Mathematics
2018 Practice Paper
Paper 3 (Calculator)
Foundation Tier

Time: 1 hour 30 minutes

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.
• **Calculators may be used**.
• Diagrams are **NOT** accurately drawn, unless otherwise indicated.
• You must **show all your working.**

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.

1 Write these numbers in order of size.
Start with the smallest number.

$$-5 \quad 2 \quad -1 \quad 3 \quad 0$$

...........−5, −1, 0, 2, 3...........

(Total for question 1 is 1 mark)

2 Work out $\frac{1}{4}$ of 128cm.

...........32...........cm

(Total for question 2 is 1 mark)

3 Work out 10% of £72

£...........7.20...........

(Total for question 3 is 1 mark)

4 In a box there are 5 red pens, 3 blue pens and 1 green pen.

George takes at random a pen from the box.

Write down the probability George takes a blue pen.

...........$\frac{3}{9}$ OR $\frac{1}{3}$...........

(Total for question 4 is 1 mark)

5 A film starts at 18:25.
The film runs for 110 minutes.
Find the time when the film ends.

...........20:15...........

(Total for question 5 is 2 marks)

6 The diagram below represents two towns on a map.

x
Bigford

                                                    x   **Diagram accurately drawn**
Dabtown

Scale: 1cm represents 5 kilometres
Work out the distance, in kilometres, between Bigford and Dabtown.

$$7 \times 5$$

..............3.5..............km

(Total for question 6 is 2 marks)

7 A model car has the length of 8cm.

The scale of the model is 1:50

Work out the length of the real car.
Give your answer in metres.

$$8 \times 50 = 400 \text{ cm}$$

..............4..............m

(Total for question 7 is 2 marks)

8 There are 20 chocolates in a tin and 10 chocolates in a box.
Abe buys t tins and b boxes.
Write an expression for the total number of chocolates Abe buys.

$$20t + 10b$$

....

(Total for question 8 is 2 marks)

9 Logan buys 3 packs of cola cans to sell.
Each pack contains 6 cans and costs £2.49

Logan sells $\frac{2}{3}$ of the cans for 50p each.

He then sells the remaining cans at 3 cans for £1.

Does Logan make a profit or a loss?

$3 \times 2.49 = £7.47$ for 18 cans

$\frac{2}{3}$ of $18 = 12$

12 cans $\times$ 50p $= £6$

6 cans left   3 for £1
                6 for £2

$£6 + £2 = \underline{\underline{£8}}$

He makes a profit.

(Total for question 9 is 4 marks)

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10 Toilet rolls are sold in three different sized packs.

4 toilet rolls cost £1.75
9 toilet rolls cost £3.50
16 toilet rolls cost £7.50

Which pack of toilet rolls is the best value for money?
You must show your working.

4 PACK
$1.75 \div 4 = 0.4375$
44p per roll

9 PACK
$3.50 \div 9$
$= 0.38$
39p per roll

16 PACK
$7.50 \div 16$
$= 0.46875$
47p per roll

The 9 pack is best value for money.

(Total for question 10 is 3 marks)

11 A shape is made from cutting a triangle out of a rectangle.

12 cm

3 cm

9 cm

6

8 cm

4
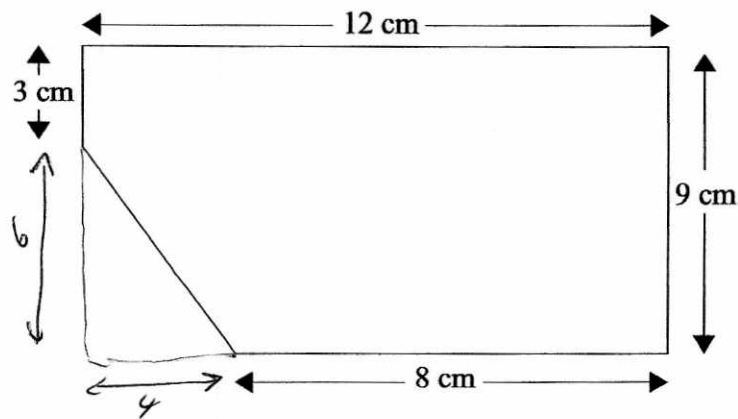
Work out the area of the shape.

whole rectangle area = 12 × 9 = 108 cm²

triangle area = $\frac{6 \times 4}{2}$ = 12 cm²

108 − 12 = 96 cm²   96 .....cm²

(Total for question 11 is 3 marks)

12 Ava wants to buy as many chocolate bars as she can.

She has £5 to spend on chocolate bars.

