

Surname <i>StemUp Model Solution</i>	Centre Number	Candidate Number
First name(s)		0



GCSE

3300U10-1



A21-3300U10-1

MONDAY, 8 NOVEMBER 2021 – MORNING

MATHEMATICS
UNIT 1: NON-CALCULATOR
FOUNDATION TIER

1 hour 25 minutes

ADDITIONAL MATERIALS

The use of a calculator is not permitted in this examination.
A ruler, a protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

You may use a pencil for graphs and diagrams only.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

If you run out of space, use the additional page at the back of the booklet. Question numbers must be given for all work written on the additional page.

Take π as 3.14.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

In question 9, the assessment will take into account the quality of your linguistic and mathematical organisation, communication and accuracy in writing.

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	6	
2.	2	
3.	3	
4.	2	
5.	4	
6.	2	
7.	2	
8.	3	
9.	6	
10.	5	
11.	3	
12.	3	
13.	2	
14.	3	
15.	5	
16.	3	
17.	3	
18.	3	
Total	60	

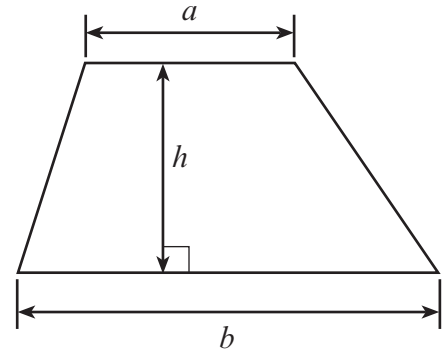
3300U101
01



NOV213300U10101

Formula List – Foundation Tier

Area of trapezium $= \frac{1}{2} (a + b)h$



1. (a) Write 95048 in words. [1]

Ninety-five thousand and forty-eight

- (b) Find the sum of 872 and 59. [1]

$$872 + 59 = 872 + 60 - 1$$

$$= 932 - 1 = 931$$

- (c) Multiply 250 by 5. [1]

$$250 \times 5 = 1250$$

$$(2 \times 250 = 500, 4 \times 250 = 1000, + 250 = 1250)$$

- (d) Work out $\frac{1}{3}$ of 624. [1]

$$\frac{1}{3} \text{ of } 624 = 624 \div 3 = 208$$

- (e) Write down all the factors of 18. [2]

$$1 \times 18, \quad 2 \times 9, \quad 3 \times 6$$

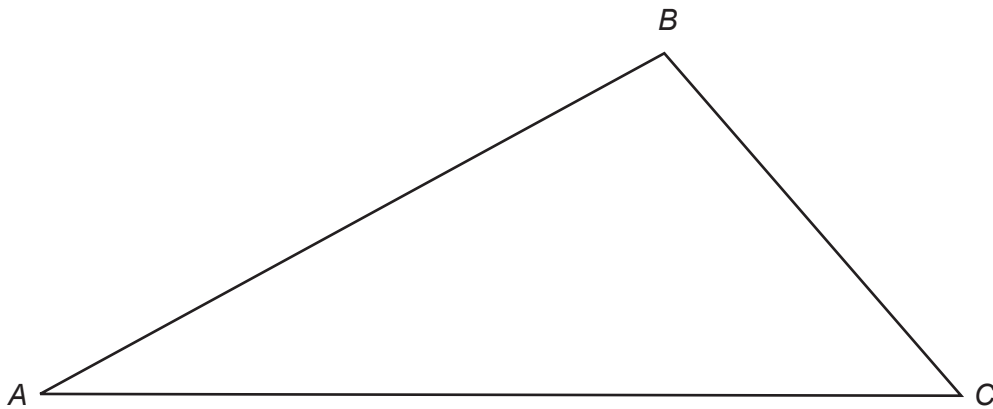
4, 5 do not go into 18

The factors of 18 are *1, 2, 3, 6, 9, 18*



2. (a) Measure the length of the side AB of this triangle.
Write your answer in millimetres.

