14+ 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. Work out:

(i) $\frac{1}{2}+\frac{2}{7}$

[2 marks]

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

[2 marks]

(iii) $\frac{3}{5}\times\frac{10}{21}$

[2 marks]

(iv) $2\frac{1}{2}\times3\frac{1}{3}$

[2 marks]

(v) $\frac{3}{8} \div \frac{5}{12}$

[2 marks]

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

[2 marks]

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2. Work out

(i) 14.07 + 11.901

[1 mark]

(ii) 2.9 – 1.909

[1 mark]

(iii) 4.9 x 2.1

[2 marks]

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3. The bill for 7 similar meals at a restaurant came to £164.36.
Find the cost of:

(i) 1 meal

£

[1 mark]

(ii) 5 meals

£

[2 marks]

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4. Work out:

5% of £5.00 + 10% of £10.00

£

[2 marks]

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5. (i) Increase 180kg by 30%

kg

[2 marks]

(ii) Decrease £300 by 12%

£

[2 marks]

(iii) Increase 100cm by 10% and then decrease your answer by 10%

cm

[2 marks]

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

In Mathematics he scored 60 out of 80.

In English he scored 24 out of 40 .

In French he scored 56 out of 80.

What percentage did he achieve in:

(i) Mathematics

[2 marks]

(ii) English

[2 marks]

(iii) French

[2 marks]

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7. $a = 3,\ b = -4,\ c = -5$

Find the value of:

(i) $a + b + c$

[1 mark]

(ii) $a - b - c$

[2 marks]

(iii) abc

[2 marks]

(iv) $a^4 + b^3 + c^2$

[2 marks]

(v) $\frac{a - c}{b - c}$

[2 marks]

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8. Find the value of x in these equations showing a clear method:

(i) $2x + 4 = 25$

x =

[2 marks]

(ii) $3x - 19 = 38$

x =

[2 marks]

(iii) $3x + 4 = 5x + 6$

x =

[3 marks]

(iv) $3(2x - 1) = 3x + 5$

x =

[3 marks]

(v) $\frac{3x + 1}{2} = 5 + 2x$

x =

[3 marks]

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9. Expand the following:

(i) $x(2x + 5)$

[2 marks]

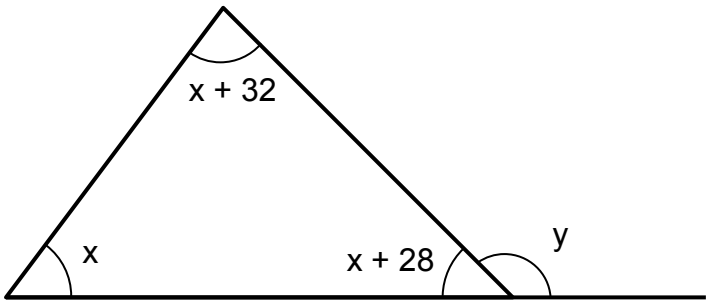
(ii) Simplify:

$3a - 3b + 4a - 2b - 6a$

[2 marks]

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10. In this question the shapes below are **not** drawn to scale.



(i) Find the value of *x* in the above triangle.

x =

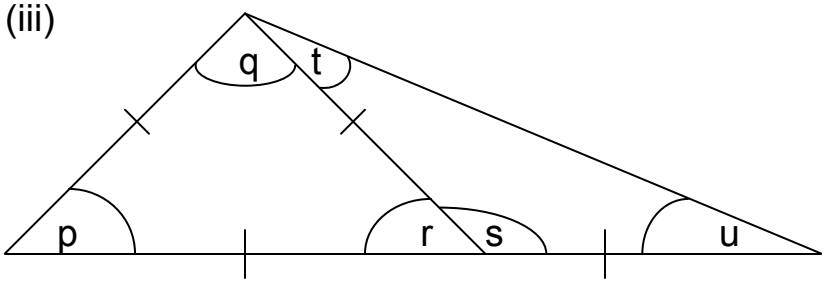
[2 marks]

(ii) Work out the value of y.

y =

[2 marks]

(iii)



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

p =

q =

r =

s =

t =

u =

[3 mark]

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11. 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]

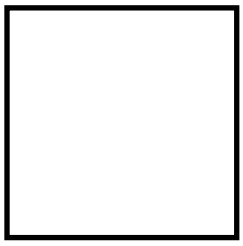
(ii) The perimeter of the rectangle below is 70cm. Find its area.



cm^2

[2 marks]

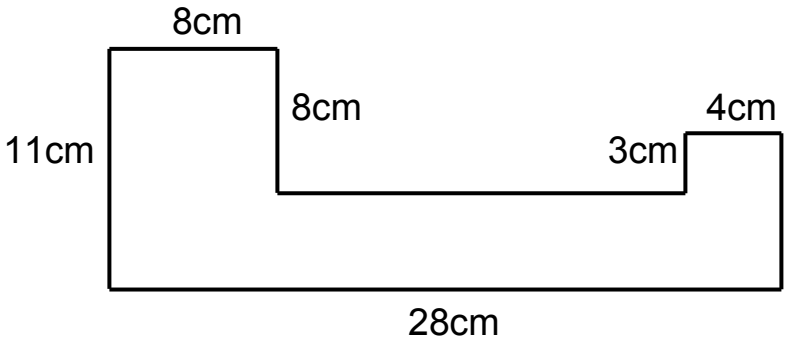
(iii) The square below has an area of $400cm^2$. Find its perimeter.



cm

[2 marks]

(iv) Calculate the area of this shape.



