

2500/405

NATIONAL
QUALIFICATIONS
2006

FRIDAY, 5 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: $s = \sqrt{\frac{\sum(x - \bar{x})^2}{n-1}} = \sqrt{\frac{\sum x^2 - (\sum x)^2 / n}{n-1}}$, where n is the sample size.

KU	RE
2	
2	
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1. Evaluate

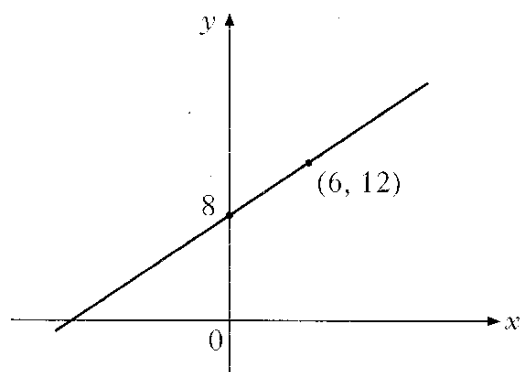
$$56 \cdot 4 - 1 \cdot 25 \times 40.$$

2. Evaluate

$$1\frac{3}{5} + 2\frac{1}{7}.$$

3. Given that $f(x) = 4 - x^2$, evaluate $f(-3)$.

4.



Find the equation of the given straight line.

[Turn over

KU	RE
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5. (a) Factorise

$$4x^2 - y^2.$$

(b) Hence simplify

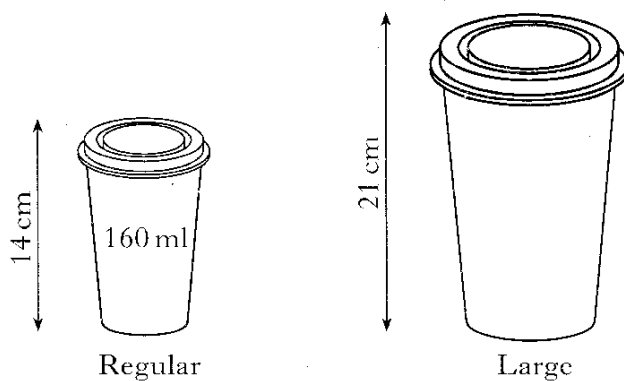
$$\frac{4x^2 - y^2}{6x + 3y}$$

6. Solve the equation

$$x - 2(x + 1) = 8.$$

7. Coffee is sold in regular cups and large cups.

The two cups are mathematically similar in shape.



The regular cup is 14 centimetres high and holds 160 millilitres.

The large cup is 21 centimetres high.

Calculate how many millilitres the large cup holds.

KU	RE

8. The graph of $y=x^2$ has been moved to the position shown in Figure 1.

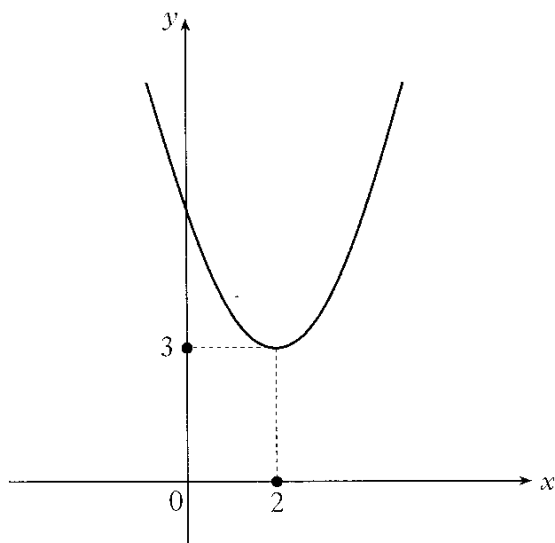


Figure 1

The equation of this graph is $y=(x-2)^2+3$.

The graph of $y=x^2$ has now been moved to the position shown in Figure 2.

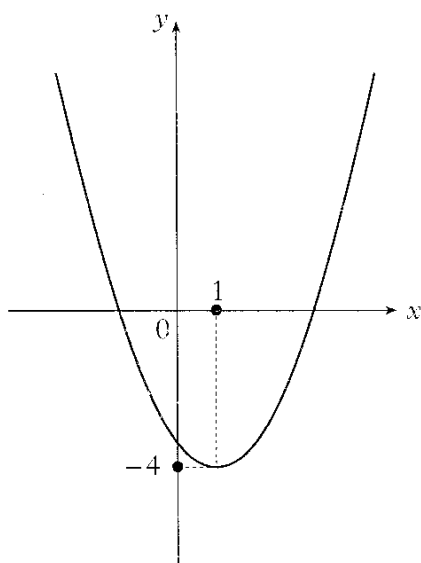


Figure 2

Write down the equation of the graph in Figure 2.

2

[Turn over

9. Euan plays in a snooker tournament which consists of 20 games.

He wins x games and loses y games.

(a) Write down an equation in x and y to illustrate this information.

(b) He is paid £5 for each game he wins and £2 for each game he loses.

He is paid a **total** of £79.

Write down another equation in x and y to illustrate this information.

(c) How many games did Euan **win**?

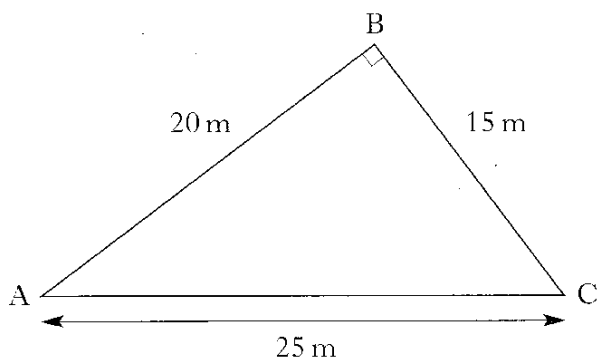
1

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10. Triangle ABC is right-angled at B.

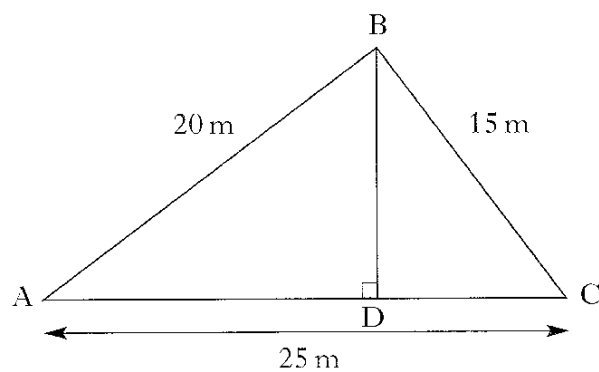
The dimensions are as shown.



(a) Calculate the area of triangle ABC.

(b) BD, the height of triangle ABC, is drawn as shown.

1



Use your answer to part (a) to calculate the height BD.

3

KU	RE
	1
	2
	3

11. (a) One session at the Leisure Centre costs £3.

£3 per session

Write down an algebraic expression for the cost of x sessions.

- (b) The Leisure Centre also offers a monthly card costing £20. The **first 6** sessions are then free, with each additional session costing £2.

Monthly card
£20

* first 6 sessions free
* each additional session £2

- (i) Find the **total** cost of a monthly card and 15 sessions.
- (ii) Write down an algebraic expression for the **total** cost of a monthly card and x **sessions**, where x is greater than 6.
- (c) Find the minimum number of sessions required for the monthly card to be the cheaper option.

Show all working.

[END OF QUESTION PAPER]