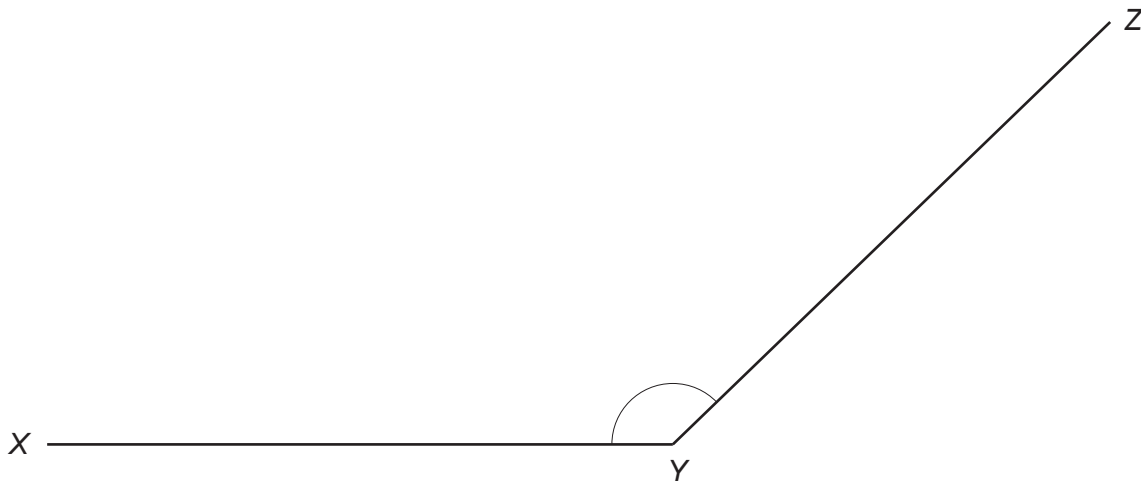
[1]



$AB = \dots\dots\dots 94 \dots\dots\dots$ mm

- (b) Measure and write down the size of $\hat{XYZ}$.

[1]



$\hat{XYZ} = \dots\dots\dots 136 \dots\dots\dots$ °



3. (a) Which one of these numbers is both a square number **and** an even number?
Circle the correct answer.

[1]

2 9 12 16 17

$16 = 4 \times 4 = 4^2$, and 16 is even

- (b) Write 75% as a fraction in its lowest terms.

[1]

$$75\% = \frac{75}{100} = \frac{3}{4}$$

- (c) Write down the mode of these numbers.

[1]

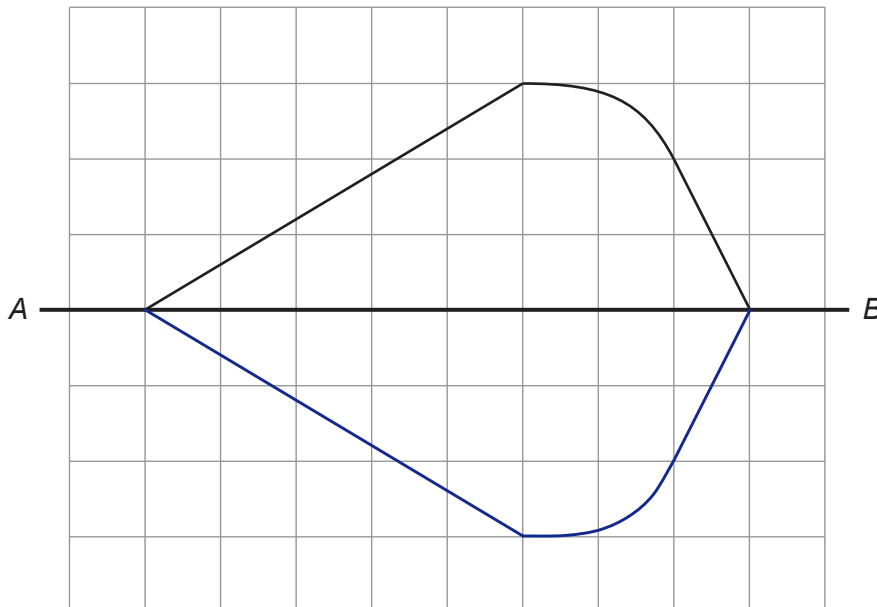
28 31 28 29 31 28 34 24 32

24, 28, 28, 28, 29, 31, 31, 32, 34: 28 appears 3 times

Mode is 28

4. Draw a reflection of this shape in the line AB.

[2]



5. (a) The mass of 1 litre of water is 1 kg.
What is the mass of 4.3 litres of water?
Write your answer in grams.

