	<h1>National 5 Applications of Mathematics</h1> <p>Larbert High School Practice Paper</p> <p>Mark <input data-bbox="1348 309 1508 544" type="text"/></p>
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Mathematics  
Paper 1  
(Non-Calculator)

1 hour 10 minutes

Fill in these boxes and read all that is written below.

Forename(s)

Surname

Class

Teacher

Total marks – 50

Attempt all question.

You may **not** use a calculator.

Full credit will be given only to solutions which contain appropriate working.

State units for answers where appropriate.

Write your answers clearly in the spaces provided in this booklet. Additional space for answers is provided at the end of this booklet. If you use this space, you must clearly identify the question number you are attempting.

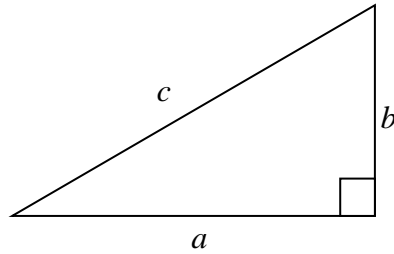
Use blue or black ink.

## FORMULAE LIST

Circumference of a circle:  $C = \pi d$

Area of a circle:  $A = \pi r^2$

Theorem of Pythagoras:



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

Volume of a cylinder:  $V = \pi r^2 h$

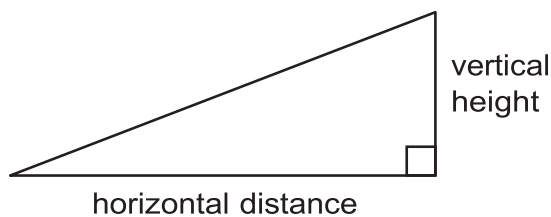
Volume of a prism:  $V = Ah$

Volume of a cone:  $V = \frac{1}{3} \pi r^2 h$

Volume of a sphere:  $V = \frac{4}{3} \pi r^3$

Standard deviation:  $s = \sqrt{\frac{\sum (x - \bar{x})^2}{n - 1}} = \sqrt{\frac{\sum x^2 - \frac{(\sum x)^2}{n}}{n - 1}}$ , where  $n$  is the sample size.

Gradient:



$$\text{gradient} = \frac{\text{vertical height}}{\text{horizontal distance}}$$

1. There is a box at the front of the class filled with only black, blue or red pens.

$\frac{1}{4}$  of the pens in the box are red

$\frac{3}{7}$  of the pens in the box are blue

What fraction of the pens in the box are black?

3

2. The table below are the length of nails processed by three separate companies.

Company A	45mm	46mm	42mm	47mm	46mm	45mm	41mm	46mm	47mm	44mm
Company B	46mm	41mm	45mm	47mm	44mm	45mm	48mm	43mm	45mm	46mm
Company C	49mm	44mm	45mm	49mm	37mm	45mm	42mm	41mm	44mm	50mm

A builder is looking for a company to supply him with  $45 \pm 2$ mm nails. The builder is looking for a company that meets the necessary size at least 75% of the time. Which, if any of the companies could the builder order from and why?

4

**3** John gets paid £8.50 an hour and works 40 hours a week.

(a) How much does he make in one week?

**1**

John worked 160 hours in the month of March. He pays income tax of £190, he contributes £118 to his pension and pays £82 of national insurance.

(b) What is John's monthly take home pay?

**3**

John is saving up to buy a TV. He saves 10% of his take home pay. After 5 months he has enough to buy the TV with an extra £55 spare.

(c) How much did John spend on the TV?

**3**

**4** Jessica flew from Glasgow to Sydney.  
The flight included a stop Dubai.  
She flew from Glasgow to Dubai then Dubai to Sydney.

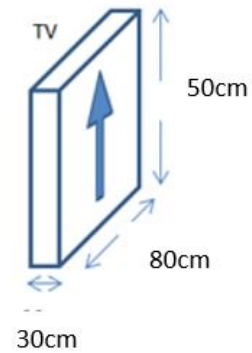
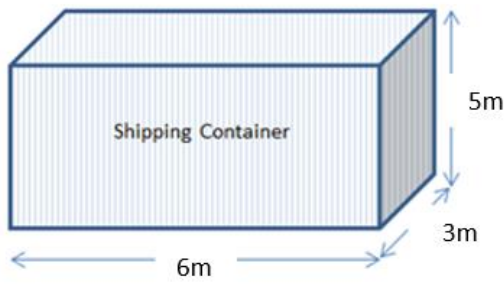
- The flight from Glasgow to Dubai took 7 hours 20 minutes
- The flight from Dubai to Sydney took 6 hours 45 minutes
- Sydney is 11 hours ahead of Glasgow

Jessica's plan took off at 9.15am local time. It landed in Australia at noon local time.

How long was the stop in Dubai?

- 5 The TVs are initially brought into the area using shipping containers measuring 6m by 3m by 5m as shown in the diagram below. The TVs, which measure 80cm by 30cm by 50cm, are delicate so must be kept upright as shown in the diagram below.

