Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2023

Mathematics

StemUp Model Solution

Unit M5 Paper 1
(Non-Calculator)
Foundation Tier



[GMC51]

GMC51

WEDNESDAY 7 JUNE, 9.15 am–10.15 am

TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

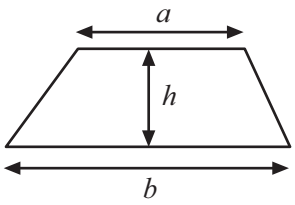
Write your Centre Number and Candidate Number in the spaces provided at the top of this page. **You are provided with Foundation Tier Additional Support Materials for use with this paper.**
You must answer the questions in the spaces provided.
Do not write outside the boxed area on each page, on blank pages or tracing paper.
Complete in black ink only. **Do not write with a gel pen.**
Answer **all fourteen** questions.
All working should be clearly shown in the spaces provided. Marks may be awarded for partially correct solutions.
You **must not** use a calculator for this paper.

INFORMATION FOR CANDIDATES

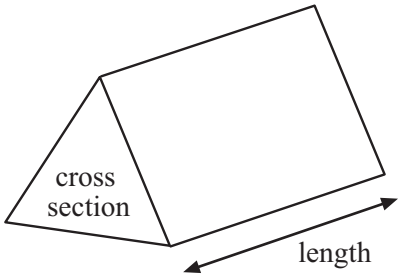
The total mark for this paper is 50.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
You should have a ruler, compasses and a protractor.
The Formula Sheet is on page 2.

Formula Sheet

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



Volume of prism = area of cross section × length



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1 Hannah is paid £7.00 per hour.

On a Monday she works for $6\frac{1}{2}$ hours.

How much is she paid for Monday?

7.00 × 6 = 42.00

7.00 ÷ 2 = 3.50 (half an hour)

42.00 + 3.50 = 45.50

Answer £ 45.50 [3]

[Turn over

2 Black and white counters are used to make the patterns below.

Pattern 1 Pattern 2 Pattern 3



(a) What is the **total** number of counters needed to make Pattern 4?

Pattern 4: 4 × 4 = 16

Answer *16* [1]

(b) How many white counters are there in Pattern 8?

3 white counters for each pattern number

Pattern 8: 8 × 3 = 24

Answer *24* [2]

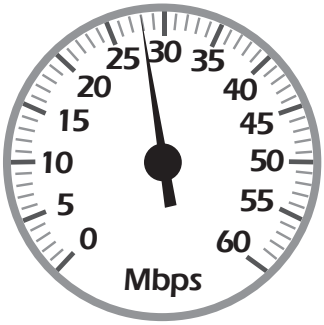
3 What is 25% of 84p?

25% = ¼

84 ÷ 4 = 21

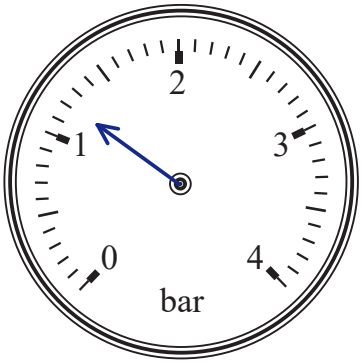
Answer *21* p [2]

4 **(a)** What reading is shown on the Internet Speed Test gauge?



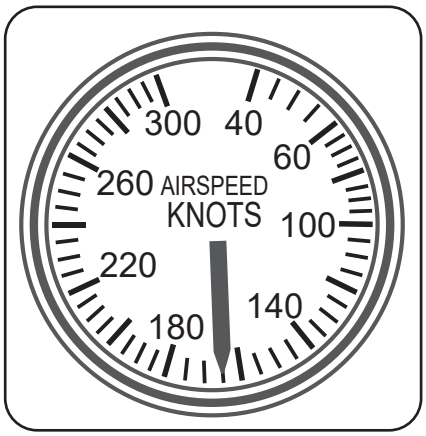
Answer 28 Mbps [1]

(b) Draw an arrow on the pressure gauge to show a pressure of 1.2 bar.



[1]

(c) What airspeed is shown?

