## SEVENOAKS SCHOOL

YEAR 9 (13+) SCHOLARSHIP<br>May 2018<br>For entry in September 2018

## MATHEMATICS

Your Name: $\qquad$

Your School: $\qquad$

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 $\mathbf{1 2}$ questions in this paper. Attempt all of them.
5. Show working out for all questions. You will not get full marks unless you show method.
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.
8. (i) Given an animal is either a herbivore, a carnivore or an omnivore.

The ratio of herbivores to carnivores is 2:3.
The ratio of herbivores to omnivores is 4:3.
What is the ratio of carnivores to omnivores?
(ii) If $A$ is divided by $B$, the result is $\frac{2}{3}$. If $B$ is divided by $C$, the result is $\frac{4}{7}$. What is the result if A is divided by C ?
2. (i) Three numbers have a mean of 23 .

Two of the numbers have a mean of 12 .
Two of the numbers have a mean of 30 . What are the three numbers?
[4 marks]
(ii) This year in Mathematics, the teacher will be giving 5 tests, each scored out of 100 . If Natalya wishes to get an $\mathrm{A}^{*}$ average ( 90 or above), what is the lowest possible score she can receive on a test?
3. A water tank is $\frac{5}{6}$ full. When 30 litres of water are removed from the tank, the tank is $\frac{4}{5}$ full. How much water does the tank hold when full?
4. The triangle HIJ has the same area as the square FGHI.

FG has a length of 4 cm .
What is the perpendicular distance from J to the extension of the line FG?

5. In another 8 years, Yandi will be twice as old as Pascale.

Ten years ago, the sum of their ages was 21.
How old will Yandi be in 20 years from now?
6. (i) $\frac{6^{9} \times 9^{6}}{(6 \times 9)^{6}} \times 9=6 x$. Find $x$.
(ii) $25 \%$ of $\mathrm{m} \%$ of $\mathrm{m} \%$ of m is $\frac{27}{40}$. What is m ?
7. Rectangle DEFG has square ABCD removed, leaving an area of $92 \mathrm{~m}^{2}$. Side AE is 4 m and side $C G$ is 8 m .

Determine the original area (in $\mathrm{m}^{2}$ ) of rectangle DEFG.

8. Uttama can type 20 pages in 4 hours. Hanni types 20 pages in 5 hours.

900 pages have to be typed in total and they must finish typing together.
In these circumstances, how many pages must be given to Hanni?
9. In a box of mangoes, $80 \%$ of them are high quality while $20 \%$ are low quality. If 10 low quality mangoes are removed, then $96 \%$ of the rest will be high quality.

What is the total number of mangoes from the start?
10. Zuraida has a large circle of cookie dough. She cuts out 7 small cookies, as shown in the diagram below. She then gathers up all the left over parts and reshape them.

How many more cookies (of the same size) can she make?

11. Every day, Clive goes up an escalator on his journey to work. If he stands still, it takes him 60 seconds to travel from the bottom to the top. One day the escalator was broken so he had to walk up and this took him 90 seconds.

How many seconds would it take him to travel up the escalator if he walked up at the same speed as before while it was working
12. ABC is an isosceles triangle with $\mathrm{AB}=\mathrm{BC}$ and $\mathrm{AC}=\mathrm{BD}=\mathrm{DA}$ where D is a point on BC . What is angle ABC in degrees?


