13+ ENTRANCE EXAMINATION

SOLIHULL

SAMPLE PAPER

MATHEMATICS

INFORMATION FOR CANDIDATES

Time: 1 hour

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.

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1. 7 0 2 9
\+ <u>1 3 3 2</u> is

[1 mark]

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2. 8 7 0 1
\- <u>3 4 6 8</u> is

[1 mark]

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3. 3 5
x <u>4 3</u> is

[1 mark]

---

4. $\underline{6\ 2\ 7\ 9}$
7 is

[1 mark]

---

5. Work out

(i) $\frac{1}{2}+\frac{1}{3}$

[2 marks]

(ii) $2\frac{1}{4}+3\frac{1}{5}$

[2 marks]

(iii) $\frac{3}{10}\times\frac{5}{9}$

[2 marks]

(iv) $2\frac{1}{2} \times 3\frac{1}{3}$

[2 marks]

(v) $\frac{3}{7} \div \frac{5}{14}$

[2 marks]

(vi) $\frac{1}{2} + \frac{1}{4} + \frac{1}{8}$

[2 marks]

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6. Work out the following:

(i) 3 + 4 x 5

[1 mark]

(ii) 3 + 8 – 6 x 3

[2 marks]

(iii) 19.5 – 1.842

[2 marks]

(iv) 4.1 x 1.9

[2 marks]

(v) Divide £84 in the ratio 5:7

:

[2 marks]

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7. 8 pens cost £11.60. Find the cost of:

(i) 1 pen

£

[1 mark]

(ii) 6 pens

£

[2 marks]

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8. Henry took tests in Mathematics, English and French.

In Mathematics he scored 32 out of 40.

In English he scored 24 out of 40.

In French he scored 56 out of 80.

What <u>percentage</u> did he achieve in:

(i) Mathematics?

[2 marks]

(ii) English?

[2 marks]

(iii) French?

[2 marks]

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9. Work out 5% of £10 + 15% of £20

£

[2 marks]

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10. $a = 4,\ b = 6,\ c = -8$

Find the value of:

(i) $a + b + c$

[1 mark]

(ii) $a - b - c$

[1 marks]

(iii) abc

[2 marks]

(iv) $a(b + c)$

[2 marks]

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

[2 marks]

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11. Find the value of x in these equations.

(i) $2x + 4 = 30$

x =

[1 mark]

(ii) $3x + 35 = 40$

x =

[2 marks]

(iii) $2x - 7 = x + 9$

x =

[2 marks]

(iv) $4(x - 3) = 2x - 18$

x =

[3 marks]

(v) $x^2 + 36 = 100$

x =

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12. Simplify the following expressions:

(i) $3a + 8a - 2a$

[1 mark]

(ii) $4a - 2b + 3a - 10b - 5a$

[2 marks]

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13. 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]

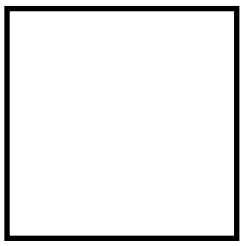
(ii) The perimeter of the rectangle below is 38cm. Find its area.



cm^2

[2 marks]

(iii) The square below has an area of 225cm^2. Find its perimeter.



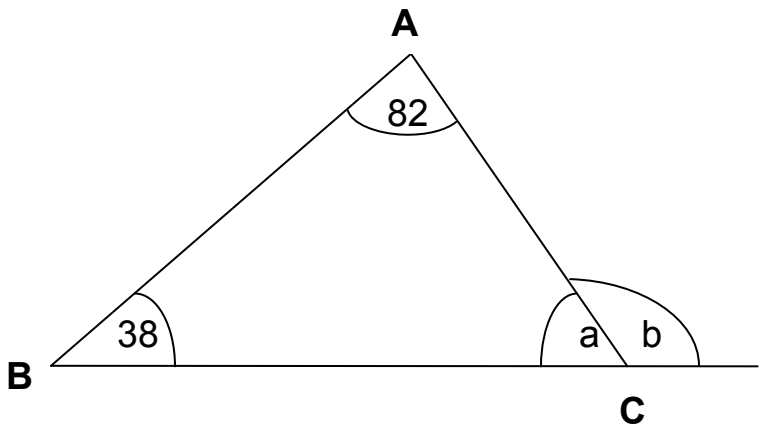
cm

[2 marks]

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

(i)