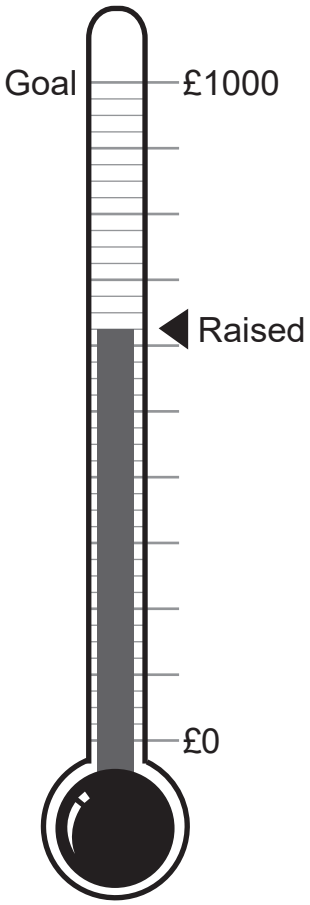


Answer 165 knots [1]

[Turn over

(d) A charity fundraiser gauge is shown.

How much money has been raised?



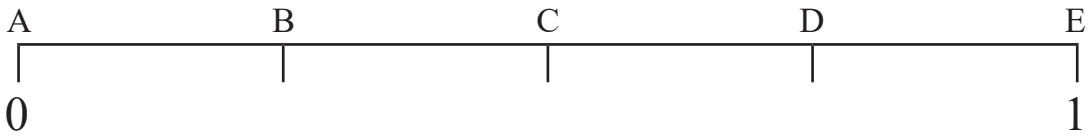
Answer £ 625 [1]

5 There are 80 packets of crisps in a school tuck shop.

The number of packets of each flavour is shown in the table.

Cheese & Onion	Pickled Onion	Prawn Cocktail	Ready Salted	Salt & Vinegar
20	7	8	5	40

A packet of crisps is chosen at random.



Which **letter** on the scale shows the probability that the flavour is

(a) Salt & Vinegar,

40 out of 80 = ½

Answer C [1]

(b) Cheese & Onion,

20 out of 80 = ¼

Answer B [1]

(c) Roast Chicken?

