

Name: ..... School: .....



# TONBRIDGE SCHOOL

Test for Entrance into Year 9 in September 2015

## MATHEMATICS

Time allowed: 1 hour

Total Marks: 100

**THIS IS A NON-CALCULATOR PAPER**

***Instructions:***

1. Complete Name and School at the top of the cover page.
2. All questions should be attempted and answers given in the space provided.
3. A completely correct answer may receive no marks unless all workings are shown.

1. (a) Write 45% as a fraction **in lowest terms**.

Answer: ..... (2)

(b) Write  $\frac{5}{8}$  as a decimal.

Answer: ..... (2)

(c) Calculate 30% of \$12.50.

Answer: \$..... (2)

(d) Calculate  $\frac{7}{15}$  of 4.5 metres.

Answer: ..... (2)

2. (a) By **first writing each number correct to 1 significant figure**, estimate the answer to

$$\frac{11.4 \times 194}{93.1}$$

Answer: ..... (3)

- (b) Calculate  $2^3 \times \sqrt[3]{27}$ .

Answer: ..... (2)

- (c) Write 300 as a product of prime factors, **using indices**.

Answer: ..... (3)

- (d) What is the smallest integer by which 300 has to be multiplied by to produce a perfect square ?

Answer: ..... (2)

3. (a) It takes 2 hour 27 minutes to travel from York to London by train. Christopher catches the 11.35 a.m. train from York.

At what time should Christopher arrive in London ?

Answer: .....p.m. (2)

- (b) A race horse averages 2 miles every 5 minutes. How long will it take the horse to run 26 miles at this rate ?

Answer: ..... h ..... min (2)

- (c) How far does a car travel in 35 minutes at 30km/h ?

Answer: ..... km (2)

- (d) Write 40km/h as a speed in metres per second.

Answer: ..... m/s (2)

4. Calculate

(a) the sum of 73.5 and 9.74

Answer: ..... (1)

(b) the difference between 84 and 7.7

Answer: ..... (1)

(c) the product of 4.3 and 7

Answer: ..... (1)

(d)  $24 \div 0.4$

Answer: ..... (2)

5. (a) **Fully** simplify the following:

(i)  $2m + 3m$

Answer: ..... (1)

(ii)  $3y^3 \times 3y^3$

Answer: ..... (2)

(iii)  $\frac{9y^6}{3y^2}$

Answer: ..... (2)

(b) Multiply out the brackets **and fully simplify**

$$2(3p + 4q) - 6(p - 2q)$$

Answer: ..... (3)

(c) Factorise **completely**

$$9a^2 + 27a$$

Answer: ..... (2)

6. (a) Solve the following:

(i)  $5a - 3 = 21 - a$

Answer:  $a = \dots\dots\dots$  (1)

(ii)  $\frac{1}{3}(b + 1) = 10$

Answer:  $b = \dots\dots\dots$  (1)

(iii)  $5c^2 = 45$

Answer:  $c = \dots\dots\dots$  (2)

(iv)  $\frac{1}{2}(6d + 2) - 4 = 10$

Answer:  $d = \dots\dots\dots$  (3)

(v)  $\frac{10}{e} = 20$

Answer:  $e = \dots\dots\dots$  (1)

(b) Solve these inequalities:

(i)  $n + 2n > 9$

Answer: ..... (2)

(ii)  $2(n - 3) \leq 6$

Answer: ..... (2)

7 (a) 60 sweets are to be divided between two people in the ratio of 5:7.  
How many sweets do each of the two people receive ?

