Name: …….. School: ……

TONBRIDGE SCHOOL

Test for Entrance into Year 9: Specimen B

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

$$\frac{11.4 \text{ x } 194}{93.1}$$

Answer: …… (3)

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

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) $3y^3$ x $3y^3$

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 = ……. (1)

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

Answer: b = ……. (1)

(iii) $5c^2 = 45$

Answer: c = ……. (2)

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

Answer: d = ……. (3)

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

Answer: e = ……. (1)

(b) Solve these inequalities:

(i) $n + 2n > 9$

Answer: ..... (2)

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

Answer: ..... (2)

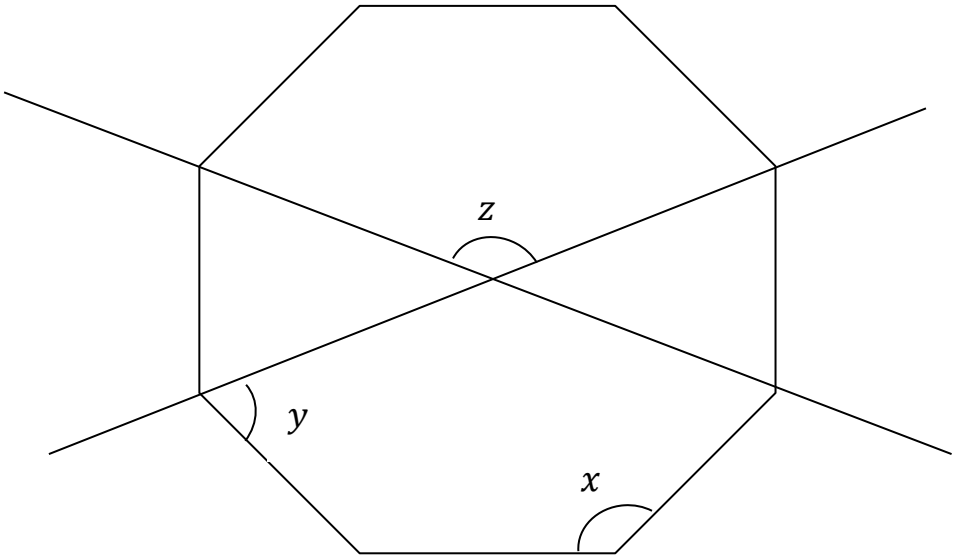
7 (a) 60 sweets are to be divided between two people in the ratio of 5:7.
How many sweets do each of the two people receive ?

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: $x =$ ..... (2)

$y =$ .... (2)

$z =$ .... (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 nth term

Answer: ……..……. (2)

(b) Calculate the 25^{th} term

Answer: ……..……. (1)

(c) Find the value of n when the nth 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