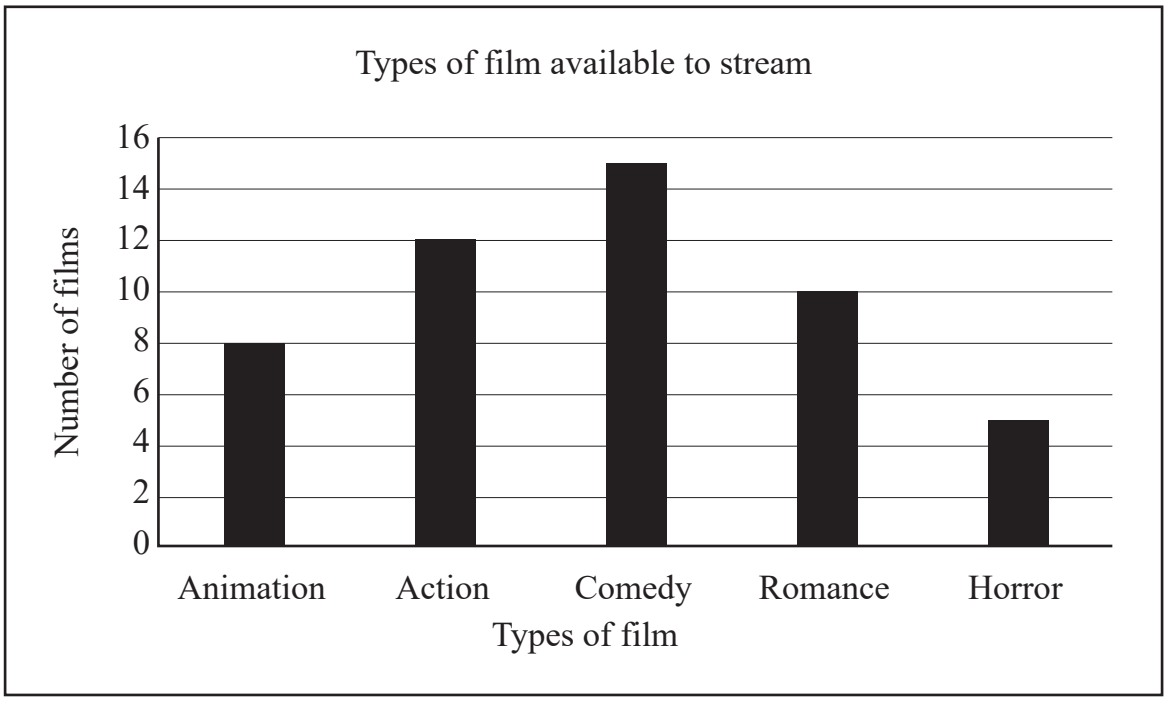
no Roast Chicken, impossible = 0

Answer A [1]

[Turn over

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6 The chart shows information about films that are available for streaming.



A film is chosen at random.

(a) What is the probability that the film chosen is a Romance?

Total = 8 + 12 + 15 + 10 + 5 = 50

Romance = 10

Answer $\frac{10}{50}$ [2]

(b) What is the probability that an Action film is **not** chosen?

50 − 12 = 38 P(not Action) = $\frac{38}{50}$

Answer $\frac{38}{50}$ [1]

7 **(a)** Show how Jack can **estimate** an answer to 588 ÷ 18 and write down his answer.

588 ≈ 600, 18 ≈ 20

600 ÷ 20 = 30

Answer 30 [2]

(b) Jill knows that she can divide by 18 by first dividing by 3 and then by 6

Using a similar method to Jill's, show how you can calculate 972 ÷ 36 and write down your answer.

36 = 4 × 9, so divide by 4 then by 9

972 ÷ 4 = 243

243 ÷ 9 = 27

Answer 27 [3]

8 The first three terms of a sequence are 1, 5 and 13

The rule is "add the next multiple of 4"

Find the next two terms in this sequence.

1 5 13 25 41 [2]

+4 +8 +12 +16

[Turn over

9 There are 30 pupils in a class.

$\frac{3}{5}$ are girls.

$\frac{2}{9}$ of the girls are absent.

25% of the boys are absent.

(a) Complete the table to show this information.

	Girls	Boys
Number of pupils	18	12
Absent	4	3
Present	14	9

[2]

(b) What fraction of the pupils are present?

Girls: $\frac{3}{5} \times 30 = 18$, $\frac{2}{9} \times 18 = 4$

Boys: $30 - 18 = 12$, 25% of $12 = 3$ Present: $14 + 9 = 23$

Answer $\frac{23}{30}$ [1]

10 The pulse rate of an athlete is taken before and after training.

His starting pulse was 54 beats per minute.

After training, it increased by $\frac{1}{6}$ of this value.

Show that each beat now lasts less than 1 second.



© *Getty Images*

$\frac{1}{6} \times 54 = 54 \div 6 = 9$

New pulse = 54 + 9 = 63 beats per minute

1 minute = 60 seconds

63 beats in 60 seconds

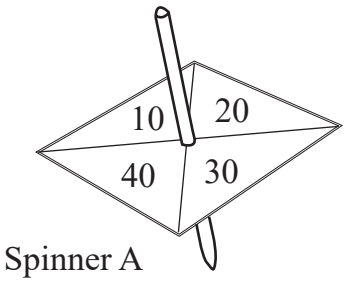
63 > 60, so there is more than 1 beat per second

Each beat lasts $\frac{60}{63}$ seconds, which is less than 1 second

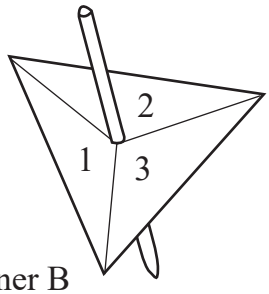
[4]

[Turn over

11 Two fair spinners are each spun once.



Spinner A



Spinner B

The scores on each spinner are multiplied together.

