

## QUIZ PAGE 6 Non-Calculator. KS4, KS5 (KS3).

\*means may be challenging. Team work is encouraged.

1. Find the value of the sum

$$1 + 2 + 3 + 4 + \dots + 98 + 99 + 100$$

NOTE:  $\dots$  means the pattern continues

2. Which number is halfway between 279 and 937 ?

3. How many different four digit numbers can be made using the digits

$$1, 2, 2, 1 \text{ ?}$$

4. If  $a + b = 280$  and  $b - c = 220$ , find the value of  $a + c$ .

5. An eight-digit number  $987*123$  is a multiple of 3.

Which digit could be represented by \* ?

6. A ten-digit number  $89999*9991$  is a multiple of 9.

Which digit could be represented by \* ?

7. If  $a + b = 10$ , and  $ab = 25$ , find the value of  $a^2 + b^2$ .

8. If  $a^2b = 10$  and  $ab^2 = 20$ , find the value of  $\frac{a}{b}$ .

9. If  $a+b = 1000$ , and  $ab = 25$ , find the value of  $\frac{1}{a} + \frac{1}{b}$ .

10. The number  $2^{10} - 1$  has three prime factors.

Find the three prime factors.

11. The number  $2^{16} - 1$  has a prime factor between 250 and 260.

Find the prime factor. (Extra: find the other three prime factors)

\*12. Work out the value of  $\frac{12^4 \times 18^6 \times 22}{24^5 \times 27^3}$

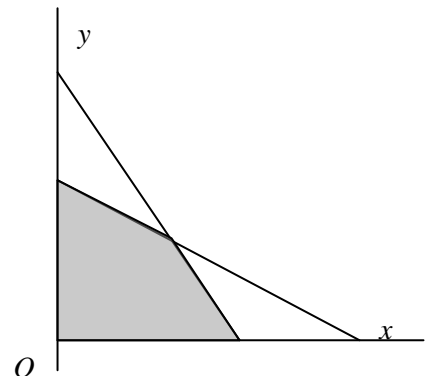
\* 13. Find the 4<sup>th</sup> root of the 3<sup>rd</sup> root of the square root of 4096.

$$\sqrt[4]{\sqrt[3]{\sqrt{4096}}}$$

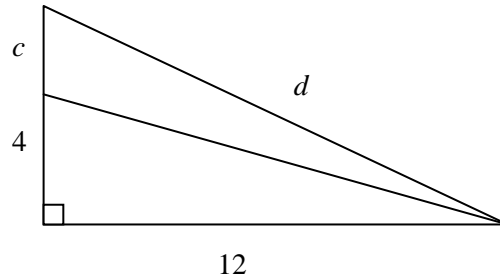
\* 14. The shaded region in the diagram is bounded by the lines

$3x + 2y = 30$ ,  $2x + 3y = 30$ , and the  $x$  and  $y$ -axes.

Work out the area of the shaded region.



\*15. If  $c + d = 4 + 12$ , work out the value of  $c$ .



\* 16. If the numbers  $\sqrt[3]{9}$ ,  $\sqrt{5}$ , 1, 2, 3 are arranged in ascending order.

Find the median (middle number).

\* 17. Find the sum of two numbers whose difference, sum and product are in the ratio 1 : 5 : 24

\*18. Work out the value of  $\sqrt[4]{\frac{5^{10} - 5^9}{20}}$

\*19. Solve the simultaneous:  $\frac{1}{x+8y} + \frac{2}{8x-y} = 7$

$$\frac{2}{x+8y} - \frac{1}{8x-y} = 4$$

\* 20. What is the units digit of the value of  $\sqrt{3\sqrt{3\sqrt{3\sqrt{3\dots}}}} + (5\sqrt{7})^2$  ?

**BONUS:**

PQ is the diameter of a circle. Q is a point on the circumference of the circle. The ratio of the area of the circle to the area of the triangle PQR is  $2\pi$ .

Work out the size of the smallest angle in triangle PQR.

