BENENDEN

SIXTH FORM 2018

MATHS

1 hour 30 mins

Full Name: _____

Current School: _____

Date: _____

Instructions to Candidates:

- Answer all the questions in this booklet, showing your workings.
- Use black pen for writing
- Calculators are allowed

Q1.

Expand and simplify $(\sqrt{7} + 2)(\sqrt{7} - 2)$.

(2)

(Total 2 marks)

Q2.

Factorise completely $x - 4x^3$

(3)

(Total 3 marks)

Q3.

(a) Find the gradient of the line with equation $3x + 4y = 10$

.....

(3)

(b) Find the coordinates of the point of intersection of the line with equation $3x + 4y = 10$ and the line with equation $5x - 6y = 23$

Show your working clearly.

(..... , ...)

(5)

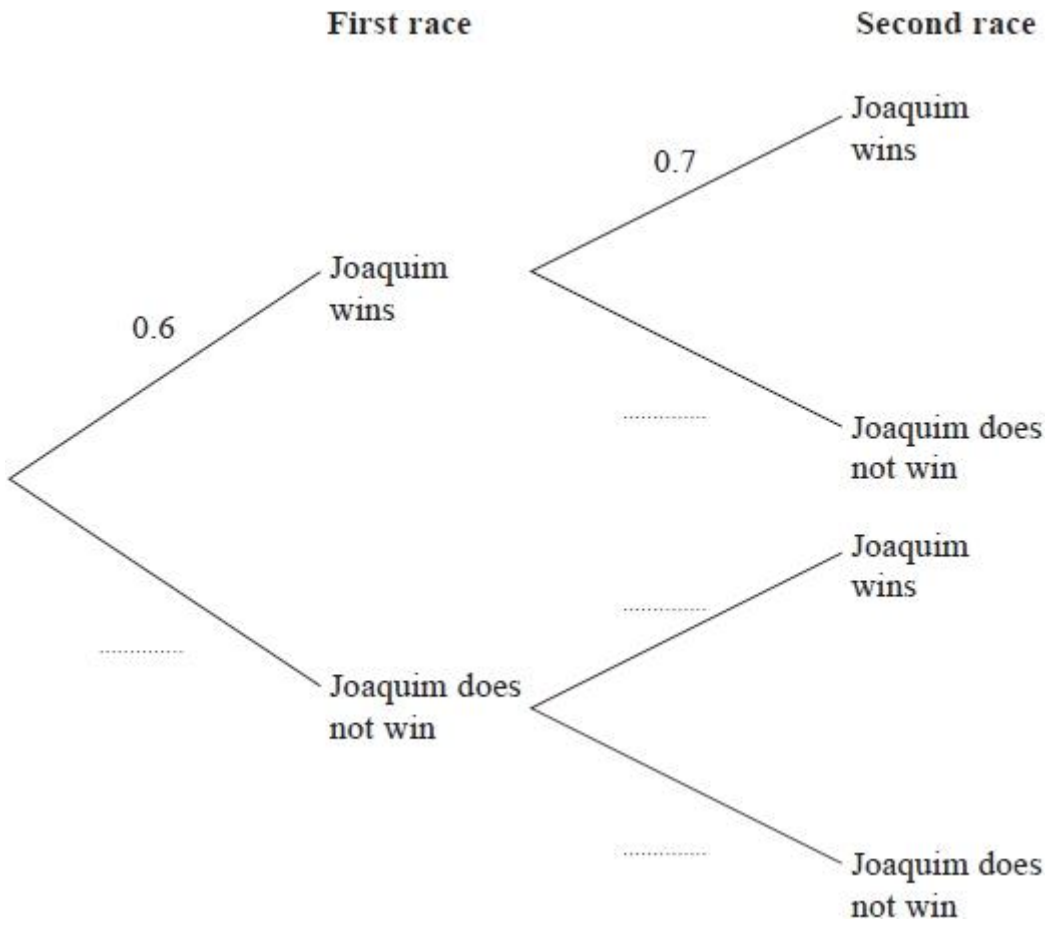
(Total for question is 8 marks)

Q4.

