**Name: …….. School: ……**

# TONBRIDGE SCHOOL

**Year 9 Entrance Examinations: Specimen A**

## MATHEMATICS

**Saturday, 7th November 2015**

**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 62% as a fraction **in lowest terms**.

Answer: ……. (2)

(b) Write $\frac{2}{5}$ as a decimal.

Answer: ……. (2)

(c) Calculate 20% of $18.70.

Answer: $……. (2)

(d) Calculate $\frac{5}{12}$ of 720 metres.

Answer: ……. (2)

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

$$\frac{17.8. \times 227}{98.1}$$

Answer: …… (2)

(b) Calculate $3^3 \times \sqrt[3]{64}$.

Answer: …… (2)

(c) Write 108 as a product of prime factors, **using indices**.

Answer: …… (3)

(d) Find the Lowest Common Multiple of 14 and 10.

Answer: …… (2)

3. (a) It takes 5 hour 37 minutes to travel from Edinburgh to London by train. John catches the 11.35 a.m. train from Edinburgh.

At what time should John arrive in London?

Answer: ……p.m. (2)

(c) How far does a car travel in 40 minutes at 72km/h?

Answer: …… km (2)

(d) A runner runs a 100m race in exactly 10 seconds. What is his average speed in kilometres per hour?

Answer: ……. km/h (2)

4. Calculate

(a) the sum of 72.6 and 4.53.

Answer: ……. (2)

(b) the difference between 92 and 5.25.

Answer: ……. (2)

(c) the product of 7.6 and 9.

Answer: ……. (2)

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

(i) $7d + 14d$

Answer: …… (1)

(ii) $4y^3 \times 3y^4$

Answer: …… (2)

(iii) $\frac{24y^8}{9y^2}$

Answer: …… (2)

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

$$12(3p + 4q) - (p - 2q)$$

Answer: …… (3)

(c) Factorise **completely:**

$$6a^3 + 33a$$

Answer: …… (2)

6. Solve the following equations:

(a) $9a - 3 = 21 - a$

Answer: $a$ = ..... (2)

(b) $\frac{1}{6}(b + 1) = 10$

Answer: $b$ = ..... (2)

(c) $2c^2 = 50$

Answer: $c$ = ..... (2)

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

Answer: $f$ = ..... (2)

(e) $\frac{35}{x} = 10$

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

7. Solve these inequalities:

(a) $2n + 1 > 15$

Answer: ..... (2)

(b) $2(n - 4) \leq 16$

Answer: ..... (2)

8. (a) 156 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) An amount of money is divided into the ratio 2:4:5. The person with the smallest share receives £86. What does the person with the largest share receive?

Answer: ……. (2)

9. Given that $a = \frac{2}{3}$ and $b = \frac{3}{5}$ and $c = \frac{1}{6}$, find the value of

(a) $a + b$

Answer: ..... (2)

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

Answer: ..... (2)

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

Answer: ..... (2)

(d) $abc$

Answer: ..... (2)

10. A vehicle uses $\frac{2}{5}$ of a litre of petrol for every mile it covers.

It uses 16 litres in a day.

How many miles has it travelled?

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 less than 3?

Answer: ……. (1)

(b) If the dice was thrown 300 times, how many times would a score greater than 4 be expected?

Answer: ……. (2)

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

$$y = -\frac{1}{2}x + 5$$

showing the coordinates where the line intercepts the axes.

(3)

13. The following graph is to be drawn

$$y = 2x^2 - 4x$$

(a) Complete the table

| $x$ | -2 | -1 | 0 | 1 | 2 | 3 |
|---|---|---|---|---|---|---|
| $x^2$ | | | | | | |
| $2x^2$ | | | | | | |
| $4x$ | | | | | | |
| $y$ | | 6 | | | | 6 |

(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. Two sides of a regular hexagon, a square and a regular n-sided polygon meet at the point P.

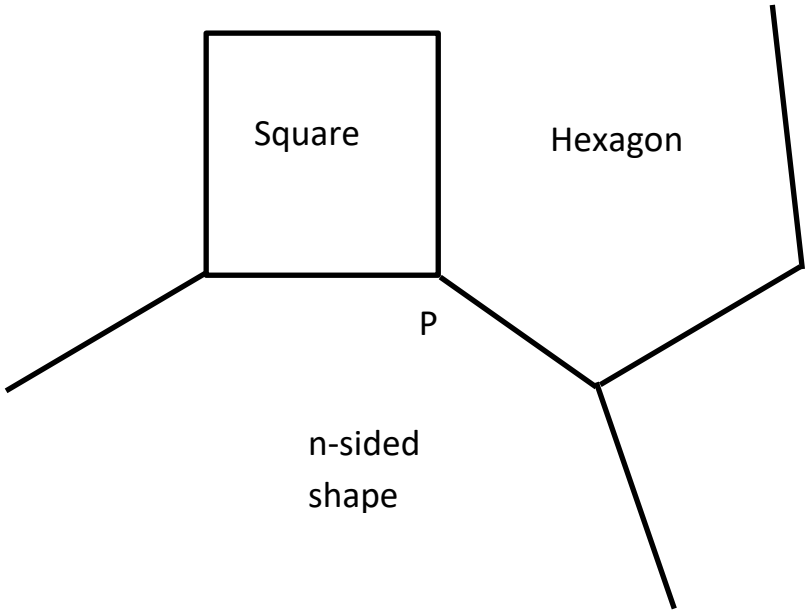



Diagram not accurately drawn

Find the value of n, showing your working clearly.

$n =$ ……. (3)

15. A man is 32 years older than his son. Ten years ago he was three times as old as his son was then. By forming an appropriate equation, or equations, find and list the age of each.

Answer: ……..……..……. (3)

16. A sequence begins:

10 8 6 4 …… …….

(a) Calculate the $25^{th}$ term.

Answer: ……..……. (2)

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

Answer: ……..……. (2)

(c) Find the value of $n$ when the $n$th term equals -36.

Answer: ……..……. (2)

(d) Determine the term number following which the sum of all terms turns negative.

Answer: ……..……. (2)

17. A man runs to a post and back in 900 seconds. His speed on the way to the post is 5m/s and his speed on the way back is 4m/s. Find the distance to the post.

Answer: ……..……. (3)

18. A bus is travelling with 52 passengers. When it arrives at a stop, $x$ get off and 4 get on. At the next stop one third of the passengers get off and 3 get on. There are now 25 passengers. Find $x$.

Answer: ……..……. (3)

19. A slot machine takes only 10p and 50p coins and it contains a total of twenty one coins altogether. The total value of these twenty one coins is £4.90. By forming suitable equations, find the number of coins of each value.

Answer: …….. (3)

**TOTAL MARKS = 100**