(a) Complete the table of outcomes.

		Spinner A			
	×	10	20	30	40
Spinner B	1	10	20	30	40
	2	20	40	60	80
	3	30	60	90	120

[2]

(b) What is the probability that the outcome is 60?

60 appears twice out of 12

Answer $\frac{2}{12}$ [1]

(c) What is the probability that the outcome is less than 40?

less than 40: 10, 20, 30, 20, 30

5 out of 12

Answer $\frac{5}{12}$ [2]

12 **(a)** Given that $23 \times 146 = 3358$

write down the answer to 2.3×1.46

Answer 3.358 [1]

(b) Showing clearly how you do it, **estimate** the answer to

$$\frac{202 \times 29}{0.48}$$

$\frac{202 \times 29}{0.48} \approx \frac{200 \times 30}{0.5} = \frac{6000}{0.5} = 6000 \times 2 = 12\,000$

Answer 12 000 [3]

13 In April, 30 males and 20 females took their driving test.

50% of the males passed and 40% of the females passed.

What percentage of people who took the test failed?



Males passed: 50% of 30 = 15

Females passed: 40% of 20 = 8

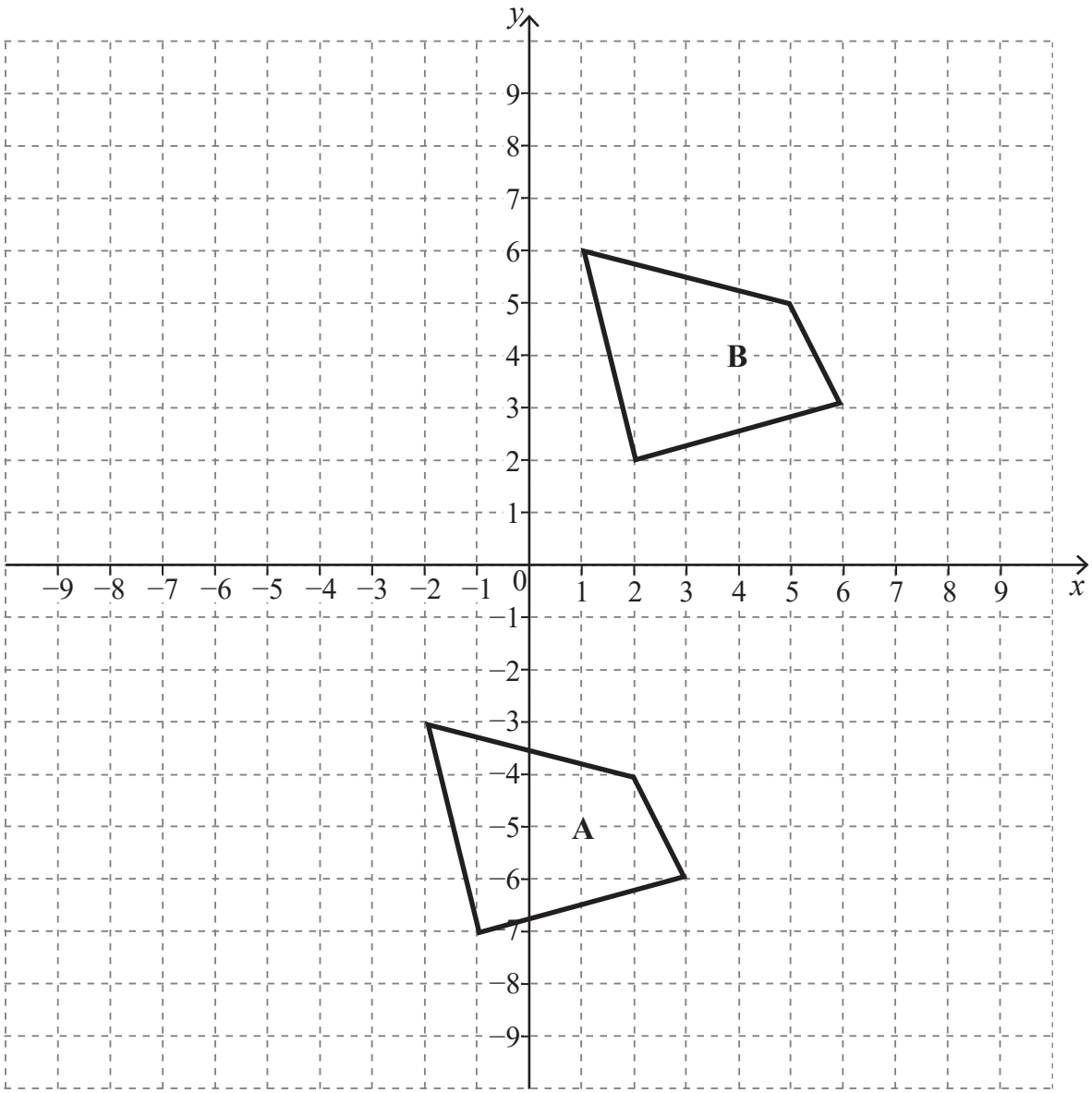
Passed = 15 + 8 = 23, failed = 50 − 23 = 27