Each chocolate bar costs £0.35

Work out how much change Ava will get from £5.
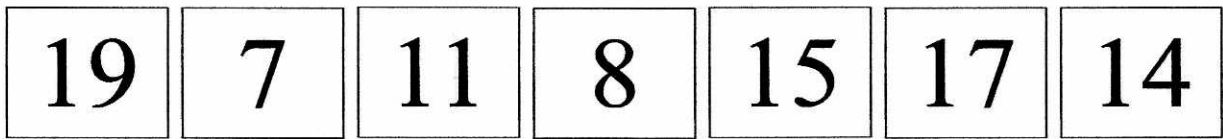
$\frac{5}{0.35}$ = 14.285...

14 chocolate bars

14 × 0.35 = £4.90

£5 − £4.90 = £0.10

£ 0.10

(Total for question 12 is 3 marks)

13 Here are seven cards. Each card has a number on it.

| 19 | 7 | 11 | 8 | 15 | 17 | 14 |

(a) Work out the range of the numbers on the cards.

$$19 - 7$$

12

(1)

(b) Work out the mean of the numbers on the cards.
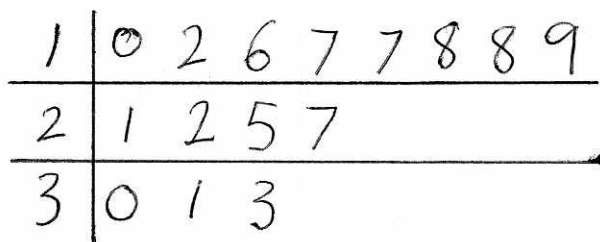
$$\frac{19 + 7 + 11 + 8 + 15 + 17 + 14}{7}$$

13

(2)

(Total for question 13 is 3 marks)

14 Here are the heights in cm of 15 tomato plants.

10   16   25   18   31

21   30   18   17   33

22   27   12   17   19

Show this information in a stem and leaf diagram.

```
1 | 0 2 6 7 7 8 8 9
2 | 1 2 5 7
3 | 0 1 3
```
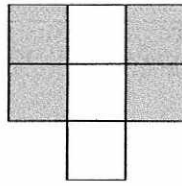
KEY
1|0 = 10 cm
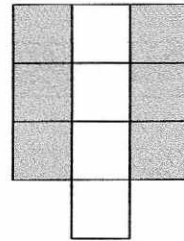
(Total for question 14 is 3 marks)

15 Here is a sequence of patterns made from white tiles and grey tiles.
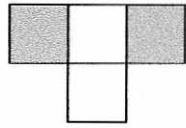
pattern number 1   pattern number 2   pattern number 3

(a) In the space below, draw pattern number 4.

(1)

(b) Work out the total number of tiles to make pattern number 7.

4   7   10   13   16   19   22

22

(2)

Kyle says
"There are 4 white tiles in pattern number 3 so there will be 8 white tiles in pattern number 6."

(c) Is Kyle right?
You must give a reason for your answer.

