



WINDERMERE
SCHOOL

SIXTH FORM

EXAM PAPER 2016

MATHEMATICS

Time: 45 minutes

Instructions

The use of a calculator is permitted.

Please show all the stages in your working.

NAME:

Mark:

Percentage:

Recommendation:

1. For this question, round your answers to 2 decimal places (the nearest penny).

£120 is invested in a bank account paying compound interest at a rate of 5% per year. (Compound interest is interest added to the initial deposit so that the added interest also earns interest from then on).

What is the total amount in the account after:

- a) One year b) two years?

a).....
.....
b).....
.....
.....

[4]

2. A number is in standard form if it is of the form $a \times 10^n$, where $1 \leq a < 10$ and n is an integer.

The distance from the Earth to the Moon is 250 000 miles.

- (a) Express this number in standard form.

The distance from the Earth to the Sun is 9.3×10^7 miles.

- (b) Calculate the value of the expression

$$\frac{\text{distance from the Earth to the Moon}}{\text{distance from the Earth to the Sun}}$$

giving your answer in standard form.

a).....
.....
b).....
.....
.....

[4]

Algebra

3. Solve the following:

(a) $2(x - 2) = 24$

(b) $6x - 2 = 8x + 6$

(c) (i) $\frac{3 - 4x}{5} = 7$

(ii) $\frac{3 - 4x}{5} > 7$

4.

(a) Simplify fully:

(i) $4ab^2 + 3a^2b - a^2b$

(ii) $\frac{10a^2}{2a}$

(b) Expand and simplify $(2x + 5)(x - 2)$

[4]

5.

(a) Factorise:

(i) $ab^2 + a^2b$

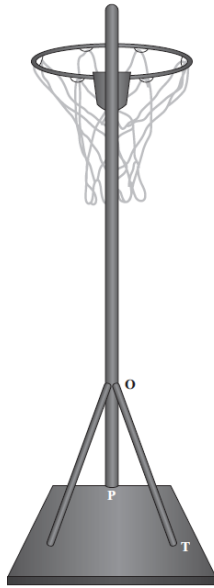
(ii) $x^2 - 4x - 5$

(b) Solve $x^2 - 4x - 5 = 0$

[4]

Shape, Space and Measures

6.



A child's practice goal post has one pole and two supports, as shown on the left.

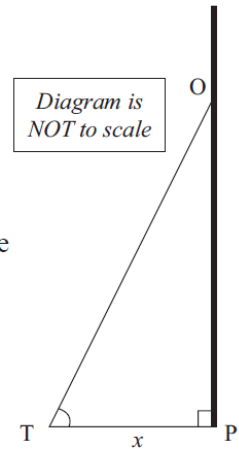
The two supports are each 90 cm long.

The pole is always perpendicular to the ground.

(a) The diagram on the right shows the view from the side.

OT is 90 cm long.

OP is 70 cm long.

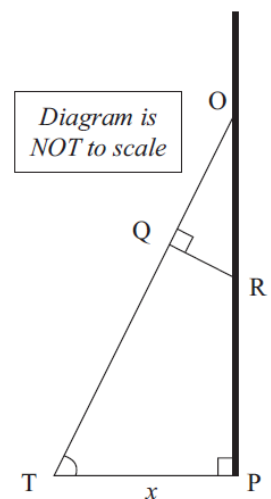


(i) Find the length of PT, x , the distance between the pole and a support along the ground.

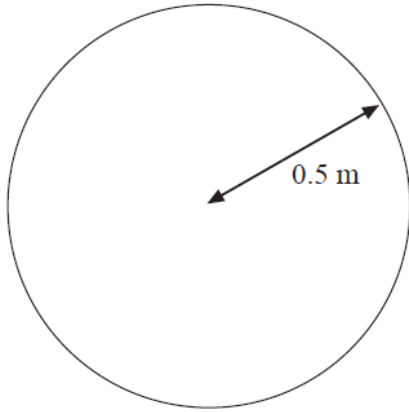
(ii) Calculate the size of angle PTO.

(iii) A support bar, QR, is added at Q, where OQ = 30 cm.

Calculate the distance of the point R below O.
 Show your working and explain your reasoning.



7.



A circular hoop of radius 0.5 m rolls along in a playground.

- (a) What is the circumference of the hoop in m, giving your answer to 2 decimal places ?
- (b) How many complete revolutions will it make as it travels 40 m in distance ?

a).....
.....
.....

b).....
.....

