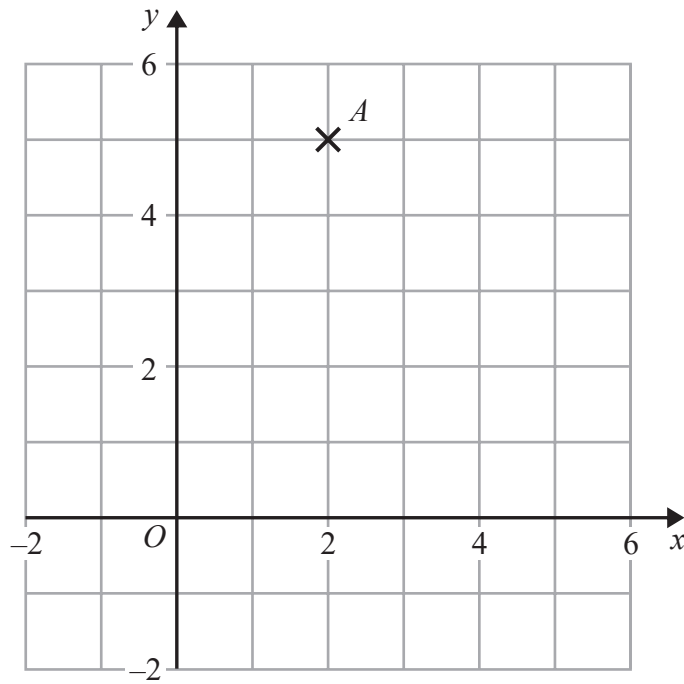
(b) Is Danesh correct?  
Give a reason for your answer.

(1)

(Total for Question 7 is 4 marks)



8 Find an equation of the straight line with gradient 3 that passes through point  $A$ .



(Total for Question 8 is 2 marks)

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- 9 Natalia pays £13 995 for a car.  
Lauren pays £14 495 for a car.

Assume that

the rate of depreciation for Natalia's car is 12% per annum  
and the rate of depreciation for Lauren's car is 13% per annum.

- (a) Work out whose car will have the greater value at the end of 3 years.  
You must show all your working.

(4)

The rate of depreciation assumed for Natalia's car was too low.