No   The number of white tiles goes up by 1 each time There will be 7

(1)

(Total for question 15 is 4 marks)

16 Here is a number machine.

Input $\longrightarrow$ [×3] $\longrightarrow$ [−6] $\longrightarrow$ Output

(a) What is the **output** when the **input** is 4?

$$4 \times 3 \quad - \quad 6$$

.... 6 ....
(1)

(b) What is the **input** when the **output** is 15?

$$\frac{15 + 6}{3}$$

.... 7 ....
(1)

(b) Show that there is a value of the input for which the input and the output have the same value.

$$4 \times 3 \quad - \quad 6 \quad = \quad 6$$
$$5 \times 3 \quad - \quad 6 \quad = \quad 9$$

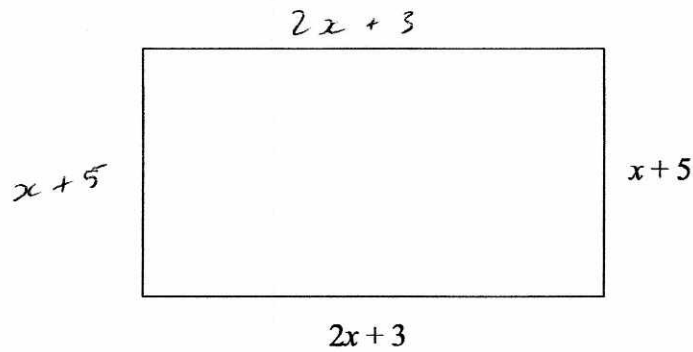$$3 \times 3 \quad - \quad 6 \quad = \quad 3$$

$$3 \longrightarrow \times 3 \longrightarrow -6 \longrightarrow 3$$

(2)

(Total for question 16 is 4 marks)

17 A rectangle has a length of $(2x + 3)$ cm and a width of $(x + 5)$ cm.

$$2x + 3$$

$x + 5$ [rectangle] $x + 5$

$$2x + 3$$

Given the rectangle has a perimeter of 43cm find the value of x.

$$x + 5 + x + 5 + 2x + 3 + 2x + 3 = 43$$
$$6x + 16 = 43$$
$$6x = 27$$
$$x = 4.5$$

4.5

(Total for question 17 is 3 marks)

1 Use your calculator to work out the value of $\dfrac{21.75 + \sqrt{98.1}}{0.192}$

write down all of the numbers on your calculator display

164.8674188

(Total for question 1 is 2 marks)

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2 Frank is travelling from the USA to Germany.

Frank wants to book flights which cost \$710 and a hotel which costs €45 per night for 12 nights.

The exchange rates are as follows:

£1 = €1.14
\$1 = €0.85

Frank can spend no more than £1000
Work out if Frank is able to book the flights and the hotel.

Flights:

$$710 \times 0.85 = €603.50$$

$$603.5 \div 1.14 = £529.39$$

Hotel:

$$45 \times 12 = €540$$

$$540 \div 1.14 = £473.68$$

$$529.39 + 473.68 = £1003.07$$

frank cannot afford the flights and hotel.

(Total for question 2 is 4 marks)

3 There are 30 sweets in a bag.
All of the sweets are either blue or red.
The ratio of blue sweets to red sweets is 2:1.

4 blue sweets are removed from the bag.

Find the ratio of the number of blue sweets now in the pack to the number red sweets now in the pack.
Give your answer in its simplest form.

$$\frac{30}{3} = 10$$

BLUE : RED

20 : 10

4 BLUE REMOVED:

16 : 10

8 : 5

8 : 5

(Total for question 3 is 3 marks)

4 (a) Write 0.000045 in standard form.

4.5×10^{-5}

(1)

(b) Work out the value of $(2.31 \times 10^{-2}) \div (6.37 \times 10^{-6})$
Give your answer in standard form correct to 3 significant figures.

3 6 2 6 . 3 7 ...

