# 2500/405

NATIONAL QUALIFICATIONS 2009

WEDNESDAY, 6 MAY 1.30 PM - 2.25 PM MATHEMATICS STANDARD GRADE Credit Level Paper 1 (Non-calculator)

#### 1 You may NOT use a calculator.

- 2 Answer as many questions as you can.
- 3 Full credit will be given only where the solution contains appropriate working.
- 4 Square-ruled paper is provided.





#### FORMULAE LIST

The roots of  $ax^2 + bx + c = 0$  are  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ 

Sine rule:  $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$ 

**Cosine rule:**  $a^2 = b^2 + c^2 - 2bc \cos A$  or  $\cos A = \frac{b^2 + c^2 - a^2}{2bc}$ 

**Area of a triangle:** Area  $=\frac{1}{2}ab$  sin C

**Standard deviation:**  $s = \sqrt{\frac{\sum (x - \overline{x})^2}{n - 1}} = \sqrt{\frac{\sum x^2 - (\sum x)^2 / n}{n - 1}}$ , where *n* is the sample size.

			KU	RE
1.	Evaluate	$(846 \div 30) - 1.09.$	2	
2.	Evaluate	$4\frac{1}{3}-1\frac{1}{2}$ .	2	
3.	Given that	$f(x) = x^2 + 3,$		
	( <i>a</i> ) evaluate $f(-4)$		2	
	(b) find t when $f(t)$	= 52.		2
4.	(a) Factorise			
		$x^2 - 4y^2.$	1	
	(b) Expand and sim	plify		
		(2x-1)(x+4).	1	
	(c) Expand	$x^{\frac{1}{2}}(3x+x^{-2}).$	2	
		[Turn over		

## **5.** In triangle ABC:

- angle ACB =  $90^{\circ}$
- AB = 8 centimetres
- AC = 4 centimetres.



Calculate the length of BC.

Give your answer **as a surd in its simplest form**.

**6.** There are 4 girls and 14 boys in a class.

A child is chosen at random and is asked to roll a die, numbered 1 to 6.



Which of these is more likely?

A: the child is female.

## OR

B: the child rolls a 5.

#### Justify your answer.

7. This year, Ben paid  $\pounds 260$  for his car insurance. This is an increase of 30% on last year's payment.

How much did Ben pay last year?

3

KU RE

3

### 8. In triangle PQR:

- PQ = x centimetres
- PR = 5x centimetres
- QR = 2y centimetres.



- (a) The perimeter of the triangle is 42 centimetres.Write down an equation in x and y to illustrate this information.
- (b) PR is 2 centimetres longer than QR.Write down another equation in x and y to illustrate this information.
- (*c*) Hence calculate the values of *x* and *y*.
- 9. A formula used to calculate the flow of water in a pipe is

$$f = \frac{kd^2}{20}.$$

Change the subject of the formula to d.

[Turn over

KU RE

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2

3

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10. The diagram below shows the path of a rocket which is fired into the air.The height, *h* metres, of the rocket after *t* seconds is given by

KU RE

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2



- (a) For how many seconds is the rocket in flight?
- (b) What is the maximum height reached by the rocket?

## **11.** In triangle ABC:

- BC = 6 metres
- AC = 10 metres
- angle ABC =  $30^{\circ}$ .



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Given that  $\sin 30^\circ = 0.5$ , show that  $\sin A = 0.3$ .

[END OF QUESTION PAPER]