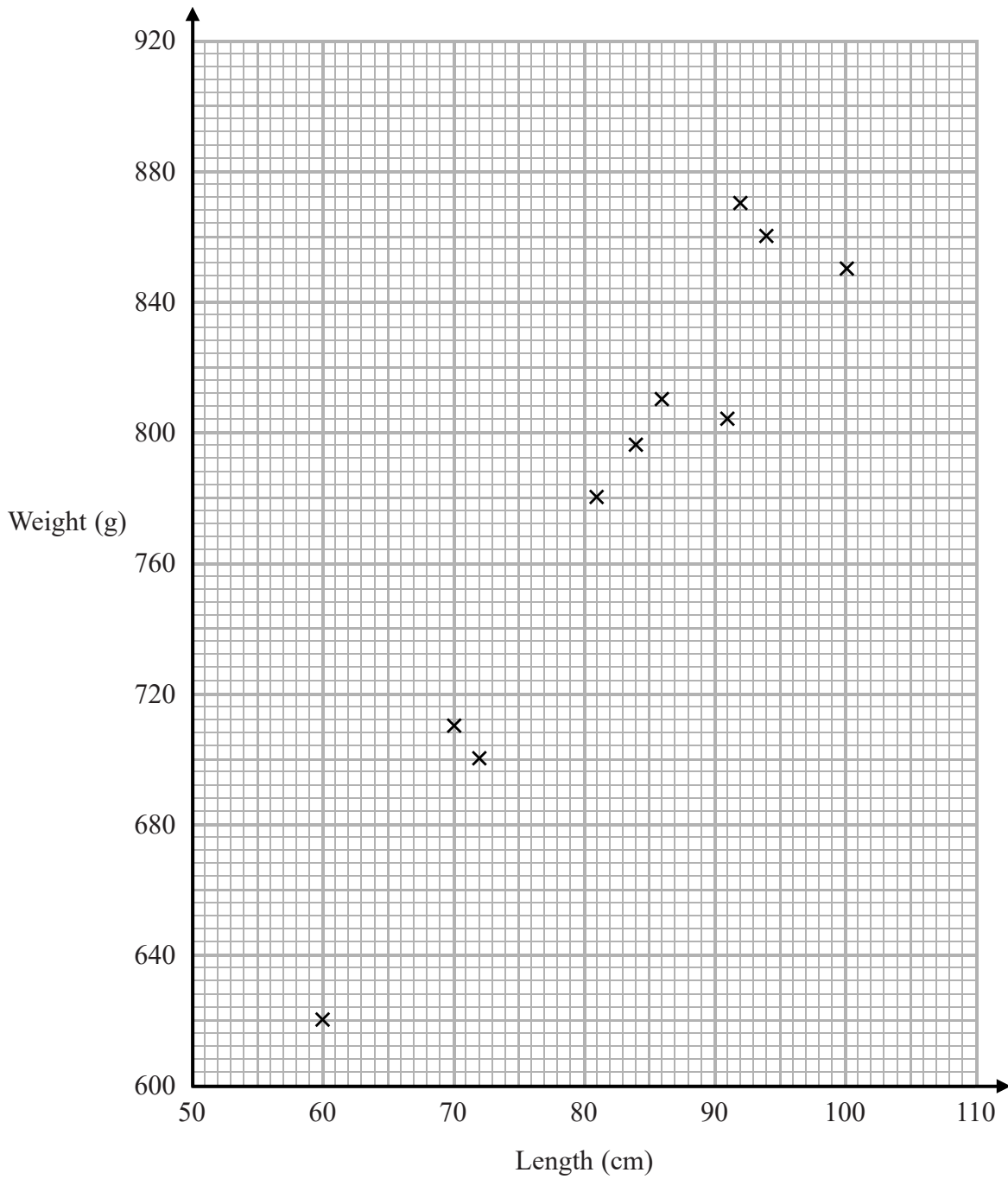
- (b) How does this affect the value of her car at the end of 3 years?

(1)

**(Total for Question 9 is 5 marks)**



- 10 The scatter graph shows information about 10 adult snakes of the same type.  
It shows the length and weight of each snake.



An adult snake of this type has a weight of 740 g.

- (a) Use the scatter graph to estimate the length of this snake.

..... cm

(2)



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Steven wants to estimate the weight of an adult snake of length 110 cm.

He says he will draw a line of best fit and read off the weight at 110 cm.

(b) Explain what is wrong with his method.

(1)

**(Total for Question 10 is 3 marks)**

**11** Write the number 47 805 000 in standard form.

**(Total for Question 11 is 1 mark)**

**12** Factorise  $x^2 - 121$

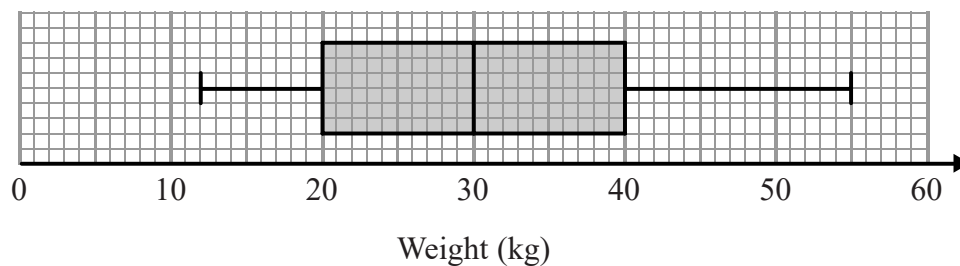
**(Total for Question 12 is 1 mark)**



13 The table shows some information about the weights, in kg, of some boxes.

Minimum	Lower Quartile	Median	Upper Quartile	Range
12	20	32	40	55

Yusuf uses this information to draw the box plot below.