3 6 3 0   (3sf)

3.63 × 10³

3.63×10^{3}

(2)

(Total for question 4 is 3 marks)

5 Solve the simultaneous equations

$$5x + 3y = 8 \quad \times 4$$
$$4x - 2y = 13 \quad \times 5$$

$$20x + 12y = 32$$
$$20x - 10y = 65$$
$$22y = -33$$
$$y = -1.5$$

$$4x - 2(-1.5) = 13$$
$$4x + 3 = 13$$
$$4x = 10$$
$$x = 2.5$$

$x = \underline{\quad 2.5 \quad}$

$y = \underline{\quad -1.5 \quad}$

(Total for question 5 is 3 marks)

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6 Change 90 km/h into m/s.

$$90 \ km / h$$

$\times 1000 \qquad 90\,000 \ m / h$

$\div 60 \qquad 1500 \ m / min$

$\div 60 \qquad 25 \ m/s$

$\underline{\quad 25 \quad}$ m/s

(Total for question 6 is 3 marks)

7 The scatter graph shows the scores of 15 students on their Biology and Physics tests.

Physics Score (y-axis) vs Biology Score (x-axis)
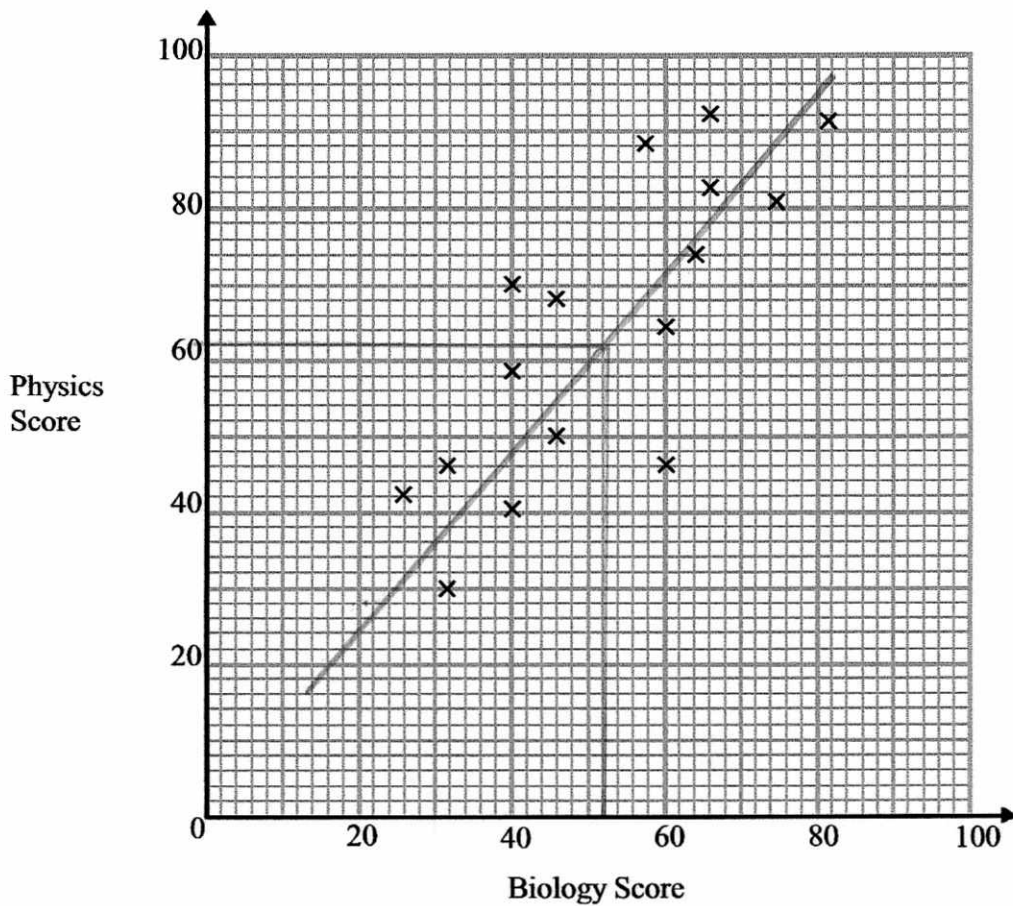
(a) What type of correlation does the scatter graph show?

positive

(1)

(b) Another students scored 52 marks on their Biology test.
Estimate the Physics score for this student.