$\frac{27}{50} \times 100 = 54$

Answer 54 % [3]

[Turn over

14

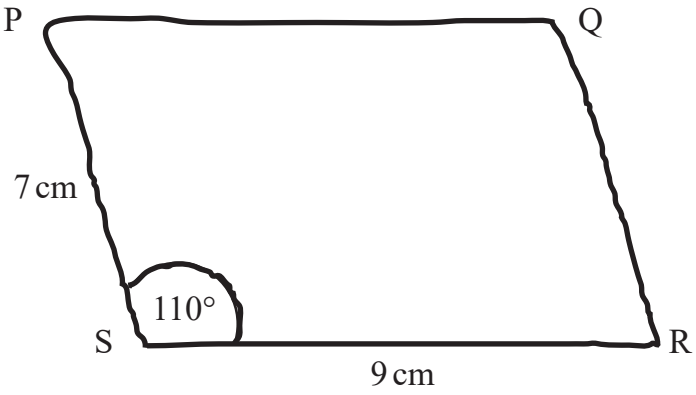


(a) Describe fully the single transformation that maps shape **A** onto shape **B**.

Answer *Translation 3 right and 9 up* [2]

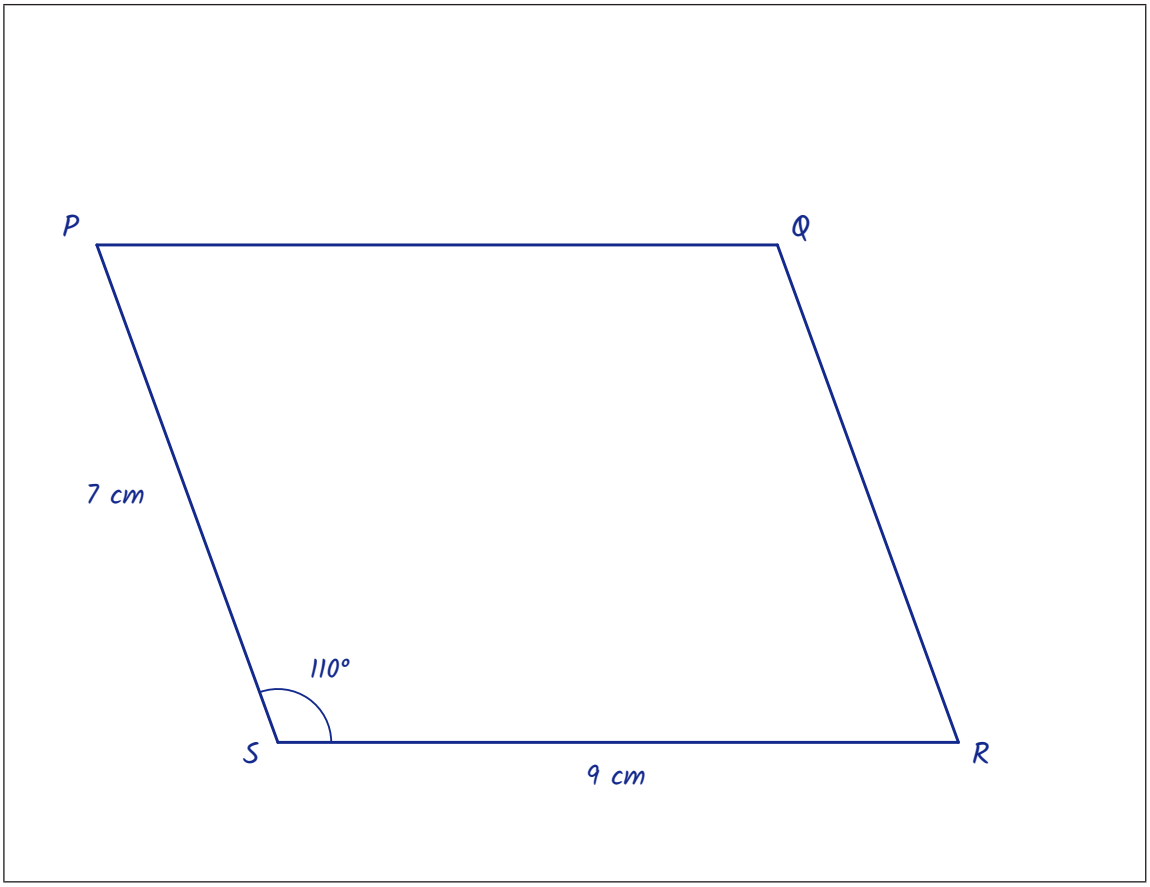
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(b) A sketch of a parallelogram PQRS is shown.