[2]

$$1 \text{ litre} = 1 \text{ kg, so } 4.3 \text{ litres} = 4.3 \text{ kg}$$

$$4.3 \times 1000 = 4300 \text{ g}$$

Mass = 4300 g

- (b) A rope is 3 m long.
It is cut into 6 equal pieces.

What is the length of each piece of rope?
Write your answer in centimetres.

[2]

$$3 \text{ m} = 3 \times 100 = 300 \text{ cm}$$

$$300 \div 6 = 50 \text{ cm}$$

Length = 50 cm

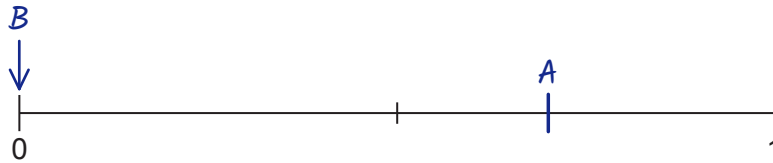


6. Meic has a bag of 20 coloured balls.
14 of the balls are yellow, 4 are blue and the rest are red.
Meic chooses a ball at random from his bag.

On the probability scale below, mark the points **A** and **B** where:

- **A** is the probability of Meic choosing a yellow ball,
- **B** is the probability of Meic choosing a green ball.

[2]



