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H

GENERAL CERTIFICATE OF SECONDARY EDUCATION

MATHEMATICS A

A502/02

Unit B (Higher Tier)

Candidates answer on the question paper.

OCR supplied materials:
None

Other materials required:
- Geometrical instruments
- Tracing paper (optional)

Monday 13 June 2011
Afternoon

Duration: 1 hour

Candidate forename		Candidate surname	

Centre number						Candidate number				

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Your answers should be supported with appropriate working. Marks may be given for a correct method even if the answer is incorrect.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Answer **all** the questions.
- Do **not** write in the bar codes.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- Your Quality of Written Communication is assessed in questions marked with an asterisk (*).
- The total number of marks for this paper is **60**.
- This document consists of **16** pages. Any blank pages are indicated.

WARNING

No calculator can be used for this paper

This paper has been pre modified for carrier language

OCR
RECOGNISING ACHIEVEMENT

ERRATUM NOTICE

H

GENERAL CERTIFICATE OF SECONDARY EDUCATION

MATHEMATICS A **A502/02**
Unit B (Higher Tier)

Monday 13 June 2011
Afternoon

FOR THE ATTENTION OF
THE EXAMINATIONS OFFICER
To be opened on the day of the exam

Instructions to Invigilators:

Before the start of the examination, please read out to candidates the following notice (please read out this notice **twice** to ensure understanding):

Please turn to **Page 13, Question 11, part (b):**

The question currently reads:

Work out the value of *a* in this question.

$$\left(6-\sqrt{a}\right)\left(6+\sqrt{a}\right)=33$$

Cross through this question.

Do not answer this question.

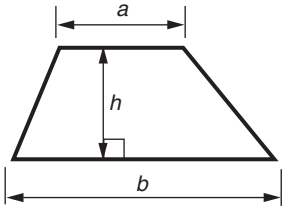
The paper will be marked out of a total of 58 marks.

Any enquiry about this notice should be referred to the Customer Contact Centre on 01223 553 998 or general.qualifications@ocr.org.uk

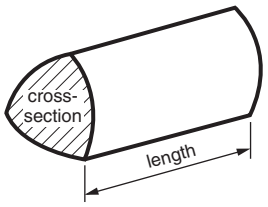
Ref: JUN11/erratum

Formulae Sheet: Higher Tier

Area of trapezium $= \frac{1}{2}(a + b)h$



Volume of prism = (area of cross-section) × length

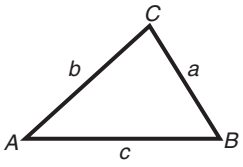


In any triangle *ABC*

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

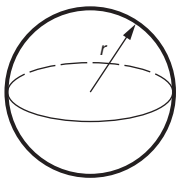
Cosine rule $a^2 = b^2 + c^2 - 2bc\cos A$

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



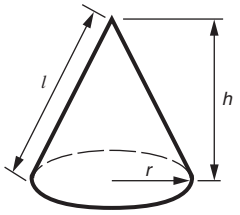
Volume of sphere $= \frac{4}{3}\pi r^3$

Surface area of sphere $= 4\pi r^2$



Volume of cone $= \frac{1}{3}\pi r^2 h$

Curved surface area of cone $= \pi rl$



The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$,
where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

PLEASE DO NOT WRITE ON THIS PAGE

1 Mark is organising a party for his group of 17 Scouts.

(a) (i) Each Scout will need $\frac{3}{4}$ of a pizza.

How many pizzas should Mark buy?

(a)(i) _____ **[3]**

(ii) The pizzas normally cost £2.60 each.
Mark is given a discount of 15% off this price.

How much does Mark pay for each pizza?

