

# Entrance Examinations (13+)

**2018**

## **MATHEMATICS**

**One hour**

- Answer as many questions as possible, presenting your answers clearly and neatly and showing all relevant working in the spaces provided.
- Calculators may be used in any question unless stated otherwise. In a question where a calculator is prohibited, your working must display sufficient detail to show that it has not been used.
- If you cannot do a question, leave it and go on to the next. You might need to move fast to get to the end of the paper.

There are 19 questions; the total number of marks available is 75.

Name: ..... Age: .....

Present school: .....

1 Work out 12% of 480m

..... [2 marks]

2 Write each of these correct to 2 decimal places.

**a** 2.654

**b** 5.107

.....

.....

..... [1 mark]

..... [1 mark]

3 Change the following amounts by the percentages shown.

**a** Increase £78 by 13%

**b** Decrease £426 by 18%

.....

.....

..... [2 marks]

..... [2 marks]

4 Simplify each of the following.

**a**  $2(q + 3) + 3(q - 4)$

.....

..... [2 marks]

**b**  $x^2 \times x^5$

..... [1 mark]

**c**  $\frac{y^6}{y^3}$

.....

..... [1 mark]

5 Write each of these correct to 3 significant figures

**a** 5634

**b** 80251

.....

.....

..... [1 mark]

..... [1 mark]

6 Evaluate each of these, showing ALL of your working.

Cancel the answer to its simplest form or write as a mixed number as appropriate.

**a**  $\frac{2}{5} + \frac{1}{3}$

**b**  $\frac{2}{3} - \frac{2}{5}$

.....  
.....  
.....

[2 marks]

.....  
.....  
.....

[2 marks]

**c**  $\frac{3}{8} \times \frac{2}{9}$

**d**  $\frac{9}{14} \div \frac{3}{7}$

.....  
.....  
.....

[2 marks]

.....  
.....  
.....

[2 marks]

7

Arrange in order of ascending size (smallest first)

$5 \times 10^{-3}$ , 1.3%, 0.015,  $\frac{8}{1000}$

.....[3 marks]

8

(a) Showing your working (and without using a calculator), estimate the answer to

$$\frac{(13.2)^2 + 29.7}{6.9 \times 1.491}$$

..... [3 marks]

(b) Now work it out on your calculator instead. Give your answer correct to 3 significant figures.

..... [2 marks]

9 Solve these equations:

**a**  $3(x - 4) = 15$

**b**  $5x - 3 = 2x + 9$

.....  
.....  
.....  
.....

[3 marks]

.....  
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.....  
.....

[3 marks]

10 Divide £230 in the ratio 2:3.

.....  
.....  
.....

[3 marks]

11 I buy a car at £1700 and sell it for £2040. Calculate

**a** my profit

.....

[1 mark]

**b** my percentage profit

.....

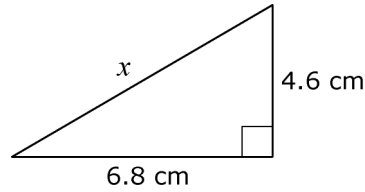
[2 marks]

12 Which is larger,  $\frac{2}{3}$  of  $2\frac{2}{5}$  or  $\frac{2}{5}$  of  $2\frac{2}{3}$ ? Show your working.

.....  
.....  
.....  
.....

[3 marks]

13 Find the length  $x$  in this triangle.



.....

.....

.....

[3 marks]

14 Simplify the following expression:

$$\frac{2a^2bc^3 \times 6a^3b^2c}{4ab^3c^2}$$

.....

[4 marks]

15 **a** There are 240 pupils in Year 11. Forty-five of them are left-handed.

What is the ratio (in its lowest terms) of left-handed : right-handed pupils in Year 11?

.....

.....

[3 marks]

**b** When the 210 pupils in Year 10 are included, the ratio of left-handed : right-handed pupils changes to 2 : 7.

How many left-handed pupils are there in Year 10?

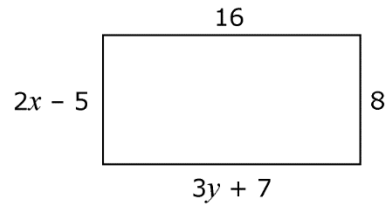
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[3 marks]

16 The diagram shows a rectangle.

**a** Find the value of  $x$ .

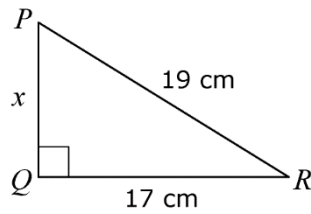


.....  
..... [2 marks]

**b** Find the value of  $y$ .

..... [2 marks]

17 Calculate length  $x$  in triangle  $PQR$ .



.....  
.....  
..... [3 marks]

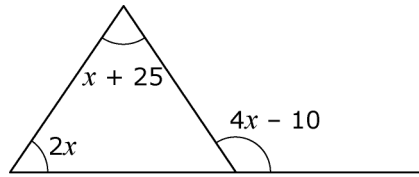
18 Solve these equations:

**a**  $\frac{n}{3} + 8 = 10$

**b**  $\frac{2x - 7}{2} = 6$

.....  
.....  
..... [3 marks]      ..... [3 marks]

19 The diagram shows a triangle, with an exterior angle shown.



Find the value of  $x$ .

.....

.....

..... [4 marks]

**END OF EXAM – BE SURE TO CHECK YOUR WORK THOROUGHLY**