Year 11 Maths Homework 5 Key Skills Due Date: _____ Name: _____ Score: /20

Answer all questions, make sure you <u>show all working</u> otherwise you will not be awarded marks. If you write on any other paper, please hand this in with the sheet.

Number

1. Find the HCF of 90 and 50

2.Linda, Mike and Tim share €120 in the ratio 6:5:4. How much does each person receive?

3. Estimate the answer to $\frac{690 - 210.4}{0.51}$

4. Work out the amount of each ingredient needed to make a cocktail for 24 people.

Ingredients for 6 people

180 ml orange juice
180 ml cranberry juice
90 ml carrot juice
130 g kiwi puree

5. Convert 1.99×10^{-3} into an ordinary number

Data

6.A group of pupils take a test. The group consists of 30 boys and 21 girls. The mean mark for the boys is 11. The mean mark for the girls is 20. Calculate the mean mark for the whole group. Give your answer correct to 1 decimal place.

7.The mean height of 25 pupils is 137 cm. Another pupil joins the group and the mean height becomes 139 cm. Determine the height of the new pupil.

8. Find the mode

Length	Frequency
2	2
3	17
4	5
5	23
6	16
7	39

9. Find the relative frequency that someone studies Chinese.

Subject	Portuguese	French	Chinese	Italian
Frequency	100	100	50	250

10.Libby has 4 purple socks, 4 green socks and 2 black socks in a box.Libby takes one sock at random from the box, keeps it, and takes another sock from the box. Draw a tree diagram to represent this data.

Algebra

11. Expand and simplify $4(x-3)+3(3x-2)$

12. Expand and simplify $(x-1)^2$

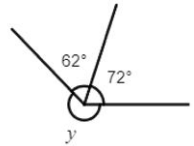
13. Cups are sold in packs and boxes. There are 24 cups in each pack. There are 42 cups in each box. Olly buys p packs of cups and b boxes of cups. Write down an expression, in terms of p and b, for the total amount of cups that Olly buys.

14. Solve $8x + 7 \geq 5x - 4$

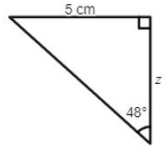
15. Find the nth term rule: $6, 13, 20, 27, \ldots$

Geometry

16. Find y, give reasons.

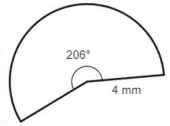


17. Find z

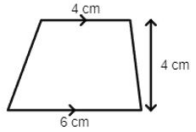


18. Find the area (1dp)

19. Find the are (1dp)



20. Find the area



Mark scheme

Question 1

10

① Write both numbers as product of prime factors.

$$90 = 2 \times 3^2 \times 5$$
$$50 = 2 \times 5^2$$

② Find the prime factors in common.

$$2 \times 5$$

③ Conclude.

The Highest Common Factor is 10

Question 2

Linda: £48
Mike: £40
Tim: £32

There are $6 + 5 + 4 = 15$ parts in the ratio.

Therefore one part in the ratio corresponds to $120 \div 15 = 8$ of the amount to share.

The final ratio becomes $6 \times 8 : 5 \times 8 : 4 \times 8$ which is equal to $48 : 40 : 32$

Question 3

1000

690 rounds to 700 to 1 significant figure.
210.4 rounds to 200 to 1 significant figure.

$$\frac{690 - 210.4}{0.51} \approx \frac{700 - 200}{0.5}$$
$$\approx \frac{500}{0.5}$$
$$\approx 1000$$

Question 4

720ml orange juice
720ml cranberry juice
360ml carrot juice
520g kiwi puree

① Find the multiplication factor.

$$24 \div 6 = 4$$

② Multiply each quantity.

$180 \times 4 = 720$ ml orange juice
$180 \times 4 = 720$ ml cranberry juice
$90 \times 4 = 360$ ml carrot juice
$130 \times 4 = 520$ g kiwi puree

Question 5

0.00199

The decimal point needs to be moved 3 times to the left.

Therefore the answer is 0.00199

Question 6

14.7

The total for the first group is $30 \times 11 = 330$
The total for the second group is $21 \times 20 = 420$

The new group has therefore a mean of:

$$\frac{330 + 420}{30 + 21} = \frac{750}{51}$$
$$= 14.7$$

Question 7

189cm

① Find the original total.

$$25 \times 137 = 3425$$

② Find the mean with the additional value.

$$26 \times 139 = 3614$$

③ Find the required answer.

$$3614 - 3425 = 189$$

Question 8

7cm

The mode is the length that occurs the most, which is 7 cm.

