**A picture containing text, screenshot, font, parallel

Description automatically generated**

**A picture containing text, diagram, origami, pattern

Description automatically generated**

**Answer ALL TWENTY SIX questions.**

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

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

**1** *P* = *m*2 – 4*c*

(*a*)Work out the value of *P* when *m* = –5 and *c* = 3

*P* = ......................................................

**(2)**

(*b*)Expand and simplify (*x* + 5)(*x* – 7)

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

**(2)**

**(Total for Question 1 is 4 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**2** Sandeep wants to buy some packets of pens and some boxes of pencils for his

stationery shop.

Each packet of pens contains 9 pens.

Each box of pencils contains 12 pencils.

Each packet of pens costs £7.60

Each box of pencils costs £4.80

Sandeep can only buy full packets of pens and full boxes of pencils.

He wants to buy exactly the same number of pens as pencils.

Work out the minimum amount Sandeep needs to pay.

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

**(Total for Question 2 is 4 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**3** Anjali travels on the Eurostar train from Paris to Amsterdam.

The distance the train travels between Paris and Amsterdam is 515 km.

The time taken by the train to travel between Paris and Amsterdam is

3 hours 18 minutes.

Work out the average speed of the train.

Give your answer in km/h correct to the nearest whole number.

...................................................... km/h

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

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**4** Here are the first four terms of an arithmetic sequence.

38 31 24 17

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

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

**(Total for Question 4 is 2 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**5** A field is in the shape of a trapezium.

A picture containing text, line, diagram

Description automatically generated

The field is sold for a price of $49 650

Given that 1 hectare = 10 000 m2

work out the average price of the field per hectare.

$......................................................

**(Total for Question 5 is 4 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**6** In his previous job, Pierre was paid 400 euros in total for working a 5-day week.

In his new job, Pierre is paid 14 euros per hour.

In his new job, Pierre works for 7 hours each day for a 5-day week.

(*a*)Work out the percentage increase in the amount that Pierre is paid for a 5-day week.

......................................................%

**(4)**

Marie changes her job.

Her salary decreases by 6%

Her new salary is 23 030 euros.

(*b*)Work out Marie’s salary before she changes her job.

...................................................... euros

**(3)**

**(Total for Question 6 is 7 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**7** (*a*)Simplify (4–2)0

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

**(1)**

3–14 × 38 = 3*m*

(*b*)Find the value of *m*

*m* = ......................................................

**(1)**

**(Total for Question 7 is 2 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**8** (*a*)Solve 9 – 4*x* > 17

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

**(2)**

A picture containing line, diagram, plot

Description automatically generated

(*b*)Write down the three inequalities that represent the shaded region **R**

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

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

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

**(3)**

**(Total for Question 8 is 5 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**9** The diagram shows a rectangular sheet of metal *ABCD*

*A picture containing text, line, diagram, font

Description automatically generated*

*BD* = 50 cm and angle *BDC* = 32°

Nasser joins side *AD* to side *BC* to form a cylinder.

*BC* is the height of the cylinder.

*DC* is the circumference of the cross section of the cylinder.

Work out the volume, in cm3, of the cylinder.

Give your answer correct to 3 significant figures.

...................................................... cm3

**(Total for Question 9 is 6 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**10** Gemara works as a taxi driver.

Last week, he recorded the following information about the distances he drove.

For the 5 days from Monday to Friday, the mean number of kilometres he drove

was 104

For the 7 days from Monday to Sunday, the mean number of kilometres he drove

was 127

On Saturday, Gemara drove 132 kilometres.

Work out the number of kilometres he drove on Sunday.

...................................................... kilometres

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

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**11** Express  in the form  where *a*, *b* and *c* are integers to be found.

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

**(Total for Question 11 is 2 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**12** Here are six graphs.

A picture containing diagram, line, plot, technical drawing

Description automatically generated

Write down the letter of the graph of

(*a*) *y* = 

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

**(1)**

(*b*) *y* = *x* – 3 + 3*x*2 – *x*3

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

**(1)**

(*c*) *y* = –

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

**(1)**

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

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**13** Feruzi invests 80 000 Kenyan shillings (KES)

He invests the money for 3 years at *x*% compound interest each year.

