

2500/405NATIONAL
QUALIFICATIONS
2003THURSDAY, 8 MAY
1.30 PM – 2.25 PMMATHEMATICS
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	
3	
1	
2	
2	

1. Evaluate

$$5 \cdot 04 + 8 \cdot 4 \div 7.$$

2. Evaluate

$$\frac{2}{7} \left(1\frac{3}{4} + \frac{3}{8} \right).$$

3. Simplify

$$3(2x - 4) - 4(3x + 1).$$

4.

$$f(x) = 7 - 4x$$

(a) Evaluate $f(-2)$.

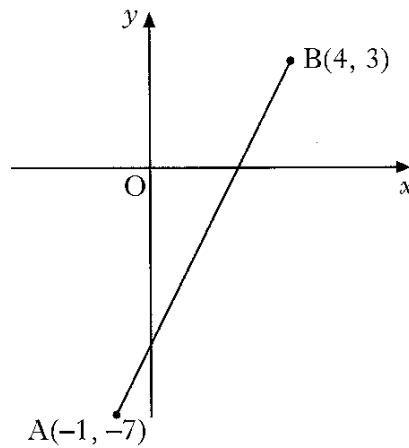
(b) Given that $f(t) = 9$, find t .

5. Factorise

$$2x^2 - 7x - 15.$$

[Turn over

6. In the diagram below, A is the point $(-1, -7)$ and B is the point $(4, 3)$.



- (a) Find the gradient of the line AB.
- (b) AB cuts the y -axis at the point $(0, -5)$.
Write down the equation of the line AB.
- (c) The point $(3k, k)$ lies on AB.
Find the value of k .

7. Andrew and Doreen each book in at the Sleepwell Lodge.

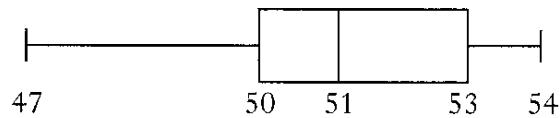
- (a) Andrew stays for 3 nights and has breakfast on 2 mornings.
His bill is £145.
Write down an algebraic equation to illustrate this.
- (b) Doreen stays for 5 nights and has breakfast on 3 mornings.
Her bill is £240.
Write down an algebraic equation to illustrate this.
- (c) Find the cost of one breakfast.

KU	RE
1	
1	
	2
1	
1	
	3

8. A mini lottery game uses **red, green, blue** and **yellow** balls.
 There are 10 of **each** colour, numbered from 1 to 10.
 The balls are placed in a drum and one is drawn out.

- (a) What is the probability that it is a **6**?
 (b) What is the probability that it is a **yellow 6**?

9. A random check is carried out on the contents of a number of matchboxes.
 A summary of the results is shown in the boxplot below.



What percentage of matchboxes contains fewer than 50 matches?

10. School theatre visits are arranged for parents, teachers and pupils.
 The ratio of parents to teachers to pupils **must** be 1 : 3 : 15.

- (a) 45 pupils want to go to the theatre.
 How many teachers must accompany them?
 (b) The theatre gives the school 100 tickets for a play.
 What is the maximum number of pupils who can go to the play?

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KU	RE
1	
1	
	1
1	
	3

13. A rectangular clipboard has a triangular plastic pocket attached as shown in Figure 1.

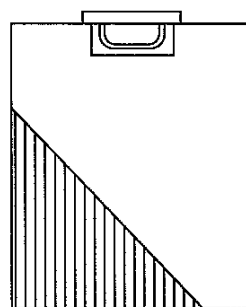


Figure 1

The pocket is attached along edges TD and DB as shown in Figure 2.

B is x centimetres from the corner C.

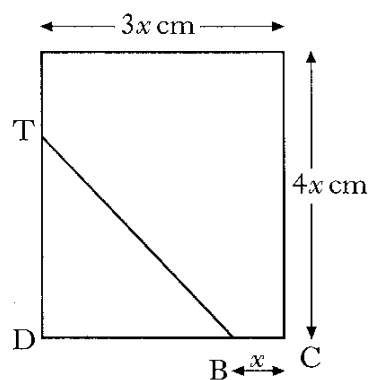


Figure 2

The length of the clipboard is $4x$ centimetres and the breadth is $3x$ centimetres.

The area of the pocket is a quarter of the area of the clipboard.

Find, in terms of x , the length of TD.

4

[END OF QUESTION PAPER]