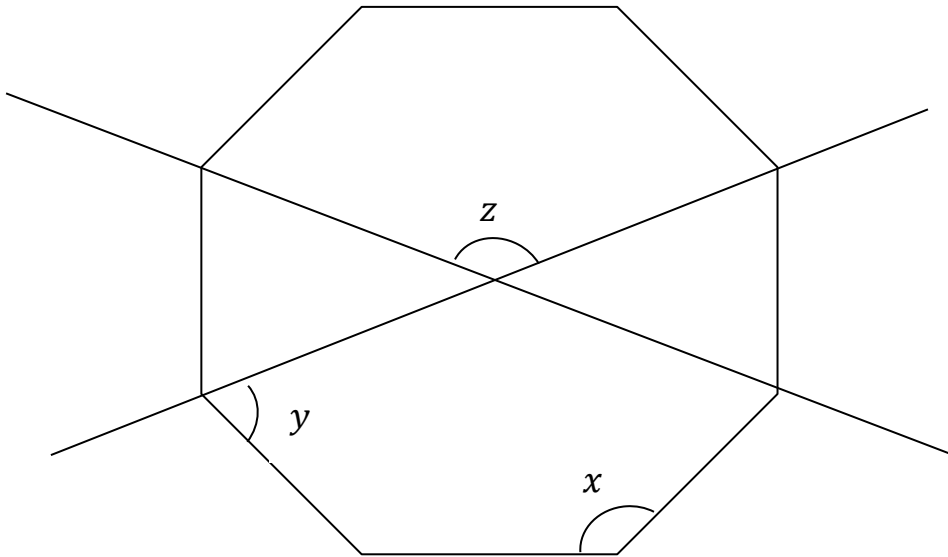
Answers: ..... and ..... (2)

(b) When £143 is divided in the ratio 2:4:5, what is the difference between the largest share and the smallest share ?

Answer: ..... (3)



8. Below is a picture of a regular octagon.



Calculate the size of the angles  $x$ ,  $y$  and  $z$

Answers:  $x = \dots\dots\dots$  (2)

$y = \dots\dots\dots$  (2)

$z = \dots\dots\dots$  (2)

9. Given that  $a = \frac{2}{5}$  and  $b = \frac{3}{4}$  and  $c = \frac{1}{3}$ , find the value of

(a)  $a + b$

Answer: ..... (2)

(b)  $\frac{12}{c}$

Answer: ..... (1)

(c)  $\frac{b}{c}$

Answer: ..... (2)

(d)  $abc$

Answer: ..... (2)

10. In the desert, every soldier drinks  $\frac{3}{5}$  of a litre of water each day.

An army patrol drinks 18 litres in a day

How many soldiers are there in the patrol ?

Answer: ..... (2)

11. A fair, six-sided dice has faces numbered 1, 2, 3, 4, 5 and 6. When the dice is thrown, the number facing up is the score.

The dice is thrown once.

(a) What is the probability that the score is 1 or 2

Answer: ..... (1)

(b) If the dice was thrown 300 times, how many times would a score of 5 be expected?

Answer: ..... (1)

12. **By first drawing a set of axes, draw the line defined by the equation**

$$y = 2x + 5$$

showing the coordinates where the line intercepts the axes.

(3)

13. The following graph is to be drawn

$$y = 2x^2 - 3x$$

- a) Complete the table

$x$	-2	-1	0	1	2	3
$x^2$						
$2x^2$						
$3x$						
$y$		5				9

(2)

- b) **By first drawing a set of axes**, then plotting appropriate points based on the information in the above table, draw the graph for the values  $-2 \leq x \leq 3$

(2)

14. The wage bill for five builders and six carpenters is £1,340, while the bill for eight builders and three carpenters is £1,220. What wage is paid to each builder?

Answer: ..... (4)

15. A sequence begins:

5 8 11 14 ..... .....

(a) Write down a formula for the  $n$ th term

Answer: ..... (2)

(b) Calculate the 25<sup>th</sup> term

Answer: ..... (1)

(c) Find the value of  $n$  when the  $n$ th term equals 146

Answer: ..... (2)

(d) Determine the value of the first term which is greater than 1000

Answer: ..... (2)

16. A *unit fraction* is one like  $\frac{1}{4}$  with numerator 1.

(a) Write 1 as the sum of three different unit fractions

Answer: ..... (2)

(b) By multiplying your answer to (a) by a suitable unit fraction, write  $\frac{1}{6}$  as the sum of three different unit fractions

Answer: ..... (2)

(c) Use your answers to (a) and (b) to write 1 as the sum of five different unit fractions

Answer: ..... (3)

**END OF PAPER**