Joaquim takes part in two cycle races.

The probability that he wins the first race is 0.6
The probability that he wins the second race is 0.7

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that Joaquim wins both races.

.....

(2)

Joaquim takes part in a third cycle race.
The probability that Joaquim wins the third race is 0.2

(c) Work out the probability that he wins exactly one of the three races.

.....

(3)

(Total for question = 7 marks)

Q5. Simplify the following:

(i) $x^2 \times x^5$

..... (1)

(ii) $x^2 \div x^5$

..... (1)

(iii) $(3y^4)^3$

..... (2)

(iv) $(5m^2)^3 \div (10m)$

..... (2)

(v) $\left(\frac{125}{64}\right)^{\frac{2}{3}}$

..... (2)

(vi) $\left(2\frac{1}{4}\right)^{-\frac{1}{2}}$

..... (3)
(Total marks 11)

Q6
Show that $x^2 + 6x + 11$ can be written as

$(x + p)^2 + q$

where p and q are integers to be found.

(2)
(Total 2 marks)

Q7

Simplify fully $\frac{4}{x}+\frac{3}{2-x}$

.....

(Total for question is 3 marks)

Q8

The volume of a box is given by $(x+3)(2x-1)(x-4)$. Find the volume when $x = 7\ cm$.

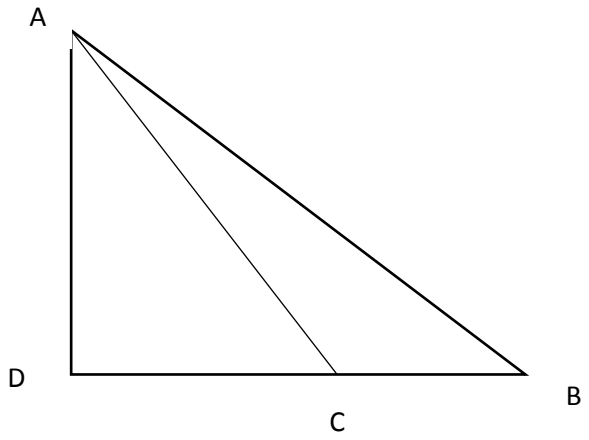
……..(2)

Q9

If $C = \frac{5}{9}(F-32)$ is the formula for converting temperatures in Fahrenheit to Celsius, find the Celsius equivalent to 102°F, to the nearest degree.

……..(2)

Q10.



Given that the length of AB is 49 cm, angle ACD is 59° and that angle ABD is 47°, find the length CD.

…… (5)

Q11.

(a) Make p the subject of the formula $s = uq + \frac{1}{2}rp$

…… (2)

(b) Make y the subject of the formula $x = \frac{2-y}{y+1}$

…… (3)

(Total marks 5)

Q12

The diagram shows a circle with centre *O* and radius 6.5cm

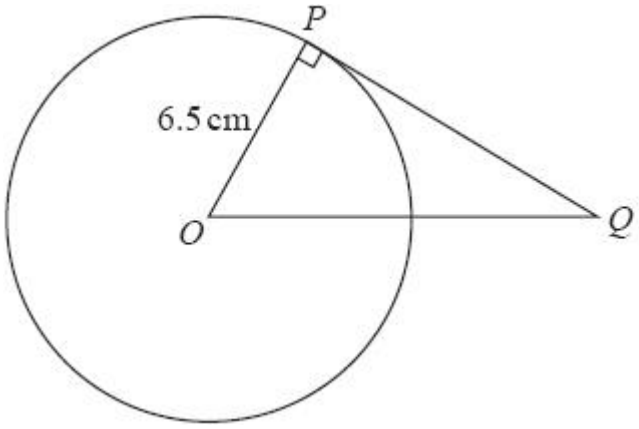


Diagram **NOT** accurately drawn

(a) Work out the area of the circle.

Give your answer correct to 3 significant figures.

