

SHREWSBURY SCHOOL

3RD FORM ENTRANCE EXAMINATION FOR ENTRY IN SEPTEMBER 2014

MATHEMATICS

1 HOUR

Attempt **all** questions.

Answer on lined or squared paper. Do **not** write directly onto this question paper.

You may use a calculator.

There are 80 marks available in total.

Relevant working must be shown in order to gain high marks.

1) Here is a list of numbers:

2 4 12 16 17 48 53 68

- a) Write down all the multiples of 8 in the list.
b) Write down all the prime numbers in the list.

[4 marks]

2) Fred goes shopping and buys the following:

3 loaves of bread at £1.25 each
4 jars of raspberry jam at £2.69 each
1 tub of butter at £1.39

He pays for all this with two £10 notes. How much change does he receive?

[4 marks]

3) You are given that $a = 6$, $b = -4$, $c = 9$. Evaluate each of the following:

- a) $2a - 3b$ b) $5\sqrt{c}$ c) $\frac{4a - c}{b + 1}$

[5 marks]

4) a) Mary and Elizabeth share 63 cupcakes in the ratio 5 : 4.
Calculate how many each one receives.

- b) Mary and Elizabeth also share some smarties in the same ratio.
If Mary gets 65 smarties, how many does Elizabeth receive?

[4 marks]

5) You must show **full working** in order to obtain any marks in this question.

Evaluate the following, giving your answers as **simplified fractions**:

- a) $\frac{1}{8} + \frac{5}{8}$ c) $\frac{5}{12} \times \frac{6}{15}$
b) $\frac{7}{10} - \frac{2}{3}$ d) $\frac{3}{5} \div \frac{9}{10}$

[8 marks]

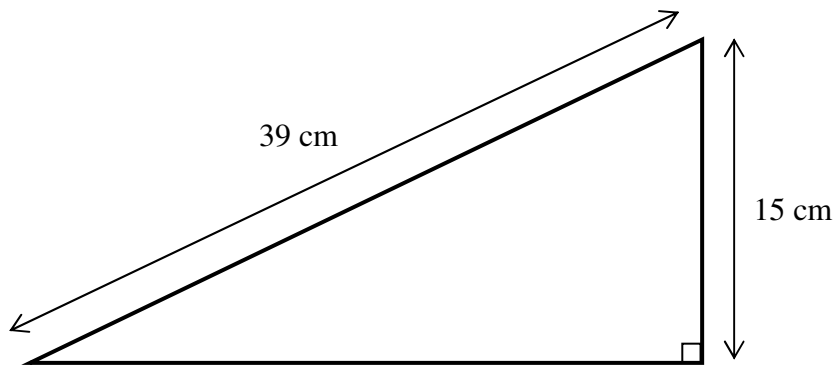
- 6) a) In a French vocab test, Victor scores 12 out of 30. What is his score as a percentage?
- b) In a German listening test, Heidi scores 95%. If the test was out of 120, how many marks did Heidi get?
- c) The number of pupils in a school increases from 720 one year to 765 the next year. What is the percentage increase in the number of pupils?
- d) The price of a box of Coco Pops is reduced by 30% in a sale. If it now costs only £2.03, how much did it cost before the sale?

[8 marks]

- 7) A cuboid has edges of length 3 cm, 5 cm and 8 cm.
- a) Calculate the volume of the cuboid, giving the correct units in your answer.
- b) Calculate the total surface area of the cuboid, again giving the correct units.
- A cube has the same volume as the cuboid above.
- c) Calculate the length of one edge of this cube.

[8 marks]

- 8) The diagram below shows a right-angled triangle.



- a) Calculate the length of the base of the triangle.
- b) Find the perimeter of the triangle.
- c) The triangle is enlarged so that the height is now 25 cm. Calculate the new length of the longest side.

[7 marks]

- 9) a) A circle has a radius of 20 cm. Calculate the area of the circle to 3 significant figures, giving the correct units in your answer.
- b) A **semicircle** has radius r .

Show carefully why the perimeter P of the semicircle is given by the formula:

$$P = (\pi + 2)r.$$

[6 marks]

- 10) Solve the following equations:

a)	$4x - 5 = 23$	c)	$\frac{5x}{7} = 6$
b)	$3(x + 2) = 5x - 8$	d)	$\frac{3}{x} = 12$

[9 marks]

- 11) Simplify the following expressions:

a)	$5x - 7y - 6x + 9y$	c)	$\frac{8x^3y^2}{20xy^4}$
b)	$(4d - 3h) - (2d - 7h)$		

[6 marks]

- 12) a) Expand the following expressions:

i) $3(x + 7)$

ii) $4v(5v - 6w)$

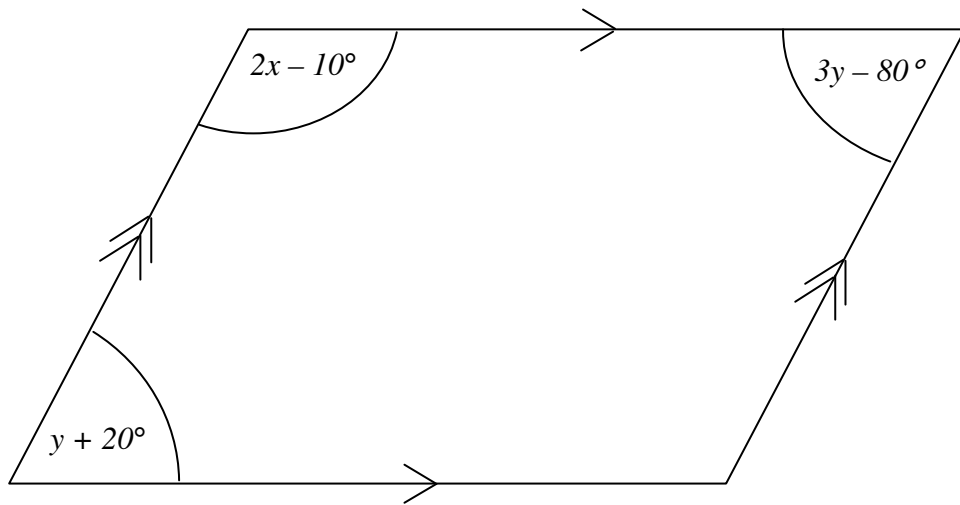
- b) Factorise the following expressions:

i) $7y - 14$

ii) $4ef + 20f^2$

[6 marks]

13) Calculate the values of x and y in the parallelogram below:



[5 marks]

++++ END +++++