$$P(\text{yellow}) = \frac{14}{20} = \frac{7}{10} = 0.7$$

There are no green balls (only yellow, blue, red),

$$\text{so } P(\text{green}) = 0$$

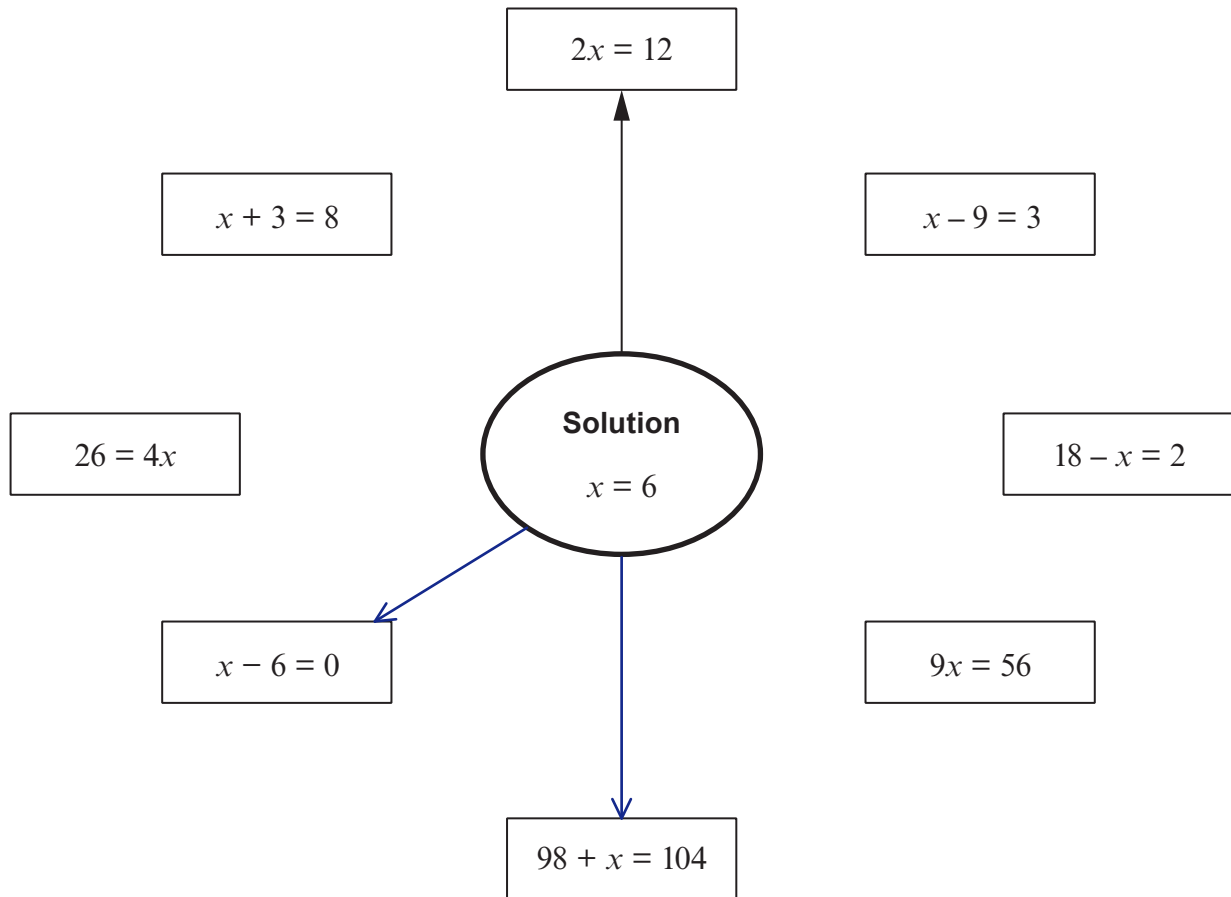


7. The solution to three of the following equations is $x = 6$.

For example, the solution to the equation $2x = 12$ is $x = 6$.

The solution has already been matched to this equation with an arrow.

Match the solution, $x = 6$, to the **other two equations** for which it is the correct solution. [2]



Space for working:

$$x - 6 = 0 \rightarrow x = 0 + 6 = 6$$

$$98 + x = 104 \rightarrow x = 104 - 98 = 6$$

$$(x + 3 = 8 \text{ gives } x = 5, x - 9 = 3 \text{ gives } x = 12)$$



8.

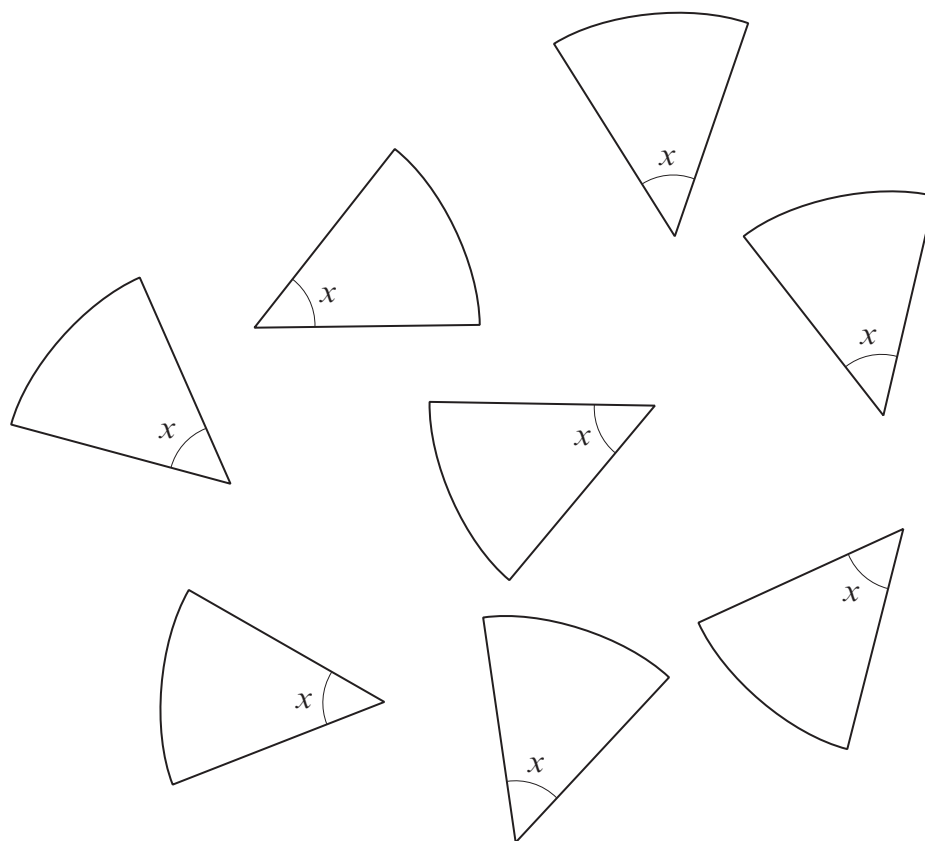


Diagram not drawn to scale

Eight identical sectors of a circle fit together to make a complete circle.
Calculate the value of x .

[3]

Angles at the centre of a full circle add up to 360°

$$8x = 360$$

$$x = 360 \div 8 = 45$$

$$x = 45^\circ$$



9. In this question, you will be assessed on the quality of your organisation, communication and accuracy in writing.

A rectangle has length 15 cm and width 7 cm.
A square has the same perimeter as this rectangle.

