Candidate forename		Candidate surname	

Centre number						Candidate number				

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GENERAL CERTIFICATE OF SECONDARY EDUCATION

A502/02

MATHEMATICS A

Unit B (Higher Tier)

MONDAY 13 JUNE 2011: Afternoon
DURATION: 1 hour

SUITABLE FOR VISUALLY IMPAIRED CANDIDATES

Candidates answer on the question paper.

OCR SUPPLIED MATERIALS:

None

OTHER MATERIALS REQUIRED:

Geometrical instruments
Tracing paper (optional)

WARNING
No calculator can be used for this paper.

This paper has been pre modified for carrier language
OCR is an exempt Charity

READ INSTRUCTIONS OVERLEAF

DC (NH/JG) 11MEP06310 47992/2

INSTRUCTIONS TO CANDIDATES

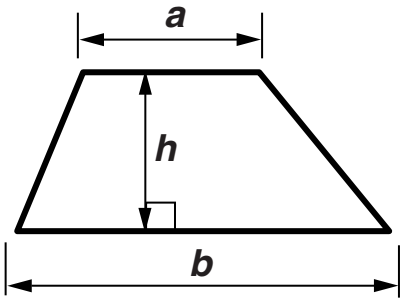
- **Write your name, centre number and candidate number in the boxes on the first page. Please write clearly and in capital letters.**
- **Use black ink. Pencil may be used for graphs and diagrams only.**
- **Read each question carefully. Make sure you know what you have to do before starting your answer.**
- **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.**

INFORMATION FOR CANDIDATES

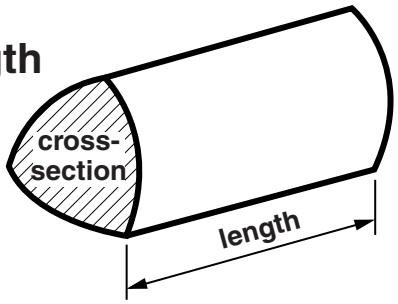
- **The number of marks is given in brackets [ ] at the end of each question or part question.**
- **Your Quality of Written Communication is assessed in questions marked with an asterisk (*).**
- **The total number of marks for this paper is 60.**

FORMULAE SHEET: HIGHER TIER

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

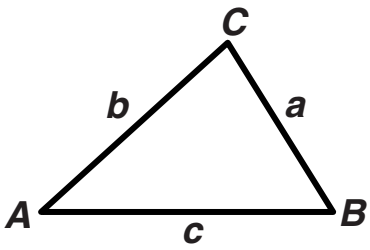


Volume of prism = (area of cross-section) × length



In any triangle ABC

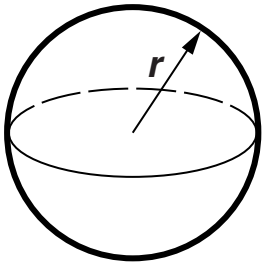
Sine rule $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$



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

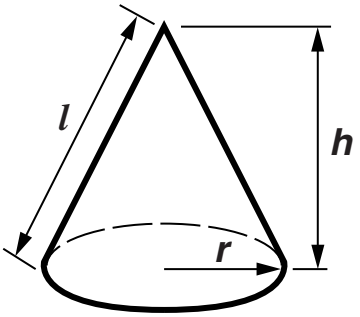
Area of triangle $= \frac{1}{2}ab\sin C$

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**

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

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?