..... cm^2

(2)

PQ is the tangent to the circle at *P*
OQ = 10.5cm

(b) Work out the length of *PQ*

Give your answer correct to 3 significant figures.

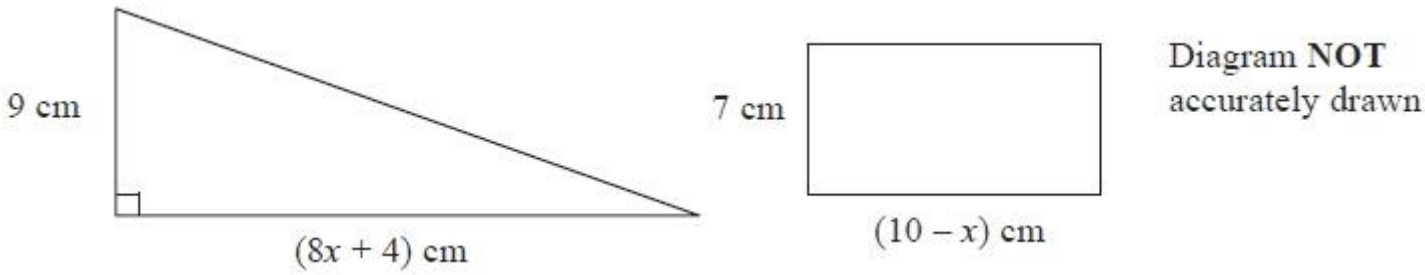
..... cm

(3)

(Total for question = 5 marks)

Q13

The diagram shows a right-angled triangle and a rectangle.



The area of the triangle is twice the area of the rectangle.

(i) Write down an equation in x.

.....

(ii) Find the area of the rectangle.
Show clear algebraic working.

..... cm^2

(Total for question = 7 marks)

Q14

Solve the simultaneous equations

$$x + y = 2$$
$$4y^2 - x^2 = 11$$

(7)

(Total 7 marks)

Q15

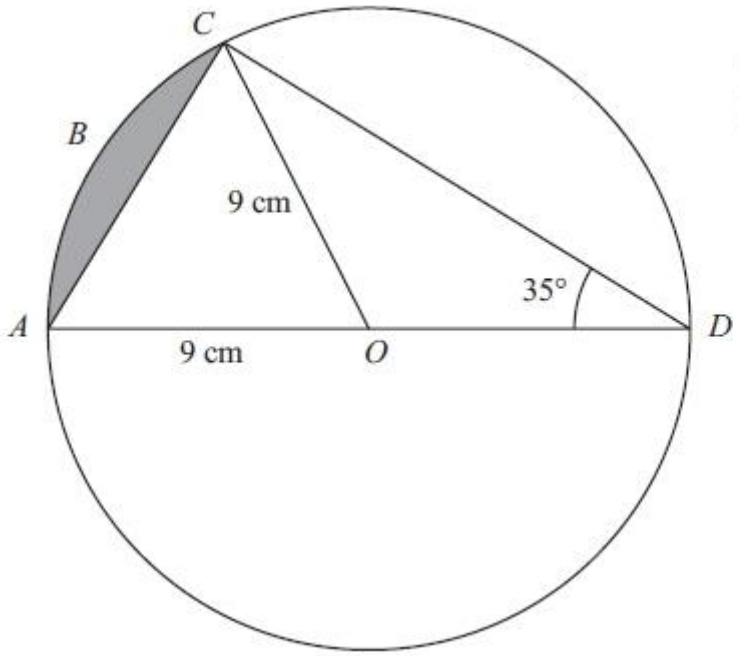


Diagram **NOT** accurately drawn

AOD is a diameter of a circle, with centre *O* and radius 9 cm.
ABC is an arc of the circle.
AC is a chord.
Angle *ADC* = 35°

Calculate the area of the shaded segment.
Give your answer correct to 3 significant figures.

..... cm^2

(Total for question is 6 marks)

TOTAL MARKS: 75