12+ ENTRANCE EXAMINATION

SOLIHULL

SAMPLE PAPER

MATHEMATICS

INFORMATION FOR CANDIDATES

Time: 1 hour 30 minutes

In each question you should put your answer in the box provided. The mark for each question is shown in brackets.

Calculators may <u>not</u> be used.

1.

$$\begin{array}{rr} & 7291 \\ + & \underline{2236} \end{array}$$ is

[1 mark]

2.

$$\begin{array}{rr} & 3031 \\ - & \underline{1128} \end{array}$$ is

[1 mark]

3.

$$\begin{array}{rr} & 34 \\ \times & \underline{23} \end{array}$$ is

[1 mark]

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4. $\frac{3184}{8}$ is

[1 mark]

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5. How many seconds are there in 21 minutes?

[1 mark]

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6. All these fractions are different:

$\frac{9}{12}$ $\frac{8}{9}$ $\frac{14}{18}$ $\frac{50}{60}$

(i) Which is the smallest fraction?

[1 mark]

(ii) Which is the biggest fraction?

[1 mark]

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7. Work out:

(i) $\frac{1}{2} + \frac{1}{4}$

[2 marks]

(ii) $\frac{2}{5} - \frac{1}{3}$

[2 marks]

(iii) $\frac{3}{7} \times \frac{1}{9}$

[2 marks]

(iv) $\frac{1}{3} \div \frac{1}{6}$

[2 marks]

(v) $\frac{1}{2} + \frac{1}{3} + \frac{1}{4}$

[2 marks]

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8. Work out the following:

(i) 1 + 2 x 3

[1 marks]

(ii) 5 + 7 − 2 x 4

[2 marks]

(iii) 11.9 – 4.42

[1 mark]

(iv) 2.1 x 1.9

[2 marks]

(v) Work out 10% of £40 + 15% of £60

£

[2 marks]

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9. a = 3, b = 5, c = −6.

Find the values of:

(i) a + b + c

[1 mark]

(ii) a − b − c

[1 mark]

(iii) abc

[2 marks]

(iv) $a(b - c)$

[2 marks]

(v) $a^2 + b^2 + c^2$

[2 marks]

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10. Find the value of x in these equations:

(i) $2x = 62$

x =

[1 mark]

(ii) $3x + 1 = 19$

x =

[2 marks]

(iii) $2(x + 6) = 31$

x =

[2 marks]

(iv) $2x + 7 = 4x - 15$

x =

[3 marks]

(v) $\frac{3}{x} = 18$

x =

[2 marks]

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11. Find the next **two** numbers in these sequences. Write your answers in the gaps.

(i) 5, 9, 13, 17, 21 _____ _____

[2 marks]

(ii) 14, 13, 11, 8, 4, _____ _____

[2 marks]

(iii) 3, 5, 9, 17, 33, _____ _____

[2 marks]

(iv) 1, 4, 9, 16, 25, _____ _____

[2 marks]

(v) 32, 16, 8, 4, 2, _____ _____

[2 marks]

(vi) 2, 3, 5, 8, 13, _____ _____

[2 marks]

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12. In this question the shapes are NOT drawn to scale.

(i) Find the perimeter (the total length around the outside of the shape) of the rectangle below.



cm

[1 mark]

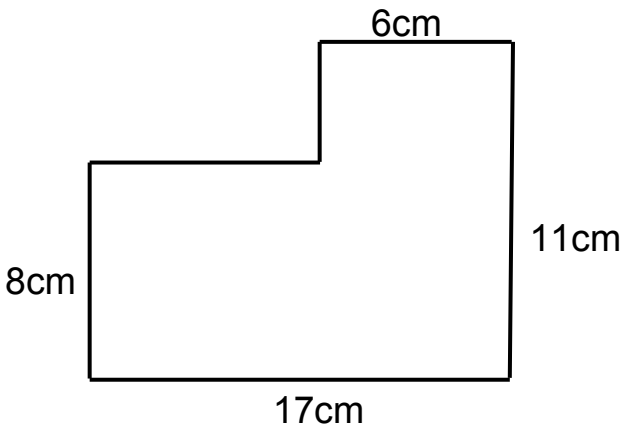
(ii) The perimeter of the rectangle below is 120cm. Find its area.