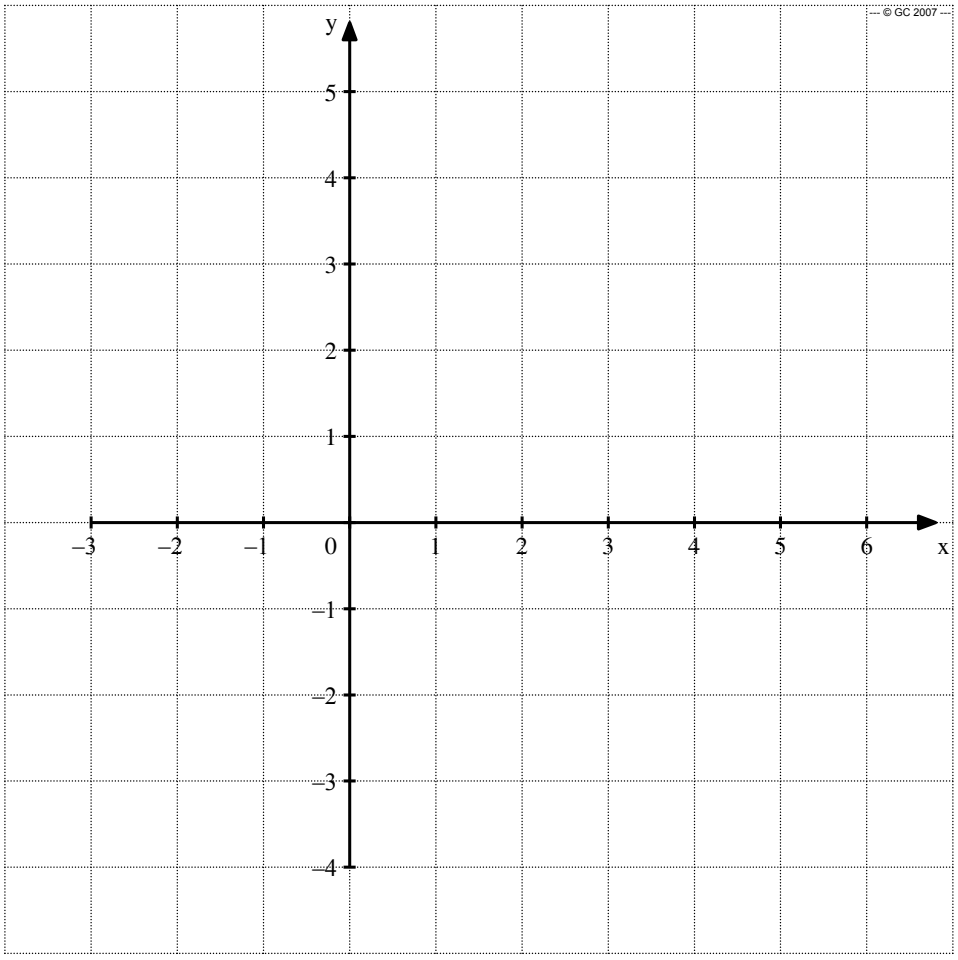
cm^2

[3 marks]

12. (i) On the graph below draw the lines:

$y = 3x - 2$

$y = 4 - x$



(ii) Give the coordinates of the point of intersection of the two lines:

[5 marks]

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

(i) 6, 10, 14, 18, 22 _____ _____

[2 marks]

(ii) 1, 2, 4, 7, 11, _____ _____

[2 marks]

(iii) 81, 27, 9, 3, 1, _____ _____

[2 marks]

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

[2 marks]

(v) 19, 13, 8, 4, 1, _____ _____

[2 marks]

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

[2 marks]

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14. I roll a fair 6-sided dice.

(i) What is the probability that I roll a square number?

[1 mark]

(ii) What is the probability that I roll a prime number?

[1 mark]

I now roll a fair 6-sided dice and toss a fair 50p coin at the same time.

(iii) What is the probability that I roll a six on the die and get a head on the coin?

[2 marks]

(iv) I now toss a fair coin 10 times and get a tail on each occasion. What is the probability I get a tail on the next toss of the coin?

[2 marks]

15. Helen drives at 70 km/hr for 3 ½ hours.

(i) How far does she go?

km

[2 marks]

(ii) She then drives at 60 km/hr 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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16. Amy, Sam and Charles share some sweets.

Sam has three times as many as Charles.

Amy has four times as many as Sam.

(i) If Charles gets 3 sweets, how many does Amy get?

[2 marks]

(ii) If, on another occasion, Sam has 12 sweets, how many sweets are there altogether?

[2 marks]

(iii) If, on a third occasion, Amy has 33 more sweets than Charles, how many sweets does Sam have?

[2 marks]

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17. The n^{th} term of a sequence is given by the formula **9n – 2.**

(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) 7, 13, 19, 25, ……..

[2 marks]

(iv) 1, 8, 27, 64, ……..

[2 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]

19. Ellie has a certain number of tennis balls and a certain number of bags to keep them in. If 9 balls are put in each bag, one ball is left over. If 11 balls are put in each bag, exactly one bag is empty. How many tennis balls and how many bags are there?

Balls	Bags

[4 marks]

20. A perfect number is a number which is equal to the sum of all its factors that are less than itself. For example, the factors of 6 less than it are 1, 2 and 3.

6 = 1 + 2 + 3, so 6 is a perfect number.

(i) Show that 24 is not a perfect number

[3 marks]

(ii) Find a perfect number that lies between 20 and 30.

[2 marks]

END OF EXAMINATION