Write down two things wrong with this box plot.

1.....

.....

2.....

.....

(Total for Question 13 is 2 marks)



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14 Solve the simultaneous equations

$$4x + 6y = 5$$

$$7x + 5y = -10.5$$

$x =$  .....

$y =$  .....

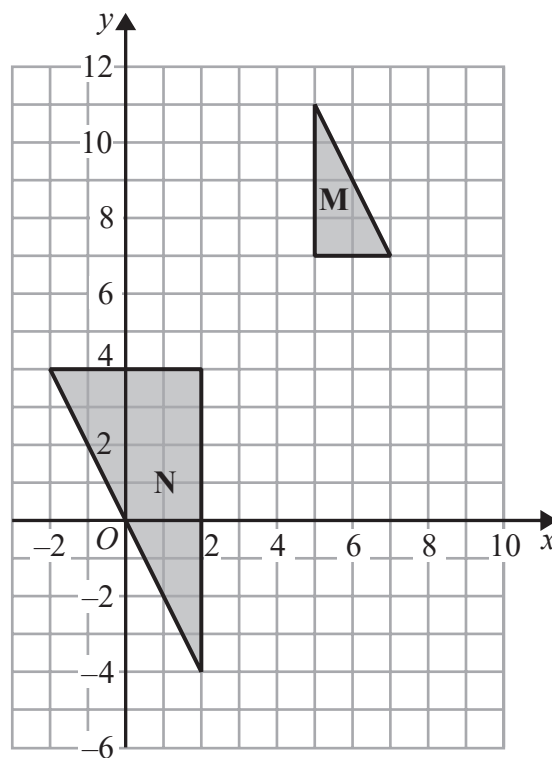
(Total for Question 14 is 4 marks)



- 15 Prove algebraically that the difference between the squares of any two consecutive integers is always an odd number.

(Total for Question 15 is 3 marks)

16



Describe fully the single transformation that maps triangle M onto triangle N.

(Total for Question 16 is 2 marks)



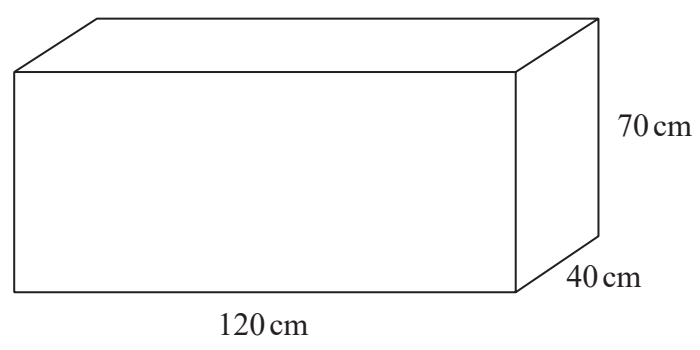
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17 The diagram shows Helen's fish tank.  
The fish tank is in the shape of a cuboid.

All the dimensions are correct to the nearest centimetre.



Helen is going to use a bucket to fill the fish tank completely with water.  
There are 14 litres, correct to the nearest litre, of water in a full bucket.

Will 25 full buckets of water definitely fill the fish tank?  
Justify your answer.

(Total for Question 17 is 4 marks)



18  $T$  is inversely proportional to the cube of  $u$ .

