Twenty-One Today #5

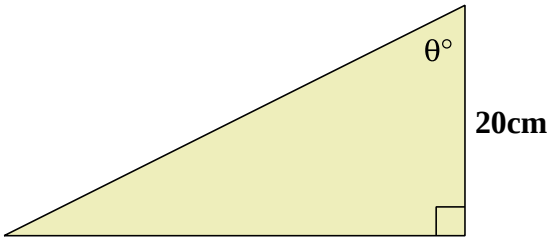
You have thirty-five minutes to answer 21 questions

Marks Available : 40

GCSE Mathematics
Twenty-One Today

Question 1

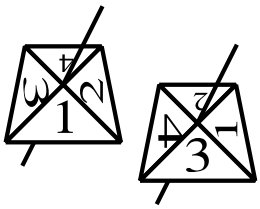
What is size of the angle, $\theta°$, in the following triangle ?



[1 mark]

Question 2

Two four sided spinners are spun, and the numbers given by each added together.



(i) Complete the probability state space diagram to show all possible outcomes.

+	1	2	3	4
1				
2				
3				
4				

[1 mark]

(ii) What is the probability of spinning the most likely score ?

[1 mark]

Question 3

A 3.6 kg catering tin of baked beans has a height of 20 cm.
(That's a lot of beans !)
It is similar to a smaller, 450 g, tin of baked beans.
What is the height of the smaller tin ?

[2 marks]

Question 4

(i) Expand the brackets of $(x + 6)^2$

[1 mark]

(ii) Hence solve the following pair of simultaneous equations,

$$y = (x + 6)^2$$

$$y = x^2$$

[2 marks]

Question 5

What is the gradient of the line $y - 5x = 8$?

[1 mark]

Question 6

Make k the subject of the formula,

$$t = \frac{8 - 3k^2}{5}$$

[2 marks]

Question 7

A warship fires a sea skimming missile.

The missile travels at a constant 400 m/s towards a target 5 km away.

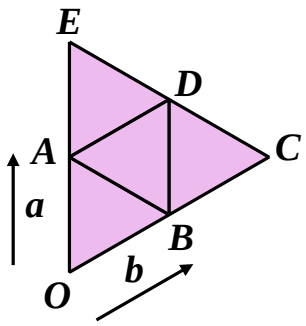
(i) What time elapses between missile launch and target impact ?

[1 mark]

(ii) Would the target be able to hear the missile coming ?

[1 mark]

Question 8



Write down in terms of ***a*** and ***b***;

(i) $\overrightarrow{OE}$ **(ii)** $\overrightarrow{DA}$

(iii) $\overrightarrow{CE}$ **(iv)** $\overrightarrow{BE}$

[2 marks]

Question 9

A sum of money is to be split between Amy, Mia and Rachael in the ratio 3 : 5 : 7

If Amy gets £225, what is the sum of money being split ?

[1 mark]

Question 10

Given that $p = 6$, $q = -9$ and $r = \frac{1}{3}$ calculate the following,

(i) pqr **(ii)** $\frac{pq}{r}$ **(iii)** $\frac{p - q}{p r^2}$

[2 marks]

Question 11

A class of twenty pupils were asked how much they enjoyed working on the "21 today" revision papers.
Here are the results:

*** ** ** **** * *** ** ****

**** *** ** ** ***** *** *** *****

*** ** *** ***

Number of stars	*	**	***	****	*****
Frequency					

(i) Fill in the frequency row of the table.

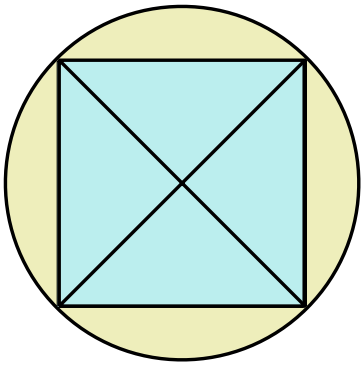
[1 mark]

(ii) Calculate the average (mean) star rating of the "21 today" revision papers.

[2 marks]

Question 12

Work out the area of a square drawn inside a circle of diameter 10 cm



[2 marks]

Question 13

Given that y is inversely proportional to the square of x and that y is 48 when x is 5, write down an equation connecting y and x which is of the form $y = \frac{k}{x^2}$ where k is the constant of the proportionality which is to be found.

[1 mark]

Question 14

Given that x is an integer, solve the inequality,

$$7 \leqslant x^2 + 3 < 28$$

[2 marks]

Question 15

Here is a trapezium $ABCD$,

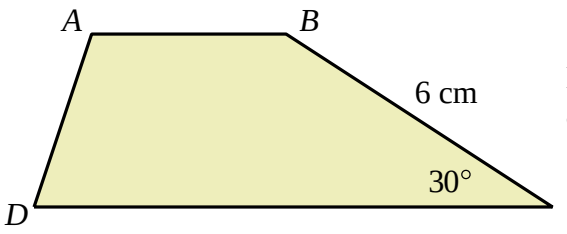


Diagram NOT accurately drawn

The area of the trapezium is 66 cm^2

the length of AB : the length of CD = 2 : 3

Find the length of AB

[4 marks]

Question 16

Solve the equation $x^2 = 16x - 48$

[2 marks]

Question 17

Write without any brackets, $\left(\frac{2\sqrt{x}}{3y^3} \right)^2$

[1 mark]

Question 18

A bag contains 5 red and 7 blue marbles.
First one, and then a second marble is removed from the bag.
What is the probability that both marbles are the same colour ?

[2 marks]

Question 19

George and Mildred buy a house.
The annual rate of house price inflation over the following year is 8%.
At the end of that first year George and Mildred's house is valued at £400000
What did they pay for it when they bought it ?

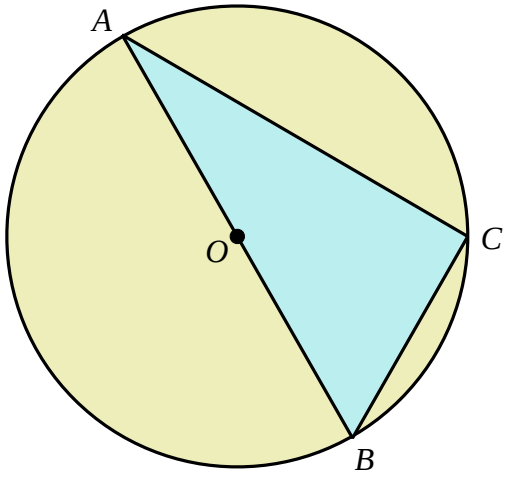
[1 mark]

Question 20

From a standard pack of 52 playing cards four are randomly chosen, one after the other WITHOUT REPLACEMENT.
What is the probability that all four cards are picture cards (King, Queen or Jack) ?

[1 mark]

21 Today !



A, *B* and *C* are points on the circumference of a circle, centre *O*
AOB is a diameter of the circle.
Prove that angle *ACB* is 90°
You must **not** use any circle theorems in your proof.

[3 marks]