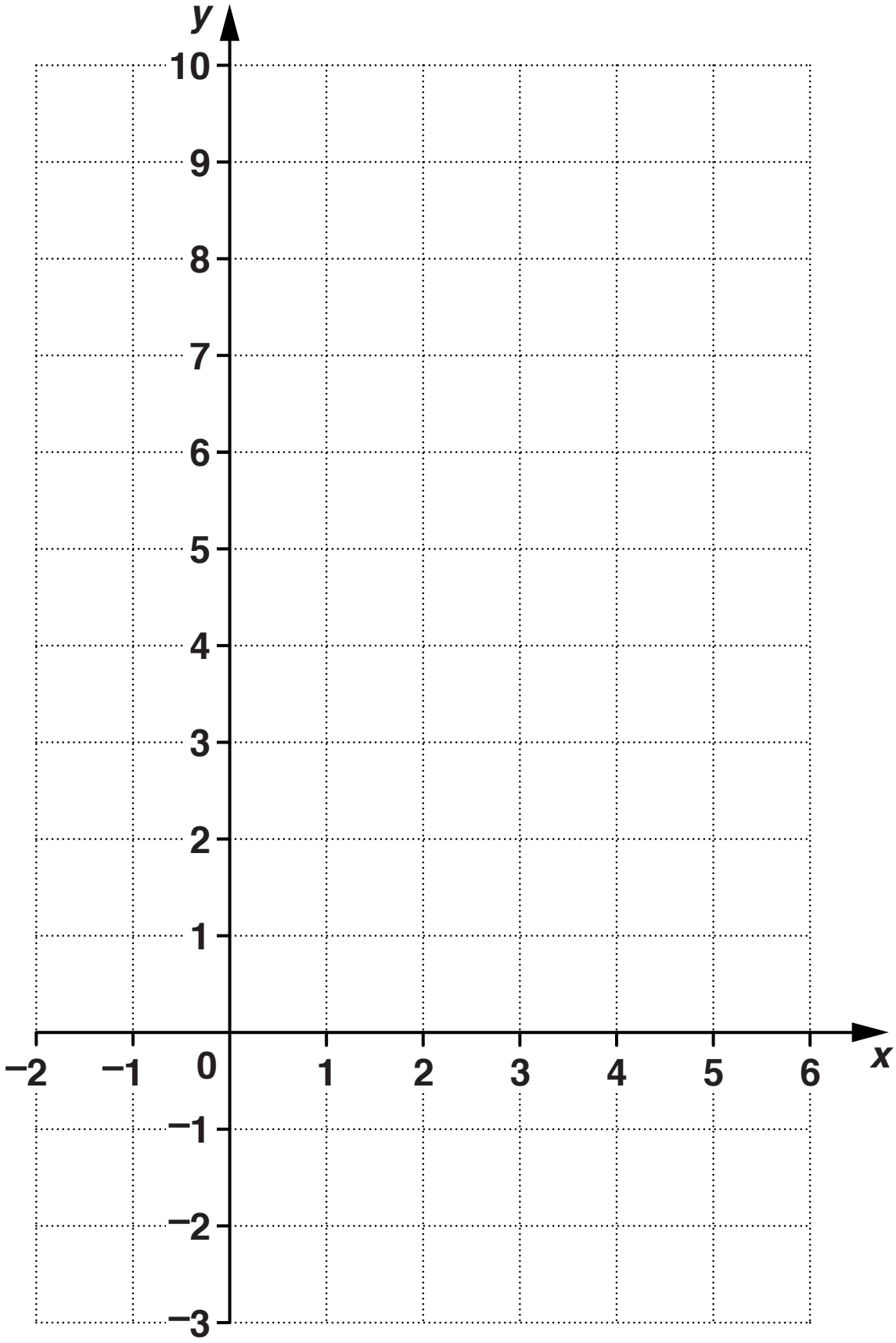
(ii) £ _____ [3]