When  $u = 5$ ,  $T = 0.0096$

Find the value of  $u$  when  $T = 0.15$

.....  
(Total for Question 18 is 3 marks)

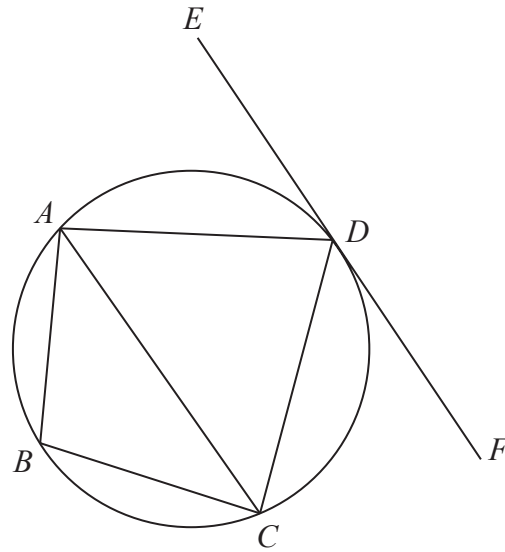
19 By completing the square, find the coordinates of the turning point of the curve with equation  $y = x^2 + 10x + 18$   
You must show all your working.

(....., .....) .....

(Total for Question 19 is 3 marks)







$A$ ,  $B$ ,  $C$  and  $D$  are points on a circle.  
 $EDF$  is the tangent to the circle at  $D$ .

$$\text{Angle } ADE = 54^\circ$$

$$\text{Angle } ABC = 114^\circ$$

Work out the size of angle  $CAD$ .

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

(Total for Question 20 is 4 marks)



21  $f$  and  $g$  are functions such that

$$f(x) = 3x^2 \quad \text{and} \quad g(x) = \frac{1}{x-2}$$

Find  $gf(4)$ .

Give your answer as a fraction.

.....  
(Total for Question 21 is 2 marks)

22  $(a + \sqrt{8})^2$  can be written in the form  $c + d\sqrt{2}$ , where  $a$ ,  $c$  and  $d$  are integers.

Find, in terms of  $a$ , an expression for  $c$  **and** an expression for  $d$ .

$c =$  .....

$d =$  .....

(Total for Question 22 is 3 marks)



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23 (a) Show that the equation  $2x^3 + 4x = 3$  has a solution between 0 and 1

(2)

(b) Show that  $2x^3 + 4x = 3$  can be rearranged to give  $x = \frac{3}{4} - \frac{x^3}{2}$

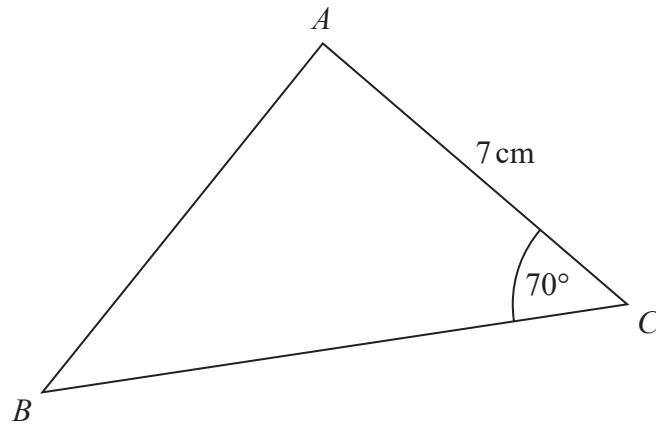
(1)

(c) Starting with  $x_0 = 0$ , use the iteration formula  $x_{n+1} = \frac{3}{4} - \frac{x_n^3}{2}$  three times to find an estimate for the solution to  $2x^3 + 4x = 3$

(3)

(Total for Question 23 is 6 marks)





The area of triangle  $ABC$  is  $42\text{ cm}^2$

Find the length of  $AB$ .

Give your answer correct to 3 significant figures.

..... cm

(Total for Question 24 is 5 marks)



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25 There are some red counters and some white counters in a bag.  
At the start, 7 of the counters are red, the rest of the counters are white.

Alfie takes at random a counter from the bag.  
He does not put the counter back in the bag.  
Alfie then takes at random another counter from the bag.

The probability that the first counter Alfie takes is white **and** the second counter Alfie takes is red is  $\frac{21}{80}$

Work out the number of white counters in the bag at the start.

.....  
(Total for Question 25 is 5 marks)

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TOTAL FOR PAPER IS 80 MARKS



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