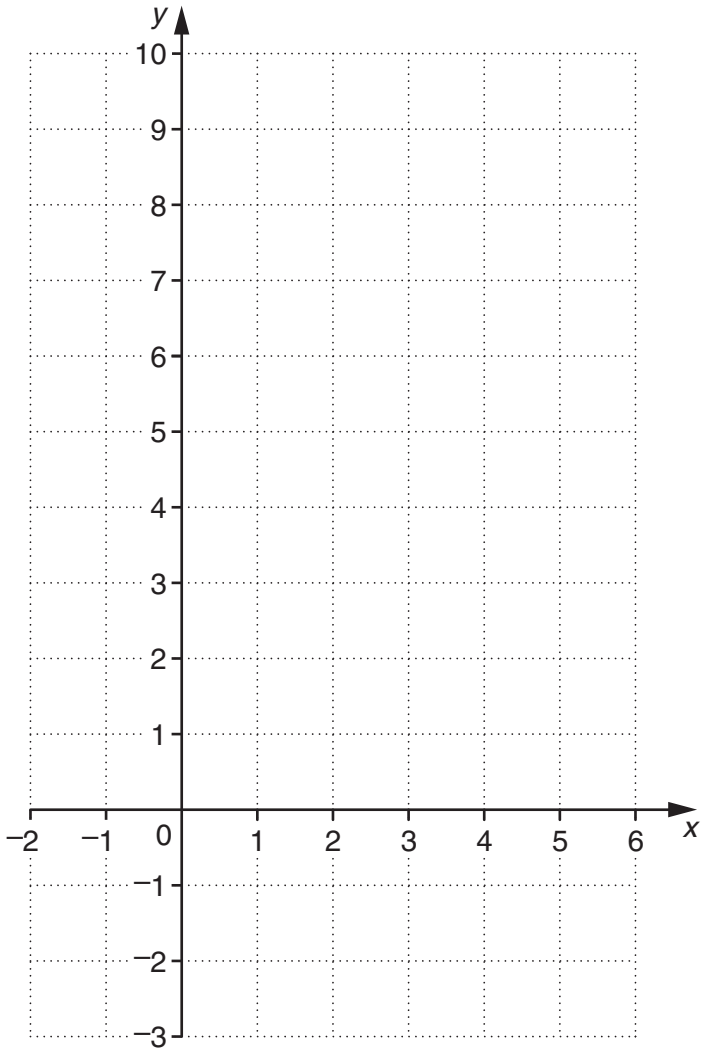
(ii) £ _____ **[3]**

(b) The area of the base of a can of lemonade is 32.4 cm^2.

What is this area in mm^2?

(b) _____ mm^2 **[2]**

2 **(a)** Draw the graph of $y = 2x - 1$ for values of x from -1 to 5.



[3]

(b) Write down the gradient and y-intercept of the line $y = 5x + 3$.

(b) gradient _____

y-intercept _____ **[2]**

(c) **(i)** Write down the **gradient** of a line **parallel** to $y = 5x + 3$.

(c)(i) _____ **[1]**

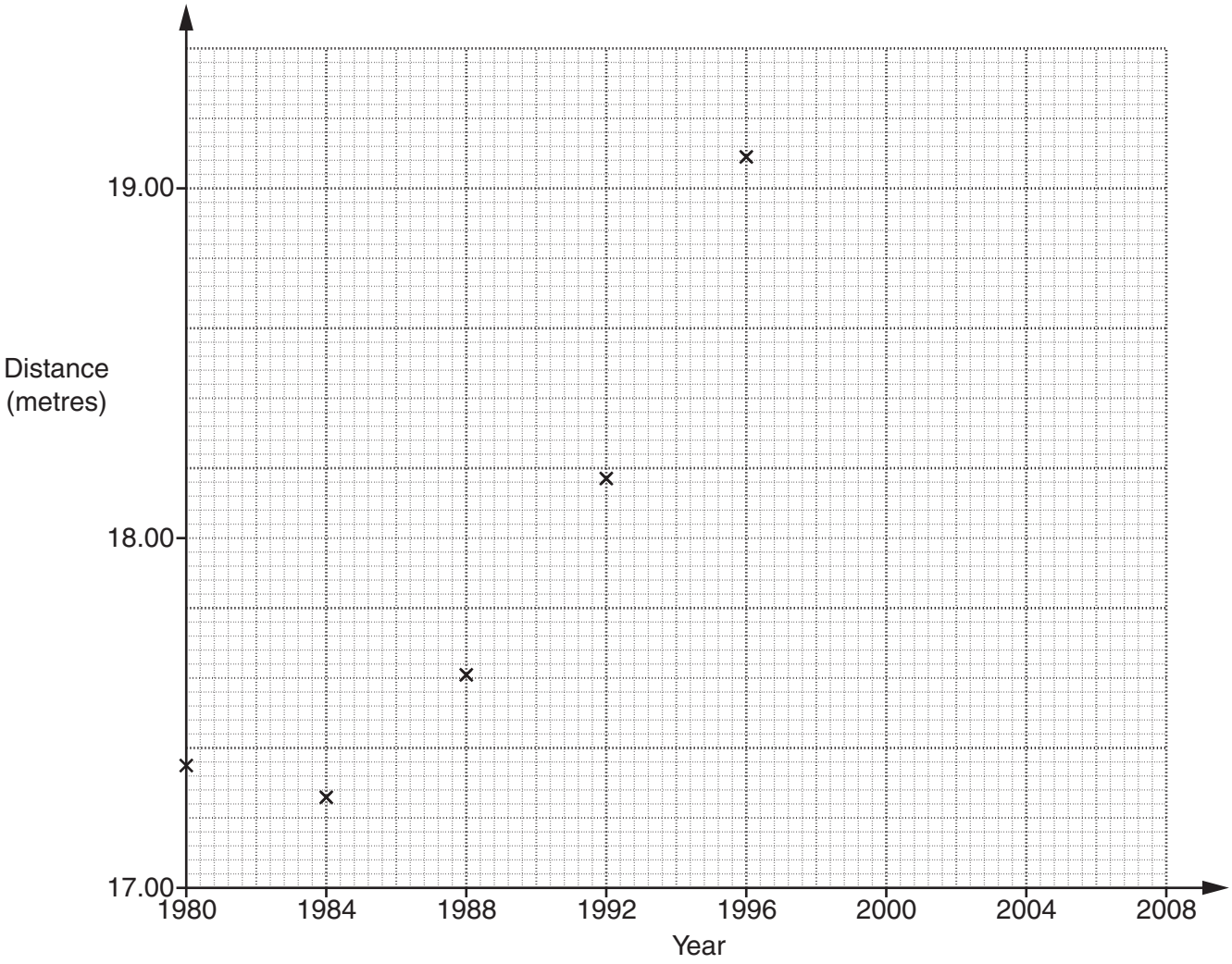
(ii) Write down the **equation** of a line **perpendicular** to $y = 5x + 3$.