Question 9

$\frac{1}{10}$

$\text{expected frequency} = \frac{\text{frequency}}{\text{number of trials}}$

$\frac{50}{500} = \frac{1}{10}$

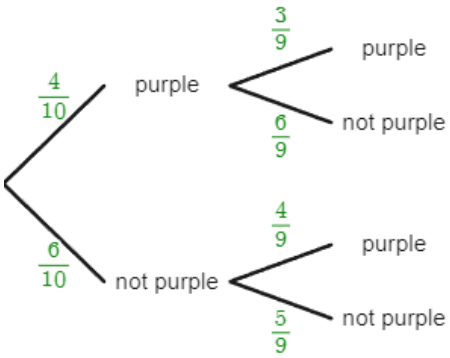
Question 10

$a = \frac{4}{10}, b = \frac{6}{10}, c = \frac{3}{9}, d = \frac{6}{9}, e = \frac{4}{9}, f = \frac{5}{9}$

There are 4 purple socks out of 10 socks therefore $a = \frac{4}{10}$

There are $4 + 2 = 6$ socks that are not purple out of 10 socks therefore $b = \frac{6}{10}$

As Libby keeps the purple sock, the total number of sock decreases by one the second time she picks a sock.



Question 11

$13x - 18$

① Expand each bracket.

$$4(x - 3) + 3(3x - 2)$$
$$= 4x - 12 + 9x - 6$$

② Collect like terms.

$= 13x - 18$

Question 12

$x^2 - 2x + 1$

$\equiv (x - 1)^2$
$\equiv (x - 1)(x - 1)$
$\equiv x^2 - x - x + 1$
$\equiv x^2 - 2x + 1$

Question 13

$24p + 42b$

① Write an expression for the total amount of cups bought in packs.

$$\begin{aligned}\text{Amount in packs} &= 24 \times p \\ &= 24p\end{aligned}$$

② Write an expression for the total amount of cups bought in boxes.

$$\begin{aligned}\text{Amount in boxes} &= 42 \times b \\ &= 42b\end{aligned}$$

③ Add together the two expressions to get an expression for the total amount.

$$\text{Total} = 24p + 42b$$

Question 14

$x \geq -\frac{11}{3}$

$$\begin{aligned} 8x + 7 &\geq 5x - 4 \\ -5x \downarrow &\quad \downarrow -5x \\ 3x + 7 &\geq -4 \\ -7 \downarrow &\quad \downarrow -7 \\ 3x &\geq -11 \\ \div 3 \downarrow &\quad \downarrow \div 3 \\ x &\geq -\frac{11}{3} \end{aligned}$$

Question 15

$7n - 1$

The sequence is going up by 7 each time, so the formula starts $7n$. This would give first term $7 \times 1 = 7$ but the first term of this sequence is actually 6 so we need to subtract 1 to give the formula for the nth term as:

$7n - 1$

Question 16

$y = 226^\circ$

① Add the two angles.

$$72 + 62 = 134$$

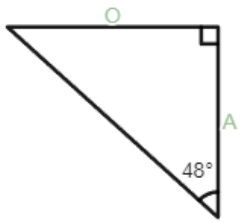
② Angles about a point sum to 360°.

$$\begin{aligned} y &= 360 - 134 \\ &= 226^\circ \end{aligned}$$

Question 17

$z = 4.5\text{cm}$

âž€ Label the sides.



âž Decide the trigonometric ratio to use.

SOH CAH T**OA**
Therefore we use tan

âž, Write an equation and solve.

$$\begin{aligned} \tan(\theta) &= \frac{O}{A} \\ \tan(48) &= \frac{5}{z} \\ z &= \frac{5}{\tan(48)} \\ &= 4.5 \text{ cm} \end{aligned}$$

Question 18

95mm^2

The area of a circle is πr^2 where r is the radius.
The radius is $11 \div 2 = 5.5$

Area $= \pi \times 5.5^2 = 95$ mm ^{2}

Question 19

28.8mm ^{2}

The area of a circle is πr^2 where r is the radius.

Area of the full circle $= \pi \times 4^2$

This shape is $\frac{206}{360}$ of the full circle, so its area is $\frac{206}{360} \times \pi \times 4^2 = 28.8$ mm ^{2}

Question 20

20cm ^{2}

The area of a trapezium is $\frac{a+b}{2} \times$ height.

$\frac{6+4}{2} \times 4 = 20$ cm ^{2}