cm^2

[2 marks]

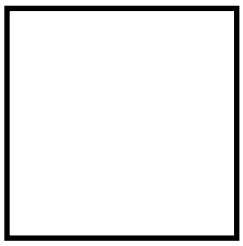
(iii) Find the area of the shape below:



cm^2

[2 marks]

(iv) The square below has an area of 169cm^2. Find its perimeter.



cm

[2 marks]

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13. When we multiply 5 by itself the answer is 25. We call 5 the square root of 25. Similarly the square root of 49 is 7 because 7 x 7 = 49.

(i) Write down the square roots of

(a) 4

[1 mark]

(b) 121

[1 mark]

(c) 400

[1 mark]

(ii) Some numbers do not have an exact square root; for instance, if we try 40, 6 is too small (6 x 6 = 36) and 7 is too large (7 x 7 = 49). The square root of 40 is between 6 and 7.

Complete the following statements with the two numbers nearest the square root required.

(a) The square root of 6 is between and

[1 mark]

(b) The square root of 84 is between and

[1 mark]

(c) The square root of 801 is between and

[1 mark]

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14. A man cycles from Birmingham to Leicester, which is 44 miles away. He starts at 9.00 am and cycles at 9 miles per hour until 1.00pm when he has a puncture.

(i) How far has he gone?

miles

[2 marks]

(ii) How much further has he to go?

miles

[1 mark]

(iii) He walks the rest of the way to Leicester and arrives at 5.00 pm. What is his average speed for this section of the journey if he started walking at 1.00pm?

mph

[1 mark]

(iv) He catches a train back from Leicester to Birmingham, and travels at 66 miles per hour. How long does the return journey take?

minutes

[2 marks]

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15. Every month John, Peter and Helen received a sum of money which was divided so that Helen received five times as much as John, and Peter received twice as much as Helen.

(i) What sum of money did Peter receive in March if Helen received £20?

£

[2 marks]

(ii) What sum of money did they receive altogether in April if Peter received £60?

£

[2 marks]

(iii) If they received £160 altogether in May, how much did John receive that month?

£

[2 marks]

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16. (i) What is the angle between the hands of a clock at 9:00am?

[1 mark]

(ii) What is the angle between the hands of a clock at 1:00pm?

[2 marks]

(iii) What is the angle between the hands of a clock at 1:30pm?

[2 marks]

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17. One quarter of the people at a party are men, a half are girls, one sixth are women, and there are five boys. How many people were at the party?

[3 marks]

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18. The rule **a * b** means (**a x a) + (b x b)**

That is, you multiply the first number by the first number, the second number by the second number and then you add your answers together.

For example, 6 * 4 = (6 x 6) + (4 x 4)
= 36 + 16
= 52

(i) Work out 3 * 1.

[1 mark]

(ii) Work out 3 * 2 + 1 * 0.

[2 marks]

(iii) a * 8 = 208. Work out the value of a.

[2 marks]

(iv) b * 2 = 4b. Work out the value of b.

[2 marks]

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19. Which multiple of 11 is nearest to 1000?

[3 marks]

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20. What number is halfway between 137 and 859?

[3 marks]

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21. 3/8 of a number is 27. What is ½ of the number?

[3 marks]

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22. I am thinking of a number less than 50. When I divide my number by 7 I get a remainder of 3. When I divide my number by 5 I get a remainder of 2. What is my number?

[3 marks]

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23. How many 20cm by 30cm carpet tiles are needed to cover a 5m by 6m rectangular floor?

[2 marks]

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24. The total of the ages of a father, his daughter and his two twin sons is 96 years. The daughter's age is half the father's age and twice the age of each of her two brothers. How old is the father?

[3 marks]

END OF EXAMINATION