SEVENOAKS SCHOOL

YEAR 9 (13+) SCHOLARSHIP
May 2021
For entry in September 2021

MATHEMATICS

Your Name:_____

Your School:_____

Time allowed: 1 hour

Equipment needed: Pen, pencil, lined paper and eraser.

Information for candidates:

1. Calculators are NOT allowed.
2. Write your name and school on this page.
3. Write your answers on the **separate paper** provided.
   Please put your name on all the sheets of paper you use.
4. There are 10 questions in this paper. Attempt all of them.
5. Show working out for all questions.
6. Leave your answers in their simplest form.
7. The marks for each question are indicated in square brackets [ ].
   There are 50 marks on the paper.

1. Evaluate

a) $(1+\frac{1}{4})\,(1+\frac{1}{5})(1+\frac{1}{6})(1+\frac{1}{7})$ [3 marks]

b) $(4+5-2\times 6\div 2)^0+1$ [2 marks]

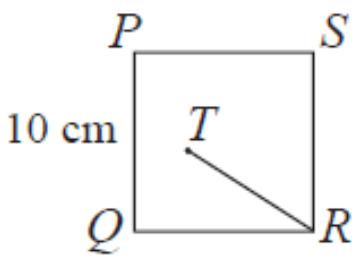
2. a) Simplify $3a-(4a-b)+2(\frac{1}{3}a-\frac{2}{5}b)$ [3 marks]

b) If $x+y^2=-4\ and\ 3x-2y^2=7$, find the value of $4x-y^2$ [2 marks]

3. Ningning writes down a list of five numbers.
The mean of her first three numbers is -3.
The mean of her first four numbers is 4.
The mean of her first five numbers is -5.
What is the difference between her fourth number and her fifth number? [5 marks]

4. If **k** is equivalent to 80%, then by what percent is **k** larger than $\mathbf{k}^2$? [5 marks]

5. In the diagram, PQRS is a square of side 10 cm. T is a point inside the square so that ∠SPT = 75° and ∠TSP = 30°. What is the length of TR?
Give a reason for each step in your working. [5 marks]

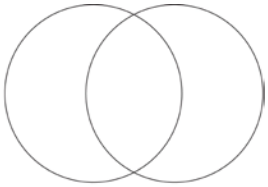


6. There are 100 people in a room, exactly 99% are teachers. How many teachers must leave the room to bring down the percentage to exactly 98%? [5 marks]

7. After tennis, Andy collects twice as many balls as Roger and five more than Nadal. They collect 35 balls in total. How many balls does Andy collect? [5 marks]

8. A jar contains red and white marbles in the ratio 1:4. When Alanna replaces 2 of the white marbles with 7 red marbles, the ratio becomes 2:3. What is the ratio of the total number of marbles in the jar now to the total number in the jar before? [5 marks]

9. Two circles of radius 1 intersect as shown



Not to scale

The area of intersection equals the area of the two outer parts. What is the area of the intersection? [5 marks]

10. The distance between Exeter and London is 175 miles. Ryan left Exeter at 10:00 on Friday for London. Natasha left London for Exeter at 13:00 the same day. They travelled on the same road. Up to the time when they met, Ryan's average speed was 25 miles per hour, and Natasha's average speed was 35 miles an hour. At what time did Ryan and Natasha meet? [5 marks]