Find angles a and b

a =

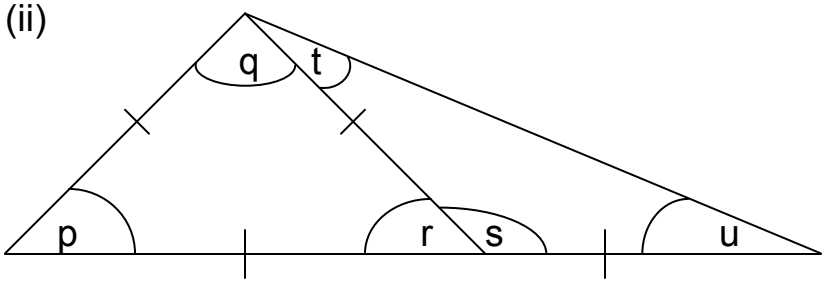
b =

[3 marks]

What sort of triangle is ABC?

[1 mark]

(ii)



Find, without measuring, all the angles in this picture.

p =

q =

r =

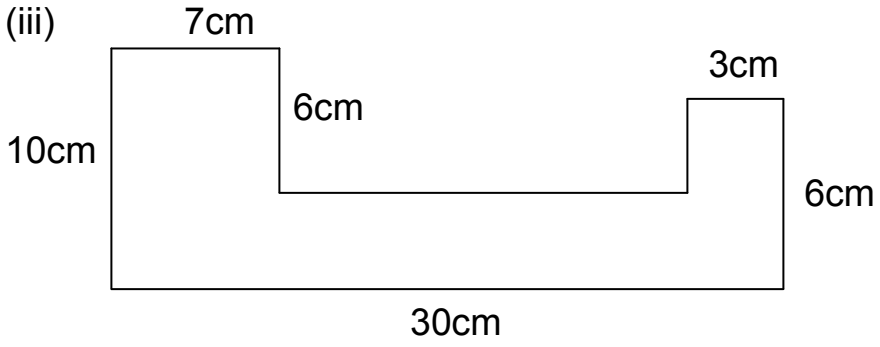
s =

t =

u =

[3 marks]

(iii)



(a) Calculate the area of this shape

cm^2

[3 marks]

(b) Calculate the total distance round the shape

cm

[2 marks]

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15. 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]

16.

(i) Helen drives at 60 km/h for 2 ½ hours.
How far does she go?

km

[1 mark]

(ii) She then drives at 40 km/h for 1 ½ hours.
How far does she go?

km

[1 mark]

(iii) What is the total distance she travels?

km

[1 mark]

(iv) What is her average speed for the whole journey?

km/h

[2 marks]

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17. Amy, Sam and Charles share some sweets.

Sam has twice as many as Charles.

Amy has three times as many as Sam.

(i) If Charles gets 6 sweets, how many does Amy get?

[2 marks]

(ii) If, on another occasion, Sam has 6 sweets, how many sweets are there altogether?

[2 marks]

(iii) If, on a third occasion, Amy has 16 more sweets than Sam, how many sweets does Charles have?

[2 marks]

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18. The n^{th} term of a sequence is given by the formula **4n − 1**

(i) Find the first 3 terms of the sequence

[2 marks]

(ii) Find the 100^{th} term of the sequence

[1 mark]

Find a formula for the n^{th} term of the following sequences:

(iii) 8, 13, 18, 23, 28, ……..

[2 marks]

(iv) 1, 4, 9, 16, 25, ……..

[2 marks]

19. A girl has as many brothers as she has sisters, but each of her brothers has only half as many brothers as sisters. How many sisters are there and how many brothers are there?

sisters

brothers

[3 marks]

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20. A rule for numbers is to **multiply by 7 and subtract 3**

For example, if you start with 10, you multiply by 7 to get 70 and then subtract 3 to get 67. So the answer you get if you apply the rule to 10 is 67.

(i) What is the answer if you apply the rule to the number 5?

[1 mark]

(ii) What is the answer if you apply the rule <u>twice</u> starting with the number 2?

[2 marks]

(iii) If the rule is applied to a number the answer is 81.
What was the starting number?

[2 marks]

(iv) If the rule is applied to a number the answer is −3.
What was the starting number?

[2 marks]

(v) The rule is applied to the number N and the answer is 4N.
What is the number N?

[2 marks]

21. 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.

[2 marks]

(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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22. Amy, Brian and Claire spent an afternoon picking strawberries. Amy picked 3kg more than Brian but 2kg less than Claire. If Brian picked three-quarters of the amount that Claire picked, how many did the three friends pick altogether?

kg

[3 marks]

END OF EXAMINATION