What is the maximum number of TVs that can be fitted into the container?



**6** Jack bought a car for £12000. The cost of the car went down by 20% for two years.

(a) Calculate the new cost of the car?

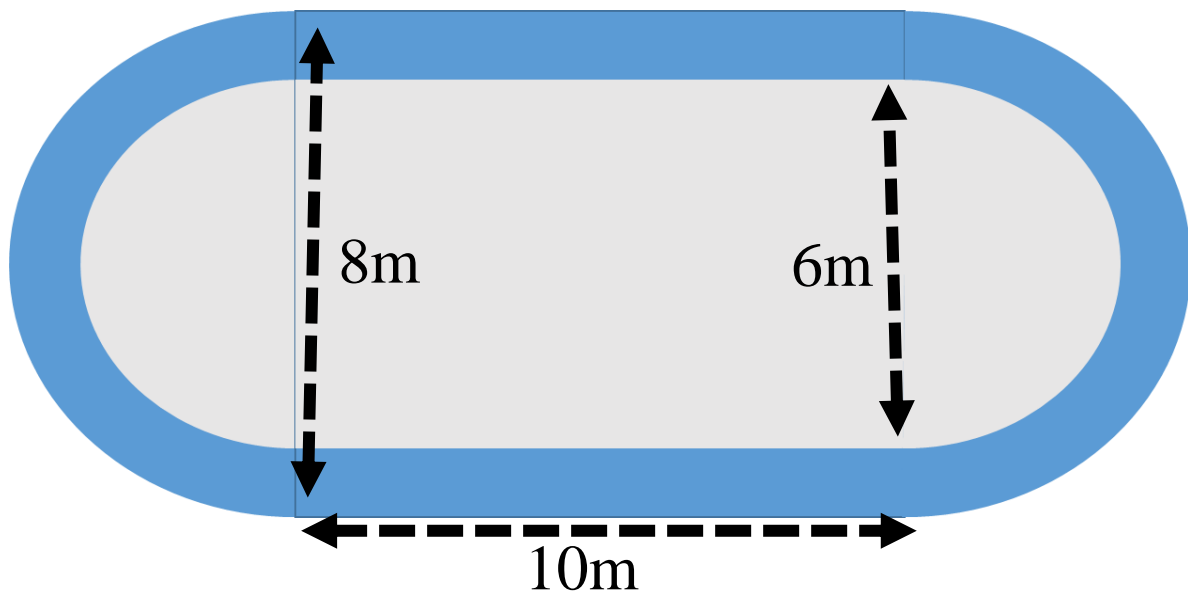
**3**

Jack then sells the car for a profit of £1250.

(b) How much did he sell the car for?

**1**

- 7 A Go Kart track is being built around an area of gravel. The dimensions of the track are below, it is made up of two semi circles and a rectangle with the middle cut out.



- (a) What is the length of one lap? Use  $\pi = 3.14$

4

The middle section of the track is covered in gravel. It costs £12.50 to buy a bag of gravel to cover  $1\text{m}^2$ .

- (b) What is the cost of all the gravel for the track.

4



- 8** A group of students of a Biology class record their heights in centimetres as shown below.

127      135      144      122      137      131      142      155      142

- (a) Calculate the median and the Semi-Interquartile Range of the set of data

**4**

Another group of students had a median height of 150cm and the Semi Interquartile range of 13.

- (b) Compare the two sets of results make two valid comparisons

**2**

9 Lauren is buying new track bike.

Lauren needs to buy a frame, a pair of peddles, a saddle, 2 wheels and 2 tyres.

The prices from different retailers are below.

Retailer	Handlebar	Pedals (pair)	Wheels (each)	Saddle	Tyres (each)
Bikes 2 Go	63.33	33.33	51.25	41.66	54.98
Bikevelo	55.49	42.50	46.66	62.37	58.33
Velo cycles	68.83	36.66	61.20	53.99	61.66
Cycle trax	59.50	43.33	52.25	63.33	69.99
EP bikes	71.58	41.66	44.49	47.85	49.99

Lauren can buy the frame of the bike for £2455.

(a) What is the cheapest that Lauren can assemble the entire bike for?

2

Lauren cannot afford this and so agrees a payment plan with EP Bikes. The bike costs £2880 there, she agrees to pays 20% of this as a deposit and 30 instalments of £85.

(b) How much in total will she pay for this bike?

4

**10** The Jones family go on holiday to Disney land every year.

Mr and Mrs Jones along with their 3 children are going for 5 days in total and are looking into a variety of options for paying for the rides when they are at the park.

The first option is to buy the unlimited family wrist band, this costs £14.99 for the entire family each day they are at Disneyland.

(a) How much would it cost to buy would this option cost?

**1**

There are two further options. One is a family pass which costs £70 and covers the family for 7 days. The other is to purchase individual tokens for each day to use the rides. Mr and Mrs Jones plan to go on three different rides every day. While the kids plan to go on five different rides each. The cost per ride is £1.50.

(b) Which of the three options would be the cheapest for the Jones family?

**4**

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