At the end of 3 years, the total interest he receives is 6151.25 KES

Work out the value of *x*

*x* = ......................................................

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

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**14** Akari played a computer game eleven times.

Here are her scores.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 25 | 20 | 28 | 27 | 26 | 22 | 23 | 29 | 20 | 29 | 26 |

(*a*)Find the interquartile range of her scores.

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

**(3)**

Machi played the same computer game eleven times.

The interquartile range for Machi’s scores was 9

(*b*)Who had the more consistent scores, Akari or Machi?

Give a reason for your answer.

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

......................................................................................................................................................**(1)**

**(Total for Question 14 is 4 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**15** Osvaldo has a biased coin.

He spins the coin three times.

The probability that the coin lands on a head three times is 

Work out the probability that the coin will land on a tail three times.

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

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

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**16** Show that  can be written in the form *a* + where *a* is an integer.

Show your working clearly.

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

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**17** Make *x* the subject of *y* = 

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

**(Total for Question 17 is 4 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**18**

*A picture containing line, diagram, circle, text

Description automatically generated*

*A*, *B*, *C* and *D* are points on a circle.

*ABP* and *DCP* are straight lines.

*AB* = 16 cm *BP* = 14 cm *CP* = 12 cm

Work out the length of *DC*

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

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

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**19** 30 adults booked to stay in a hotel.

19 adults booked breakfast

15 adults booked dinner

4 adults did not book breakfast or dinner

Some adults booked breakfast **and** dinner.

Meihui chooses at random two of the 30 adults.

Work out the probability that these two adults each booked breakfast **and** dinner.

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

**(Total for Question 19 is 4 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**20** *A*, *B* and *C* are points on a circle.

*A picture containing line, diagram, circle

Description automatically generated*

*MN* is the tangent to the circle at *C*

*AB* = *CB*

Angle *BCN* = 78°

Find the size of angle *ABC*

......................................................°

**(Total for Question 20 is 2 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**21** Work out the coordinates of the points of intersection of

*y* – 2*x* = 1 and *y*2 + *xy* = 7

Show clear algebraic working.

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

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

**(Total for Question 21 is 5 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**22** Here is a cuboid *ABCDEFGH*

*A picture containing diagram, text, line, plot

Description automatically generated*

*AB* = 15 cm *BC* = 4 cm *CF* = 9 cm

(*a*)Work out the length of *BE*

Give your answer correct to 3 significant figures.

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

**(2)**

Here is a cuboid *PQRSTUVW*

*A drawing of a cube

Description automatically generated with low confidence*

*PR* = 42 cm

The size of the angle between *PU* and the plane *PQRS* is 30°

*M* is the midpoint of *PR*

(*b*)Work out the size of angle *UMR*

Give your answer correct to 3 significant figures.

......................................................°

**(3)**

**(Total for Question 22 is 5 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**23** Here are the first three terms of an arithmetic sequence.

8*p* 7*p* – 3 4*p* + 2

The sum of the first *n* terms of the sequence is –1914

Work out the value of *n*

Show your working clearly.

*n* = ......................................................

**(Total for Question 23 is 5 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**24** The surface area of sphere **A** is nine times the surface area of sphere **B**

The difference between the volume of sphere **A** and the volume of sphere **B** is 117*π* cm3

Find the radius of the smaller sphere.

Show your working clearly.

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

**(Total for Question 24 is 5 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**25** The straight line with equation *y* – 2*x* = 7 is the perpendicular bisector of the line *AB*

where *A* is the point with coordinates ( *j*, 7) and *B* is the point with coordinates (6, *k*)

Find the coordinates of the midpoint of the line *AB*

Show clear algebraic working.

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

**(Total for Question 25 is 6 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**26** Here is a sketch of the curve with equation *y* = *a* cos *bx*° + *c* where –90 ≤ *x* ≤ 450

A graph with lines and numbers

Description automatically generated with low confidence

Find the value of *a*, the value of *b* and the value of *c*

*a* = ......................................................

*b* = ......................................................

*c* = ......................................................

**(Total for Question 26 is 3 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**TOTAL FOR PAPER IS 100 MARKS**