It is not drawn to scale.

Use a ruler and protractor to draw an accurate diagram of the parallelogram in the box below.



[4]

Sources: All images © CCEA unless stated

THIS IS THE END OF THE QUESTION PAPER

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For Examiner's use only	
Question Number	**Marks**
1	
2	
3	
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12	
13	
14	
Total Marks	

Examiner Number

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General Certificate of Secondary Education
Summer 2023

GCSE Mathematics

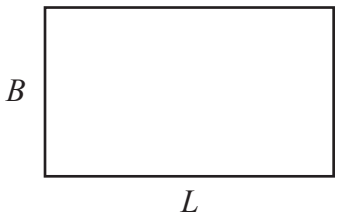
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(For use in Summer 2023)

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$$\text{Average Speed} = \frac{\text{Distance}}{\text{Time}}$$

Perimeter, Area and Volume

The perimeter of a polygon is the distance around the outside of the polygon.



The area of a rectangle is found by multiplying the length of the rectangle by the breadth.

$A = L \times B$, where A is the area, L is length and B is breadth.

The volume of a cuboid is found by multiplying the length by the breadth by the height of the cuboid.

$V = L \times B \times H$ where V is volume, L is length, B is breadth and H is height.

The area of a circle is $A = \pi r^2$ where r is the radius of the circle.

Gradient of Line

$$\text{Gradient of line} = \frac{\text{increase in vertical distance}}{\text{increase in horizontal distance}}$$

Geometry and Angles

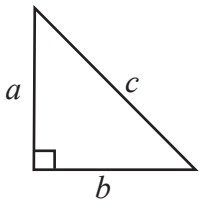
There are 180° on a straight line.
There are 180° inside a triangle.
An isosceles triangle is a triangle with 2 equal sides and 2 equal angles.
The sum of all the angles inside a polygon is given by $180(n - 2)$ where n is the number of sides in the polygon.

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Pythagoras' Theorem

If a, b and c are the sides of a right angled triangle shown below, then

$$a^2 + b^2 = c^2$$



Mean

The mean of a set of data is the sum of all the data values divided by the number of data values.

Estimate for the mean of a grouped frequency distribution

Estimated mean = sum of (mid interval values multiplied by their frequency) divided by the sum of all the frequencies.

Pie Chart

In a pie chart, the total angle that corresponds to the entire data set is 360°

Probability

The sum of the probabilities of all outcomes equals 1

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