

**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*.

* **Calculators may be used.**
* If your calculator does not have a *π* button, take the value of *π* to be
3.142 unless the question instructs otherwise.
* Diagrams are **NOT** accurately drawn, unless otherwise indicated.
* You must **show all your working out**.

**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.

**Answer ALL questions.**

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

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

**1** Make *t* the subject of the formula *w* = 3*t* + 11

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**(Total for Question 1 is 2 marks)**

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**2** Three companies sell the same type of furniture.

The price of the furniture from Pooles of London is £1480.

The price of the furniture from Jardins of Paris is €1980.

The price of the furniture from Outways of New York is $2250.

The exchange rates are

 £1 = €1.34

 £1 = $1.52

Which company sells this furniture at the lowest price?

You must show how you get your answer.

**(Total for Question 2 is 3 marks)**

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**3** The time-series graph gives some information about the number of pairs of shoes sold

in a shoe shop in the first six months of 2014.



The sales target for the first six months of 2014 was to sell a mean of 96 pairs of shoes

per month.

Did the shoe shop meet this sales target?

You must show how you get your answer.

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

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**4** The grouped frequency table gives information about the heights of 30 students.

|  |  |
| --- | --- |
| **Height (*h* cm)** | **Frequency** |
| 130 < *h* ≤ 140 | 1 |
| 140 < *h* ≤ 150 | 7 |
| 150 < *h* ≤ 160 | 8 |
| 160 < *h* ≤ 170 | 10 |
| 170 < *h* ≤ 180 | 4 |

(*a*)Write down the modal class interval.

..................................................................................

**(1)**

This incorrect frequency polygon has been drawn for the information in the table.



(*b*)Write down two things wrong with this incorrect frequency polygon.

1....................................................................................................................................................

2....................................................................................................................................................

**(2)**

**(Total for Question 4 is 3 marks)**

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**5** At 9 am, Bradley began a journey on his bicycle.

From 9 am to 9.36 am, he cycled at an average speed of 15 km/h.

From 9.36 am to 10.45 am, he cycled a further 8 km.

(*a*)Draw a travel graph to show Bradley’s journey.



**(3)**

From 10.45 am to 11 am, Bradley cycled at an average speed of 18 km/h.

(*b*)Work out the distance Bradley cycled from 10.45 am to 11 am.

...................................................... km

**(2)**

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

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**6** Toby invested £7500 for 2 years in a savings account.

He was paid 4% per annum compound interest.

How much money did Toby have in his savings account at the end of 2 years?

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

**(Total for Question 6 is 2 marks)**

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**7** Becky has some marbles.

Chris has two times as many marbles as Becky.

Dan has seven more marbles than Chris.

They have a total of 57 marbles.

Dan says,

“If I give some marbles to Becky, each of us will have the same number of marbles.”

Is Dan correct?

You must show how you get your answer.

**(Total for Question 7 is 3 marks)**

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**8** Here is a diagram showing a rectangle, *ABCD*, and a circle.

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*BC* is a diameter of the circle.

Calculate the percentage of the area of the rectangle that is shaded.

Give your answer correct to 1 decimal place.

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**(Total for Question 8 is 4 marks)**

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**9** The diagram shows the positions of three points, *A*, *B* and *C*, on a map.



The bearing of *B* from *A* is 070°

Angle *ABC* is 50°

*AB* = *CB*

Work out the bearing of *C* from *A*.

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**(Total for Question 9 is 3 marks)**

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10 The graph shows the depth, *d* cm, of water in a tank after *t* seconds.



(*a*)Find the gradient of this graph.

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**(2)**

(*b*)Explain what this gradient represents.

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**(1)**

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

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**11** Finlay plays two tennis matches.

The probability that he will win a match and the probability that he will lose a match are

shown in the probability tree diagram.



(*a*)Work out the probability that Finlay wins both matches.

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**(2)**

(*b*)Work out the probability that Finlay loses at least one match.

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**(2)**

**(Total for Question 11 is 4 marks)**

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**12** (*a*)Find the reciprocal of 2.5.

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**(1)**

(*b*)Work out 

 Give your answer correct to 3 significant figures.

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**(2)**

**(Total for Question 12 is 3 marks)**

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**13** Show that

(3*x* – 1)(*x* + 5)(4*x* – 3) = 12*x*3 + 47*x*2 – 62*x* + 15

for all values of *x*.

**(Total of Question 13 is 3 marks)**

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**14** *ABC* and *ABD* are two right-angled triangles.



Angle *BAC* = angle *ADB* = 90°

*AB* = 13 cm

*DB* = 5 cm

Work out the length of *CB*.

....................................................... cm

**(Total for Question 14 is 3 marks)**

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**15** A pendulum of length *L* cm has time period *T* seconds.

*T* is directly proportional to the square root of *L*.

The length of the pendulum is increased by 40%.

Work out the percentage increase in the time period.

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**(Total for Question 15 is 3 marks)**

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**16** The histogram gives information about house prices in a village in 2015.



20 houses in the village have a price between £300 000 and £400 000.

Work out the number of houses in the village with a price under £200 000.

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**(Total for Question 16 is 3 marks)**

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**17** Here are the first 5 terms of a quadratic sequence.

1 3 7 13 21

Find an expression, in terms of *n*, for the *n*th term of this quadratic sequence.

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**(Total for Question 17 is 3 marks)**

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**18** f(*x*) = 3*x*2 – 2*x* – 8

Express f(*x* + 2) in the form *ax*2 + *bx*

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

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**19** Here is a right-angled triangle.



All measurements are in centimetres.

The area of the triangle is 2.5 cm2.

Find the perimeter of the triangle.

Give your answer correct to 3 significant figures.

You must show all of your working.

....................................................... cm

**(Total for Question 19 is 6 marks)**

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**20** The graph shows information about the velocity, *v* m/s, of a parachutist *t* seconds after

leaving a plane.



(*a*)Work out an estimate for the acceleration of the parachutist at *t* = 6

....................................................... m/s2

**(2)**

(*b*)Work out an estimate for the distance fallen by the parachutist in the first

 12 seconds after leaving the plane.

 Use 3 strips of equal width.

....................................................... m

**(3)**

**(Total for Question 20 is 5 marks)**

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**21** The number of bees in a beehive at the start of year *n* is *Pn*.

The number of bees in the beehive at the start of the following year is given by

*Pn* + 1 = 1.05(*Pn* – 250)

At the start of 2015 there were 9500 bees in the beehive.

How many bees will there be in the beehive at the start of 2018?

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**(Total for Question 21 is 3 marks)**

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**22** *D = *

*x* = 99.7 correct to 1 decimal place.

*y* = 67 correct to 2 significant figures.

Work out an upper bound for *D*.

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**(Total for Question 22 is 3 marks)**

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**23** Here is a circle, centre *O*, and the tangent to the circle at the point *P*(4, 3) on the circle.



Find an equation of the tangent at the point *P*.

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**(Total for Question 23 is 3 marks)**

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**24** *A*, *B* and *C* are points on the circumference of a circle centre *O*.



Prove that angle *BOC* is twice the size of angle *BAC*.

**(Total for Question 24 is 4 marks)**

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**TOTAL FOR PAPER IS 80 MARKS**