Calculate the length of a side of the square.
You must show all your working.

[4 + 2 OCW]

$$\text{Perimeter of rectangle} = 15 + 15 + 7 + 7$$

$$= 44 \text{ cm}$$

The square has the same perimeter and 4 equal sides.

$$\text{Length of a side of the square} = 44 \div 4$$

$$= 11 \text{ cm}$$

So the length of a side of the square is 11 cm.



10. (a) Calculate the size of angle x in the right-angled triangle shown below.

[2]

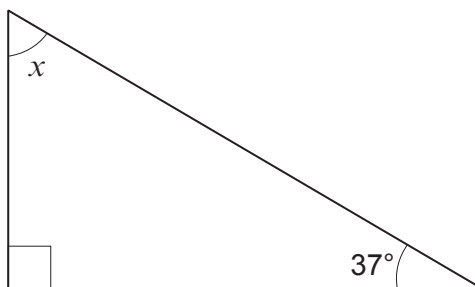


Diagram not drawn to scale

Angles in a triangle add up to 180°

$$x = 180^\circ - 90^\circ - 37^\circ$$

$$x = 53^\circ$$

- (b) $ABCD$ is a quadrilateral.
 BE is a straight line.
 Calculate the size of angles a and b .

[3]

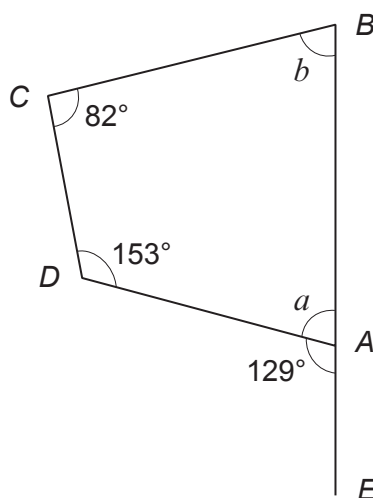


Diagram not drawn to scale

$$a = 180^\circ - 129^\circ = 51^\circ \text{ (angles on a straight line add up to } 180^\circ)$$

Angles in a quadrilateral add up to 360°

$$b = 360^\circ - (51^\circ + 82^\circ + 153^\circ)$$

$$b = 360^\circ - 286^\circ = 74^\circ$$

$$a = 51^\circ \quad b = 74^\circ$$



11. Circle the correct answer to complete each of the following statements.

(a) $\frac{1}{3}$ of $\frac{1}{3}$ is equal to

[1]

$\frac{2}{3}$

$\frac{2}{6}$

$\frac{1}{6}$

$\frac{1}{9}$

$\frac{2}{9}$

$$\frac{1}{3} \times \frac{1}{3} = \frac{1}{9}$$

(b) 0.02×0.8 is equal to

[1]

0.016

0.16

1.6

0.4

4

$$2 \times 8 = 16, \text{ so } 0.02 \times 0.8 = 0.016$$

(c) 1.5% can be written as

[1]

1.5^{100}

0.15

0.015

0.105

1.5^{10}

$$1.5\% = 1.5 \div 100 = 0.015$$

12. (a) Calculate the value of $\frac{2}{5} \times \frac{1}{4}$.

Give your answer in its simplest form.

[1]

$$\frac{2}{5} \times \frac{1}{4} = \frac{2}{20} = \frac{1}{10}$$

(b) Calculate the value of $3^3 \div 2^2$.
Give your answer as a decimal.

[2]

$$3^3 = 3 \times 3 \times 3 = 27, \quad 2^2 = 2 \times 2 = 4$$

$$27 \div 4 = 6 \text{ remainder } 3 = 6\frac{3}{4}$$

$$= 6.75$$



13. A cuboid measures 5 cm by 3 cm by 2 cm.

Calculate the volume of the cuboid.
Give your answer in cm^3 .

[2]

$$\text{Volume} = \text{length} \times \text{width} \times \text{height}$$

$$= 5 \times 3 \times 2 = 30 \text{ cm}^3$$

$$\text{Volume} = 30 \text{ cm}^3$$

14. A number n is added to the square root of 81.
The answer is equal to 7 squared.

What is the value of n ?

