

SEVENOAKS SCHOOL



YEAR 9 (13+) ENTRANCE EXAMINATION

April 2020
for entry in September 2021

MATHEMATICS

Your Name: _____

Your School: _____

Time allowed: 1 hour

Equipment needed: Pen, Pencil, Eraser.

Information for candidates:

1. Calculators, Rulers and Protractors are NOT allowed.
2. Write your name and school on this page.
3. Write your answers on the question paper in the space provided.
4. There are 20 questions in this paper. Try to answer all of them, but don't worry if you don't complete the paper. If you get stuck, just go on to the next question and if you have time at the end come back to the one(s) you left.
5. There are 60 marks in total available for this paper. Marks for each question are shown in square brackets [] after the question.
6. Show all your working. You may be awarded marks for correct working even if your final answer is incorrect, and a correct answer unsupported by correct working may not receive full marks.

1. Work out the value of $\frac{5}{7}$ of 63

_____ [2 marks]

2. Simplify $5x - 6y - x + 3y$

_____ [2 marks]

3. Simplify:

a. $w^8 \div w^2$

_____ [1 mark]

b. $5c^2d \times 3c$

_____ [2 marks]

4. By rounding each number to **2 significant figures**, **estimate** the answer to $\frac{24.3 \times 14.93}{123}$

_____ [2 marks]

5. Expand and simplify:

a. $4c(d - 5)$

_____ [2 marks]

b. $3x - (2x - 3)$

_____ [2 marks]

6. Complete the **missing numbers** in each of the function diagrams below.

a.



[1 mark]

b.



[1 mark]

c.



[1 mark]

7. Given that: $a - b = 5$

a. Work out the value of:

$$3(a - b)$$

_____ [1 mark]

b. Work out the value of:

$$b - a$$

_____ [1 mark]

8. Complete the grid so that when you multiply the three numbers in any column, row or diagonal the answer is **1**.

10		$\frac{1}{2}$
$\frac{1}{20}$		20
2	5	

[3 marks]

9. There are 24 boys, 45 girls and 281 adults in a badminton club.
50 more children join the club.
The number of girls is now 18% of the total number of members.
How many of the 50 children were boys?

_____ [4 marks]

10. A football team has P points.

$$P = 3W + D$$

W is the number of wins.

D is the number of draws.

A team gets 0 points for losing a match.

- a. A team has won 5 games, drawn 3 games and lost 1 game.
How many **points** does the team have?

_____ [1 mark]

- b. After 33 games a different team has 53 points.
11 games were draws.
How many games has this team **lost**?

_____ [3 marks]

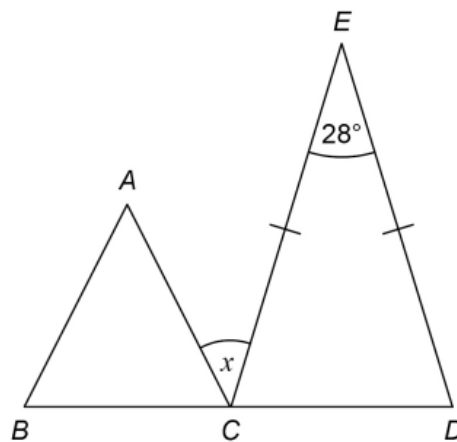
11. BCD is a straight line.

Triangle ABC is equilateral.

$$CE = DE$$

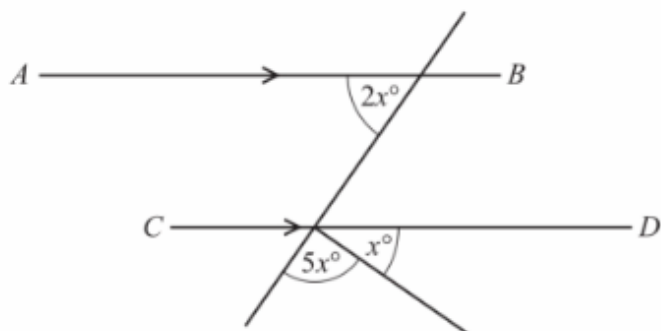
Work out the size of angle x .

Not drawn
accurately



_____ [4 marks]

12. AB is parallel to CD .
Calculate the value of x .



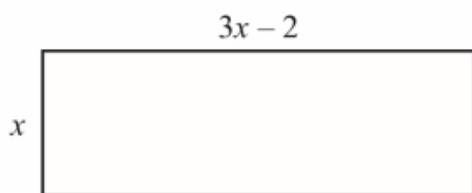
NOT TO SCALE

_____ [3 marks]

13. Nicola thinks of a number.
She doubles it, adds 4 to the answer, and then divides the result by 7.
The number she now has is 2.
Find the number she **first** thought of.

_____ [3 marks]

14. In this question all lengths are in centimetres.



NOT TO SCALE

- a. Form a **simplified** expression for the perimeter of this rectangle.

_____ [2 marks]

- b. The perimeter of this rectangle is 124 cm. Calculate the value of x .

_____ [3 marks]

15. Here are five cards.
One of the cards is removed.
The mean of the numbers on the remaining four cards is 6.
Which card was removed?
You **must** show your working.



_____ [2 marks]

16. The range of a set of numbers is $15\frac{1}{4}$
The smallest number is $-2\frac{7}{8}$
Work out the largest number.
Give your answer as a **mixed** fraction.

_____ [3 marks]

17. A sequence has three terms.
The term-to-term rule for the sequence is
multiply by 8 and then add 11
a. The first term of the sequence is -1
Work out the **third** term.

_____ [2 marks]

- b. The order of the three terms is reversed to make a new sequence.
Work out the **term-to-term rule** for this sequence.

_____ [1 mark]

18. Find the value of x .

$$\frac{1}{2} : \frac{2}{3} = x : 1$$

_____ [2 marks]

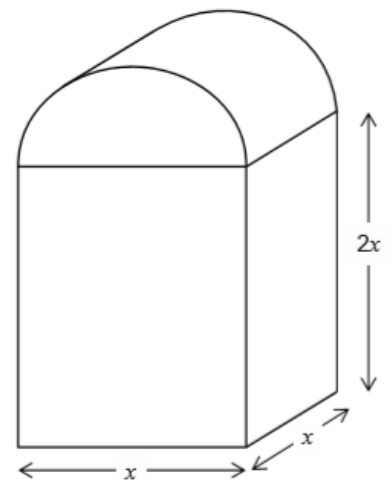
19. In this question all dimensions are in centimetres.

A solid has uniform cross section.

The cross section is a rectangle and a semicircle joined together.

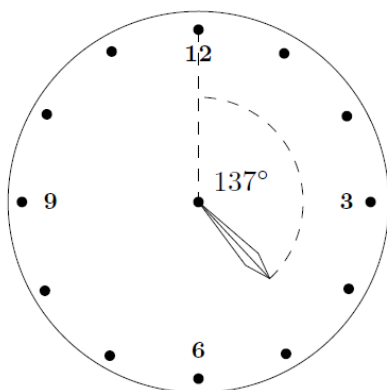
Work out an expression, in cm^3 for the **total** volume of the solid.

Give your answer in terms of π .



_____ [3 marks]

20. The minute hand of this clock is missing. How many minutes have passed since the last full hour, if the angle between the hour hand and twelve o'clock is 137° ?



_____ [3 marks]

Total Marks = 60