Year 11 Maths Homework 3 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. Work out $2\frac{1}{3} \div 1\frac{1}{2}$

Give your answer as a mixed number in its simplest form.

2. Emma is putting money into a new savings account. Each month they deposit €170. After 17 months they spend 9% of the money in the account. Work out how much Emma spent.

3. Write 22:18 in the form 1:n

4.The price of a wardrobe is decreased by 60% and now costs $162.80. Find the original price.

5. Convert 1.1×10^3 o an ordinary number,

Data

6. Find the mean of 6, 6, 9, 4, 6, 3

7. Find the mode of 1, 3, 1, 7, 7, 8, 7, 9, 6, 0, 8, 1, 2, 4

8. Find the upper quartile of:
2, 4, 4, 6, 7, 7, 8, 8, 9, 10, 11, 14, 16, 16, 16, 17, 18, 18, 20

9. The probability that Mike wins a game is 7/15, find the probability that Mike does not win.

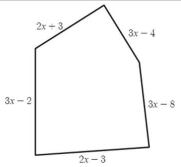
10. 90 pupils were asked what their favourite juice was. Complete the two way table.

	Apple	Orange	Grape	Total
Boy	17		23	44
Girl	20	11		46
Total		15	38	

Algebra

11. Simplify $6x^2y + 6xy - 3x - xy$

12. Find an expression for the perimeter.



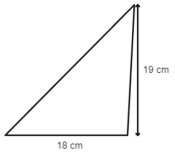
13. Simplify $\frac{14x^7y^8}{7x^4y^3}$

14. Solve $7x + 9 \geq -5$

15. Factorise completely $13y^4z - 13x^2y^3z^5$

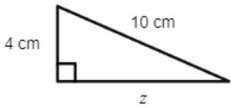
Geometry

16. Find the area

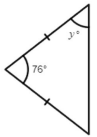


17. Find the exact circumference of the circle. Give your answer in terms of pi.

18. Find the value of z.



19. Find the value of y, Give reasons.



20. Find the sum of the interior angles of a polygon with 19 sides.

Mark scheme

Question 1

$1\frac{5}{9}$

One way to calculate $2\frac{1}{3} \div 1\frac{1}{2}$ is to convert both mixed numbers to improper fractions.

$$
\begin{aligned}
& 2\frac{1}{3} \div 1\frac{1}{2} \\
= & \frac{2 \times 3 + 1}{3} \div \frac{1 \times 2 + 1}{2} \\
= & \frac{7}{3} \div \frac{3}{2} \\
= & \frac{7}{3} \times \frac{2}{3} \\
= & \frac{7 \times 2}{3 \times 3} \\
= & \frac{14}{9} \\
= & 1\frac{5}{9}
\end{aligned}
$$

Question 2

£260.10

① Calculate the value after 17 deposits.

$$170 \times 17 = 2890$$

② Find 9%.

$$2890 \times 0.09 = £260.10$$

Question 3

$1 : \frac{9}{11}$

You need to divide both part by 22.

$$
\begin{aligned}
22 : 18 &= \frac{22}{22} : \frac{18}{22} \\
&= 1 : \frac{9}{11}
\end{aligned}
$$

Question 4

$407

The percentage multiplier is $\frac{100 - 60}{100} = 0.4$

If x is the original quantity, then $x \times 0.4 = 162.8$ which rearranges to $x = \frac{162.8}{0.4}$

Therefore $x = 407$

Question 5

1100

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

Therefore the answer is 1100

Question 6

5.7pens

① Add all the values.

$$6 + 6 + 9 + 4 + 6 + 3 = 34$$

② Divide by the number of values.

$$34 \div 6 = 5.6667 \ldots$$
$$= 5.7 \text{ (to 1 dp)}$$

Question 7

7times

① Sort the list into ascending order.

01467778891213

② To find the mode, identify the number that appears the most often.

01467778891213

Question 8

Upper quartile =16seconds

① Find the upper quartile.

$$\frac{19+1}{4} \times 3 = 15^{\text{th}}$$
$$\therefore UQ = 16$$

Question 9

$\frac{8}{15}$

① Probabilities of exhaustive events add up to 1.

$$1 - \frac{21}{45} = \frac{8}{15}$$

Question 10

	Apple	Orange	Grape	Total
Boy	17	4	23	44
Girl	20	11	15	46
Total	37	15	38	90

Question 11

$5xy - 3x + 6x^2y$

① Collect like terms.

$$\equiv 6x^2y + 6xy - 3x - xy$$
$$\equiv 6xy - xy - 3x + 6x^2y$$
$$\equiv 5xy - 3x + 6x^2y$$

Question 12

$13x - 14$

The perimeter is the sum of all the sides.

$$(2x - 3) + (3x - 8) + (3x - 4) + (2x + 3) + (3x - 2)$$
$$= 13x - 14$$

Question 13

$2x^3y^5$

① Divide the coefficients then the variables.

$$\frac{14x^7y^8}{7x^4y^3} = xy$$

Question 14

$x \geq -2$

$$\begin{array}{rcl} 7x + 9 & \geq & -5 \\ {\scriptstyle -9\downarrow} & & {\scriptstyle \downarrow -9} \\ 7x & \geq & -14 \\ {\scriptstyle \div 7\downarrow} & & {\scriptstyle \downarrow \div 7} \\ x & \geq & -2 \end{array}$$

Question 15

$13y^3z(y - x^2z^4)$

You need to find the highest number that is a common factor of 13 and -13. This number is 13.
For the variables, take the lowest power of each variable in common, so y^3z

We can write $13y^3z(\quad)$ and consider what we need to multiply $13y^3z$ by to get each of the terms.

$13y^4z - 13x^2y^3z^5 = 13y^3z(y - x^2z^4)$

Question 16

Area $=171\text{cm}^2$

① Find the area of the triangle.

$$\begin{aligned} &\tfrac{1}{2} \times \text{base} \times \text{height} \\ &= \tfrac{1}{2} \times 18 \times 19 \\ &= 171 \text{ cm}^2 \end{aligned}$$

Question 17

22π

① Substitute into $C = 2\pi r$.

$$\begin{aligned} C &= 2\pi r \\ &= 2\pi \times 11 \\ &= 22\pi \end{aligned}$$

Question 18

9.2cm

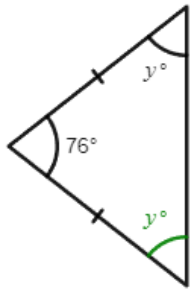
① Use Pythagoras' theorem.

$$\begin{aligned} a^2+b^2 &= c^2 \\ z^2+4^2 &= 10^2 \\ z^2 &= 10^2-4^2 \\ z^2 &= 84 \\ z &= \sqrt{84} \\ z &= 9.2 \text{ cm} \end{aligned}$$

Question 19

$y = 52^\circ$

âž€ The base angles of an isosceles triangle are equal.



âž The angles in a triangle sum to 180°.

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âž, Find y.

$$\begin{aligned} y &= 104 \div 2 \\ &= 52^\circ \end{aligned}$$

Question 20

3060°

① Use $(n-2) \times 180$ to find the angles sum.

$$\begin{aligned} (19-2) \times 180 &= 17 \times 180 \\ &= 3060^\circ \end{aligned}$$