[3]

$$\sqrt{81} = 9 \quad \text{and} \quad 7^2 = 7 \times 7 = 49$$

$$n + 9 = 49$$

$$n = 49 - 9$$

$$n = 40$$

$$n = 40$$



15. Some letters are made using only straight lines e.g. T.
Some letters are made using straight lines and curved lines e.g. P.
Some letters are made using only curved lines e.g. S.

Six cards spell out the name BANGOR.



In a game, the six cards are placed in a bag.

One card is chosen at random.

The letter on the card is noted and the card is returned to the bag.

If the card has a letter on it that is made using only straight lines, the player gains 10 points.
A card with any other type of letter gains no points.

Leah plays the game 24 times.

Do you expect Leah to score a total of 100 points?

You must show all your working.

[5]

Letters made using only straight lines: A and N

(B, G, O and R all have curves), so 2 out of 6 letters gain points.

$$P(10 \text{ points}) = \frac{2}{6} = \frac{1}{3}$$

$$\text{Expected number of wins} = \frac{1}{3} \times 24 = 24 \div 3 = 8 \text{ wins}$$

$$\text{Expected points} = 8 \times 10 = 80 \text{ points}$$

80 is less than 100, so No, I do not expect Leah

to score a total of 100 points (expected score is 80).



16. AB and CD are parallel.

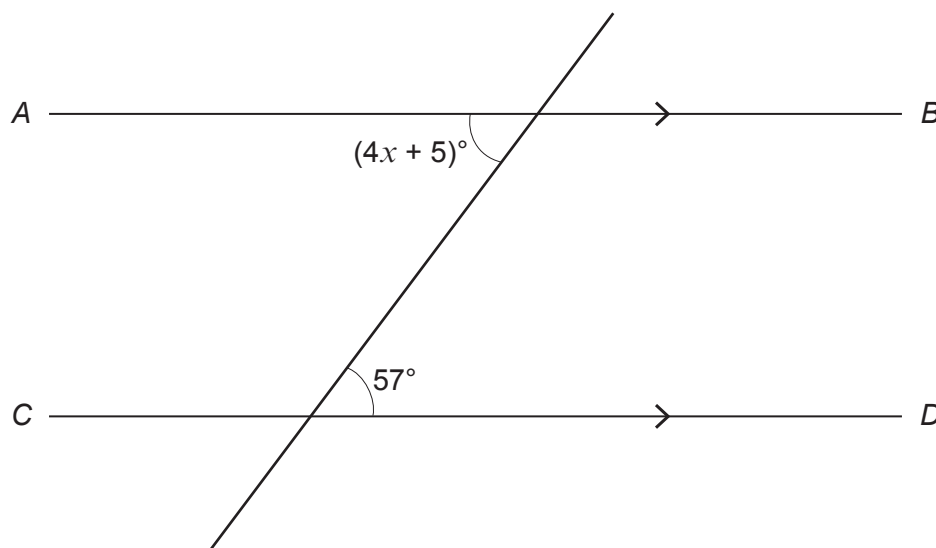


Diagram not drawn to scale

Calculate the value of x .

[3]

$$4x + 5 = 57 \quad (\text{alternate angles are equal})$$

$$4x = 57 - 5 = 52$$

$$x = 52 \div 4$$

$$x = 13$$

17. Write down four positive whole numbers in the boxes below so that:

- the range of the numbers is 6,
- the mean of the numbers is 5,
- the median of the numbers is 4.

[3]

$$\text{Mean } 5, \text{ so total} = 4 \times 5 = 20$$

$$\text{Median } 4, \text{ so the middle two numbers are } 4 \text{ and } 4$$

$$\text{Range } 6: \text{ smallest } 3, \text{ largest } 9 \quad (9 - 3 = 6)$$

$$\text{Check: } 3 + 4 + 4 + 9 = 20, \quad 20 \div 4 = 5$$

$$\text{Median} = (4 + 4) \div 2 = 4$$

3

4

4

9



18. A car travels 100 miles in 2 hours and 30 minutes.
Calculate its average speed in miles per hour.

[3]

$$2 \text{ hours } 30 \text{ minutes} = 2.5 \text{ hours}$$

$$\text{Speed} = \text{distance} \div \text{time} = 100 \div 2.5$$

$$= 1000 \div 25$$

$$\text{Average speed} = 40 \text{ mph}$$

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