(ii) _____ **[2]**

3 The table shows the winning distances in the Olympic Men's Triple Jump competition since 1980.

Year	1980	1984	1988	1992	1996	2000	2004	2008
Distance (metres)	17.35	17.26	17.61	18.17	19.09	17.71	17.79	17.67

(a) Complete the time-series graph to show these values.
The first five points have already been plotted.



[2]

(b) Jonathan thinks that the Men's Triple Jump gold medal winner in the 2012 Olympics will jump more than 20 metres.

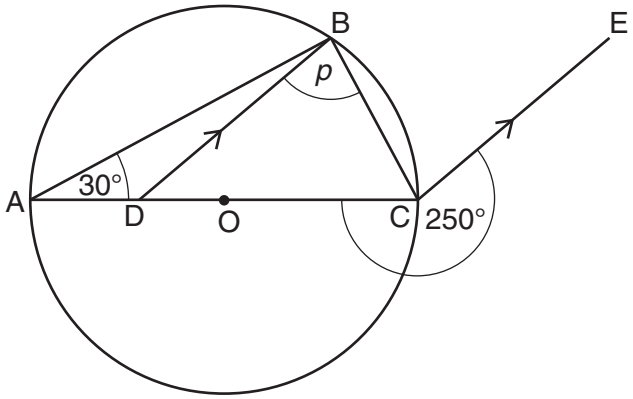
Does the graph support Jonathan's view?
Explain your answer.

_____

_____

_____ **[1]**

4* ADOC is the diameter of the circle, centre O.
B is a point on the circle and DB is parallel to CE.



Not to scale

Work out angle *p*.
Give a reason for each stage of your working.