62

(2)

60 - 65

(Total for question 7 is 3 marks)

25 David bought a new car.
Each year the car depreciates in value by 12%.

Work out the number of years it takes for the car to half in value.

$$100 \times 0.88 = 88$$
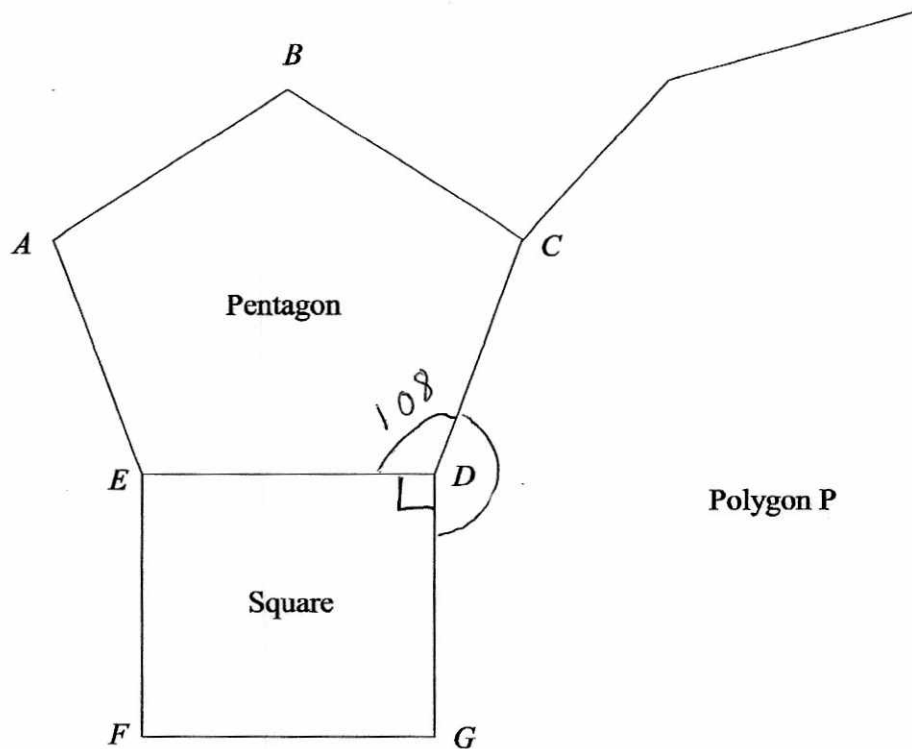
$$100 \times 0.88^2 = 77.44$$

$$100 \times 0.88^4 = 59.9...$$

$$100 \times 0.88^5 = 52.7...$$

$$100 \times 0.88^6 = 46.4...$$

After 6 years it is worth 46% of its original value.

..............6..............years

(Total for question 25 is 3 marks)

26

The diagram shows a regular pentagon, ABCDE, and a square, EDFG.

The lines CD and DG are both sides of another regular polgon, P.

How many sides does polygon P have?

You must show how you got your answer.

