

**2500/405**

---

NATIONAL  
QUALIFICATIONS  
2001WEDNESDAY, 16 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 =  $\frac{1}{2}ab \sin C$

**Volume of a cylinder:** Volume =  $\pi r^2 h$

**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	
2	
3	
3	
1	

1. Evaluate

$$3 \cdot 1 + 2 \cdot 6 \times 4.$$

2. Evaluate

$$3\frac{5}{8} + 4\frac{2}{3}.$$

3. Given that  $f(m) = m^2 - 3m$ , evaluate  $f(-5)$ .

4. Solve **algebraically** the equation

$$2x - \frac{(3x-1)}{4} = 4.$$

5. A furniture maker investigates the delivery times, in days, of two local wood companies and obtains the following data.

<i>Company</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Lower Quartile</i>	<i>Median</i>	<i>Upper Quartile</i>
Timberplan	16	56	34	38	45
Allwoods	18	53	22	36	49

(a) Draw an appropriate statistical diagram to illustrate these two sets of data.

(b) Given that consistency of delivery is the most important factor, which company should the furniture maker use? Give a reason for your answer.

[Turn over

6. A is the point  $(a^2, a)$ .

T is the point  $(t^2, t)$ ,  $a \neq t$

Find the gradient of the line AT.

Give your answer in its simplest form.

3

7. A garage carried out a survey on 600 cars.

The results are shown in the table below.

		Engine size (cc)			
		0–1000	1001–1500	1501–2000	2001+
Age	Less than 3 years	50	80	160	20
	3 years or more	60	100	120	10

(a) What is the probability that a car, chosen at random, is less than 3 years old?

1

(b) In a sample of 4200 cars, how many would be expected to have an engine size greater than 2000cc **and** be 3 or more years old?

2



KU	RE
3	
1	
2	
	3

10. Simplify

$$\frac{\sqrt{3}}{\sqrt{24}}$$

Express your answer as a fraction with a rational denominator.

11. The intensity of light,  $I$ , emerging after passing through a liquid with concentration,  $c$ , is given by the equation

$$I = \frac{20}{2^c} \quad c \geq 0.$$

- (a) Find the intensity of light when the concentration is 3.
- (b) Find the concentration of the liquid when the intensity is 10.
- (c) What is the maximum possible intensity?

[END OF QUESTION PAPER]

**2500/406**

---

NATIONAL  
QUALIFICATIONS  
2001WEDNESDAY, 16 MAY  
2.45 PM – 4.05 PMMATHEMATICS  
STANDARD GRADE  
Credit Level  
Paper 2

- 1 You may 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 =  $\frac{1}{2}ab \sin C$

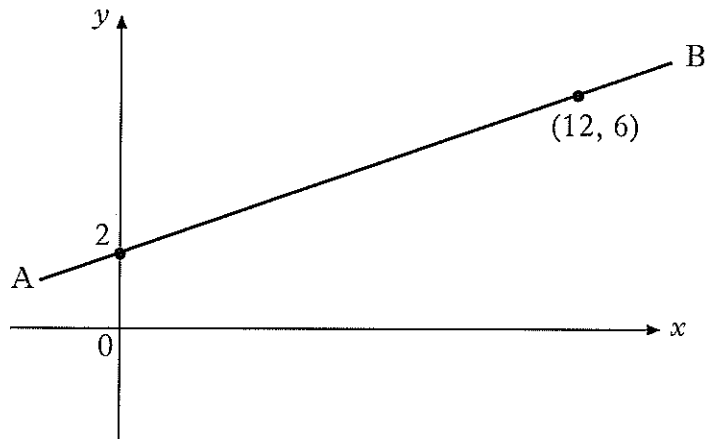
**Volume of a cylinder:** Volume =  $\pi r^2 h$

**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.





4. A water pipe runs between two buildings.  
These are represented by the points A and B in the diagram below.



- (a) Using the information in the diagram, show that the equation of the line AB is  $3y - x = 6$ .
- (b) An emergency outlet pipe has to be built across the main pipe. The line representing this outlet pipe has equation  $4y + 5x = 46$ .

Calculate the coordinates of the point on the diagram at which the outlet pipe will cut across the main water pipe.

5. A cylindrical soft drinks can is 15 centimetres in height and 6.5 centimetres in diameter.

A new cylindrical can holds the same volume but has a reduced height of 12 centimetres.

What is the diameter of the new can?

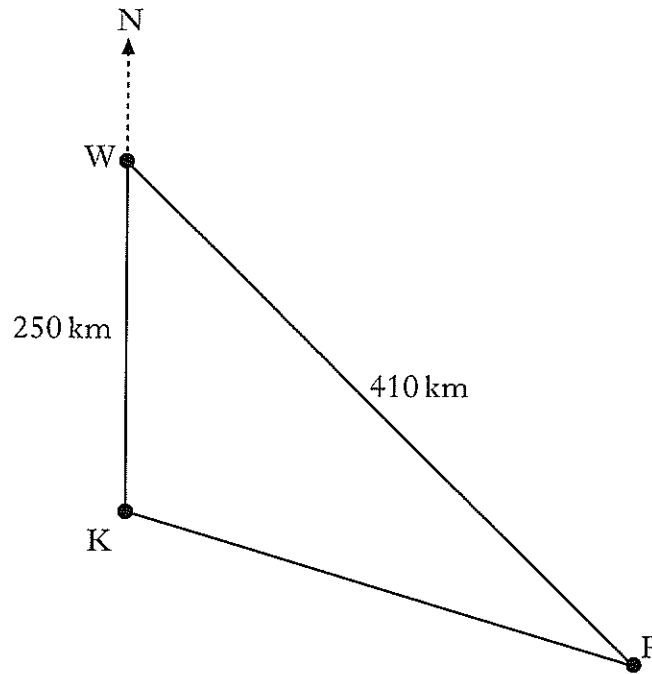
Give your answer to 1 decimal place.

3

4

4

6. Three radio masts, Kangaroo (K), Wallaby (W) and Possum (P) are situated in the Australian outback.



Kangaroo is 250 kilometres due south of Wallaby.

Wallaby is 410 kilometres from Possum.

Possum is on a bearing of  $130^\circ$  from Kangaroo.

Calculate the bearing of Possum from Wallaby.

**Do not use a scale drawing.**

7. Solve **algebraically** the equation

$$\tan 40^\circ = 2\sin x^\circ + 1 \quad 0 \leq x < 360.$$

KU	RE
	4
3	

[Turn over