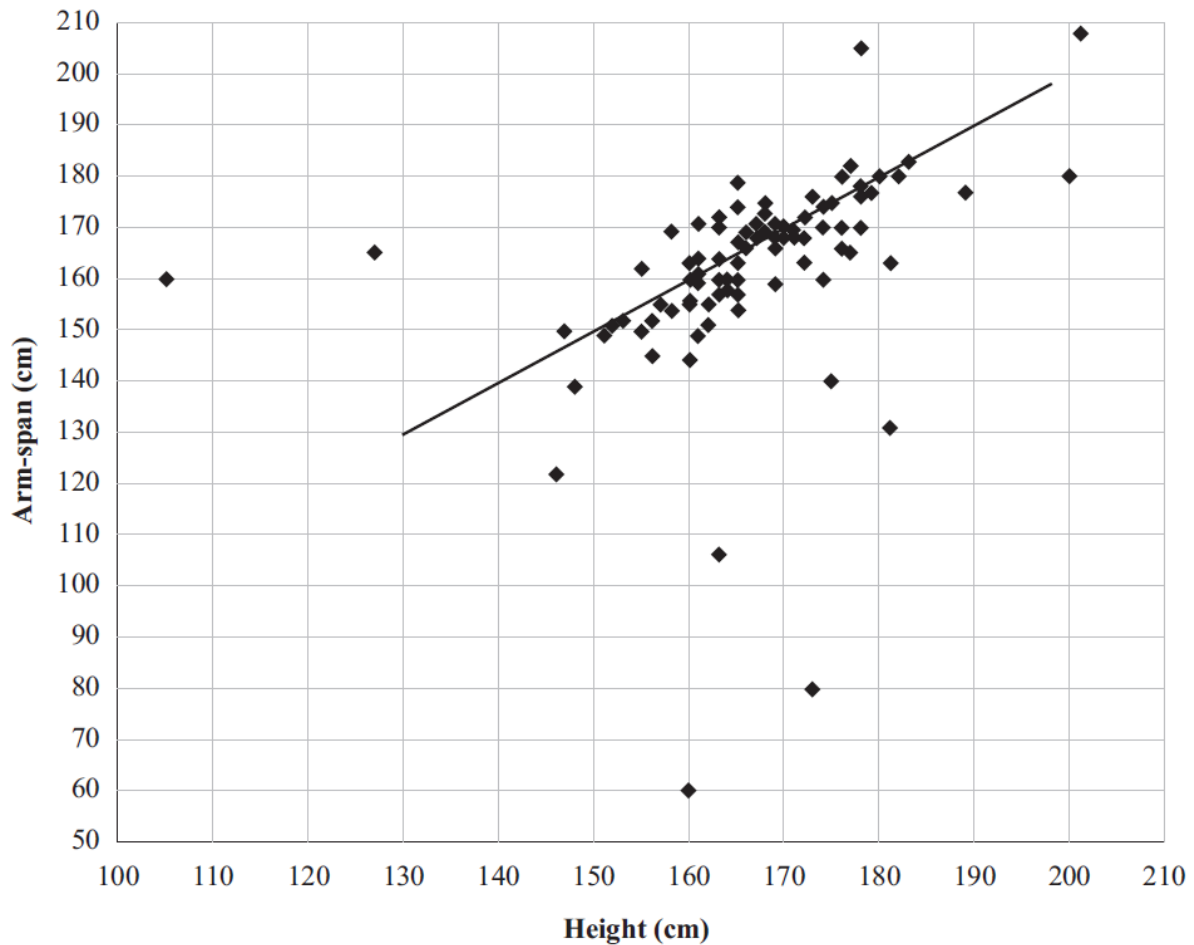
[4]

Handling Data

8.

Tuahu's grandfather told him that a person's arm-span is often the same as their height (your arm-span is the distance from the fingertips of your left hand to the fingertips of your right hand, when your arms are stretched out).

Tuahu wondered if this was true. He collected measurements from 100 randomly selected year 10 boys and girls. He drew a scattergraph of the results. He added a line of best fit to the graph. The results are shown on the graph below and some statistics are listed in the table.



(a) (i) What is the height of the tallest person on the graph?

(ii) What is the height of the person with the smallest arm-span?

(iii) How many people have an arm-span between 120 and 135 cm?

(b) Why was a scattergraph appropriate to show the data Tuahu had collected?

(c) There are some points on the graph that seem to be unlikely measurements for a year 10 student.

Give the height and arm-span for THREE points that seem unlikely. Explain why you think they are unlikely measurements for a year 10 student.

9.

In Bag A, there are 3 RED balls and 2 WHITE balls.

In Bag B, there are 2 RED balls and 3 WHITE balls.

One ball is taken, at random, from each bag.

Using a tree diagram, or otherwise, calculate the probability that

- (a) the two balls are both RED,
- (b) the two balls are of different colours.

a).....
.....
.....

b).....
.....
.....