$$\text{interior angle of square} = 90°$$

$$\text{exterior angle of pentagon} = \frac{360}{5} = 72$$

$$\text{interior angle of pentagon} = 180 - 72 = 108°$$

$$\text{interior angle of } P = 360 - 90 - 108 = 162°$$

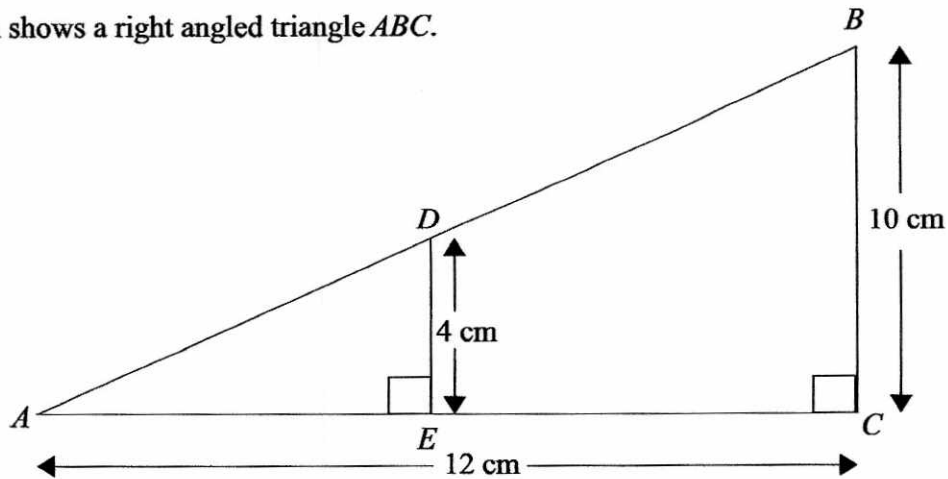$$\text{exterior angle of } P = 180 - 162 = 18°$$

$$\frac{360}{18} = 20 \text{ sides}$$

20

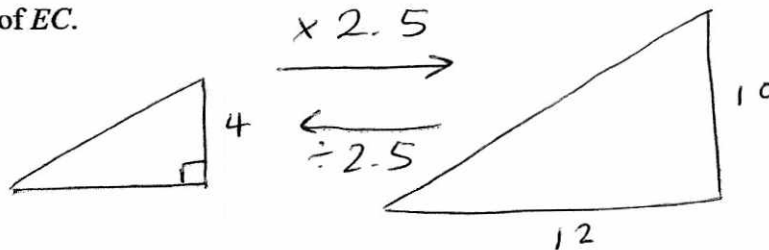**(Total for question 26 is 4 marks)**

27 The diagram shows a right angled triangle *ABC*.

Work out the length of *EC*.

$\times 2.5$

$\div 2.5$

$12 \div 2.5 = 4.8 \quad (AE = 4.8 \, cm)$

$EC = 12 - 4.8$
$= 7.2 \, cm$

7.2 ....cm

(Total for question 27 is 3 marks)

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28 Solve $x^2 - 4x - 12 = 0$

$(x - 6)(x + 2) = 0$

$x = 6 \qquad x = -2$

$x = 6 \qquad x = -2$

(Total for question 28 is 3 marks)

29

(o) 17 cm

24 cm
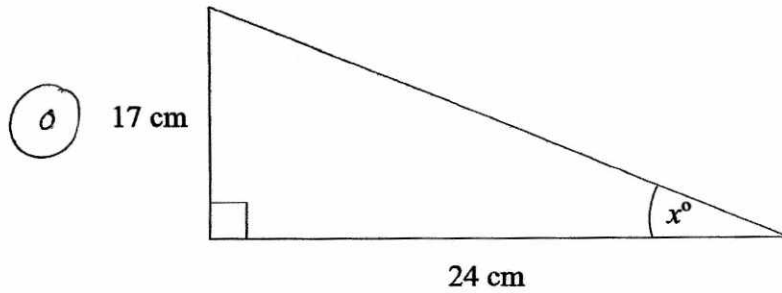
Work out the value of x.

Give your answer to 1 decimal place. (A)

$$\tan x = \frac{17}{24}$$

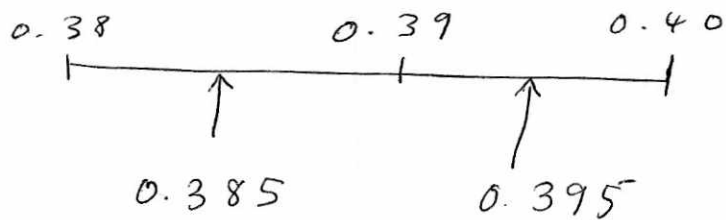$$x = \tan^{-1}\left(\frac{17}{24}\right)$$

35.3

(Total for question 29 is 2 marks)

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30 A number x is rounded to 2 decimal places.

The result is 0.39

Write down the error interval for x.

0.38   0.39   0.40

0.385   0.395

$$0.385 \leq x < 0.395$$

(Total for question 30 is 2 marks)