_____ ° **[5]**

5 Calculate.

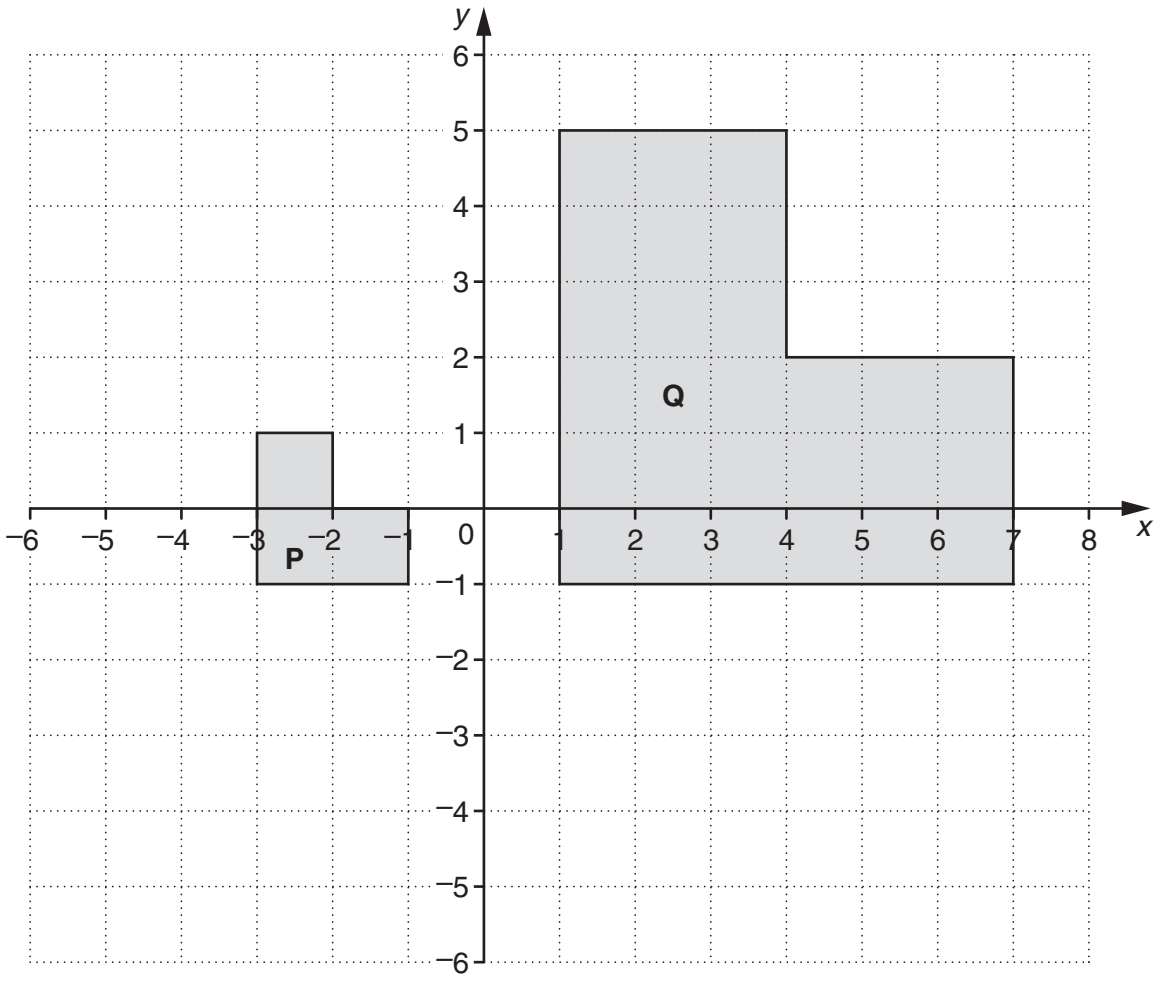
(a) $\frac{3}{4} - \frac{2}{5}$

(a) _____ **[2]**

(b) $\frac{3}{4} \div 5$

(b) _____ **[2]**

6



(a) Describe fully the **single** transformation that maps shape **P** onto shape **Q**.

_____

_____

_____ **[3]**

(b) Rotate shape **P** 180° about the point (⁻2, ⁻2).
Label the image **R**. **[2]**

7 Beads can be bought in packets, each containing x beads.

Lizzie has 7 packets of beads and 2 extra beads.
Grace has 5 packets of beads and 25 extra beads.
Grace has more beads than Lizzie.

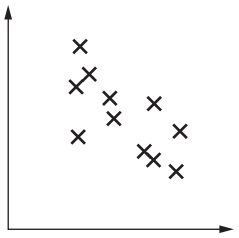
(a) Write an inequality in x to show this information.

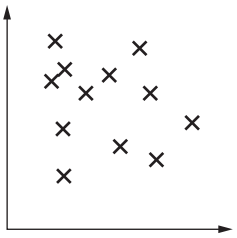
(a) _____ **[1]**

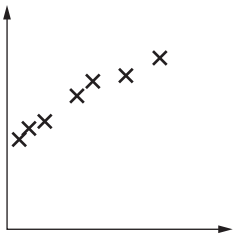
(b) Solve your inequality and hence write down the largest number of beads that could be in each packet.

(b) _____ **[4]**

8 Describe **fully** the correlation shown in each scatter graph.







_____ _____ _____

_____ _____ _____ **[3]**

9 Solve, algebraically, these simultaneous equations.

$$20x + 3y = 1$$
$$6x - 5y = 18$$

$x =$ _____

$y =$ _____ **[4]**

10 **(a)** Evaluate.

(i) 17^0

(a)(i) _____ **[1]**

(ii) 4^{-3}

(ii) _____ **[2]**

(b) The distance, d, in miles to the horizon is given by the formula

$$d = \left(\frac{3h}{2}\right)^{\frac{1}{2}}$$

where h is the height, in feet, of an observer's eyes above sea level.

(i) How far away is the horizon from a man whose eyes are 6 feet above sea level?

(b)(i) _____ miles **[2]**

(ii) From the top of a cliff, Samira can see the horizon 12 miles away.

Find the height above sea level of Samira's eyes.

(ii) _____ feet **[3]**

11 **(a)** Simplify.

(i) $(\sqrt{5})^4$

(a)(i) _____ **[1]**

(ii) $\dfrac{\sqrt{45}}{3}$

(ii) _____ **[1]**

(iii) $\sqrt{5} \times \sqrt{40}$

(iii) _____ **[3]**

(b) Work out the value of a in this equation.

$$(6 - \sqrt{a})(6 + \sqrt{a}) = 33$$

(b) _____ **[2]**

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