(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]**

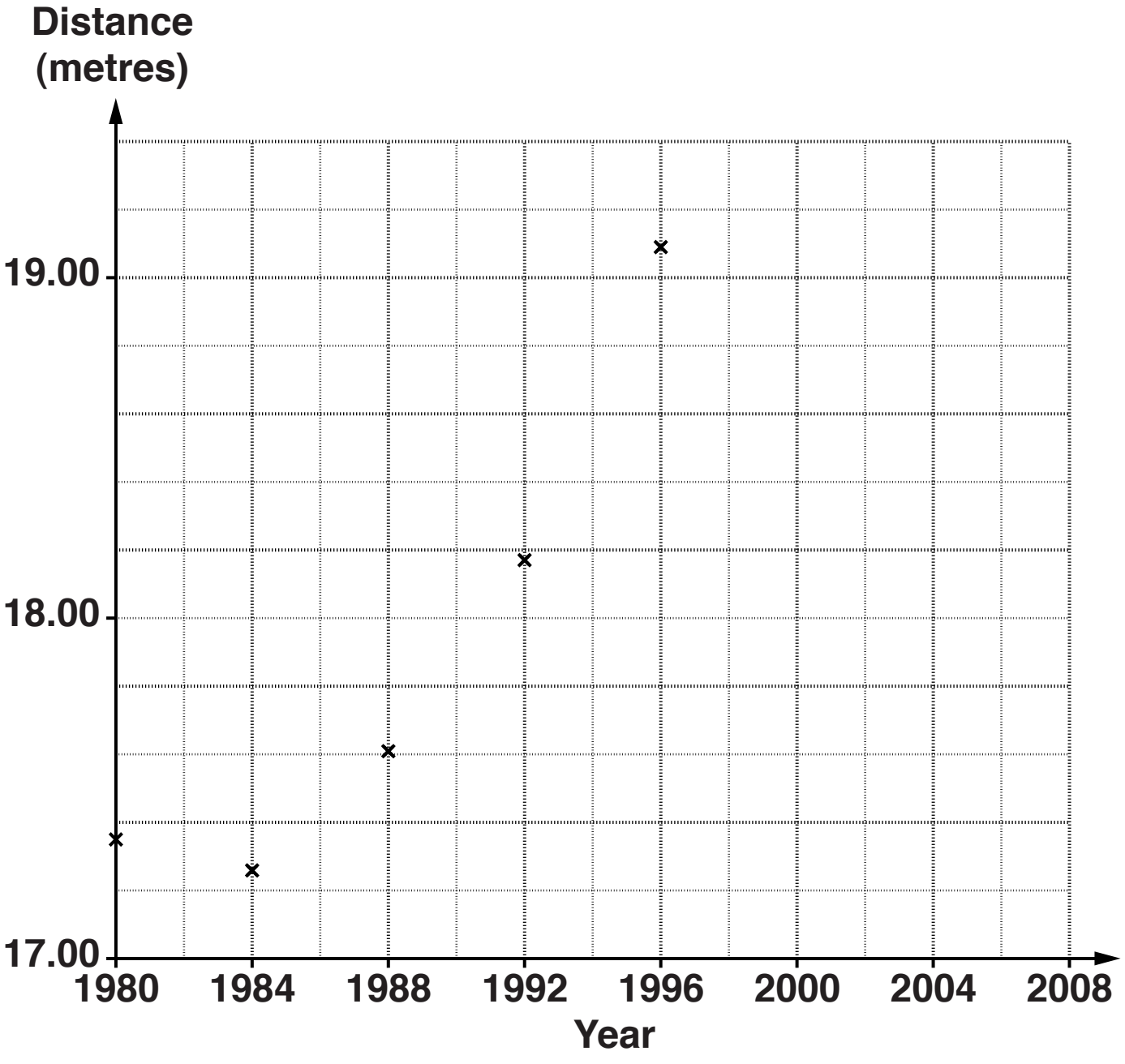
(ii) Write down the EQUATION of a line PERPENDICULAR to $y = 5x + 3$.

(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.

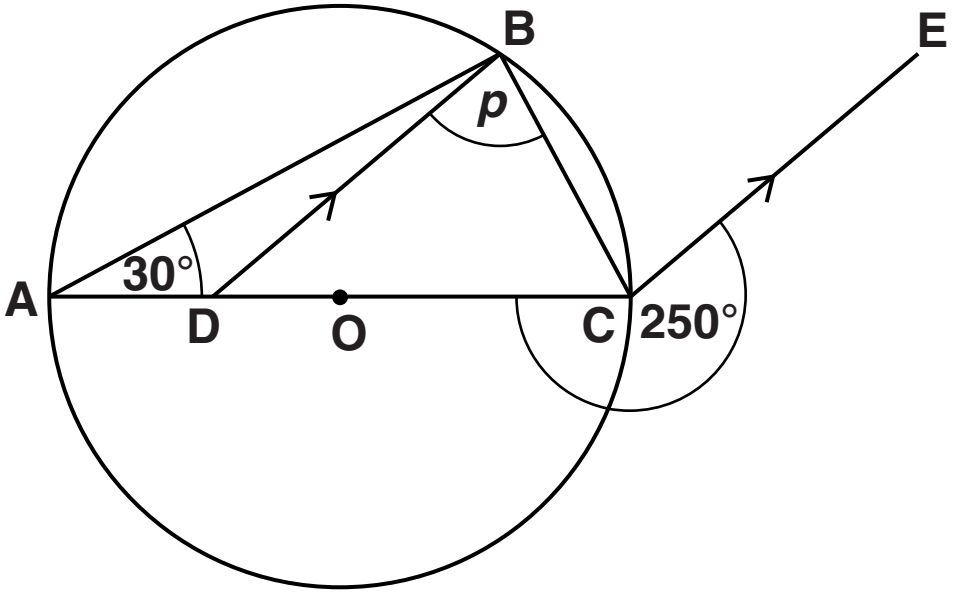
Does the graph support Jonathan's view? Explain your answer.

_____

_____

_____ **[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.

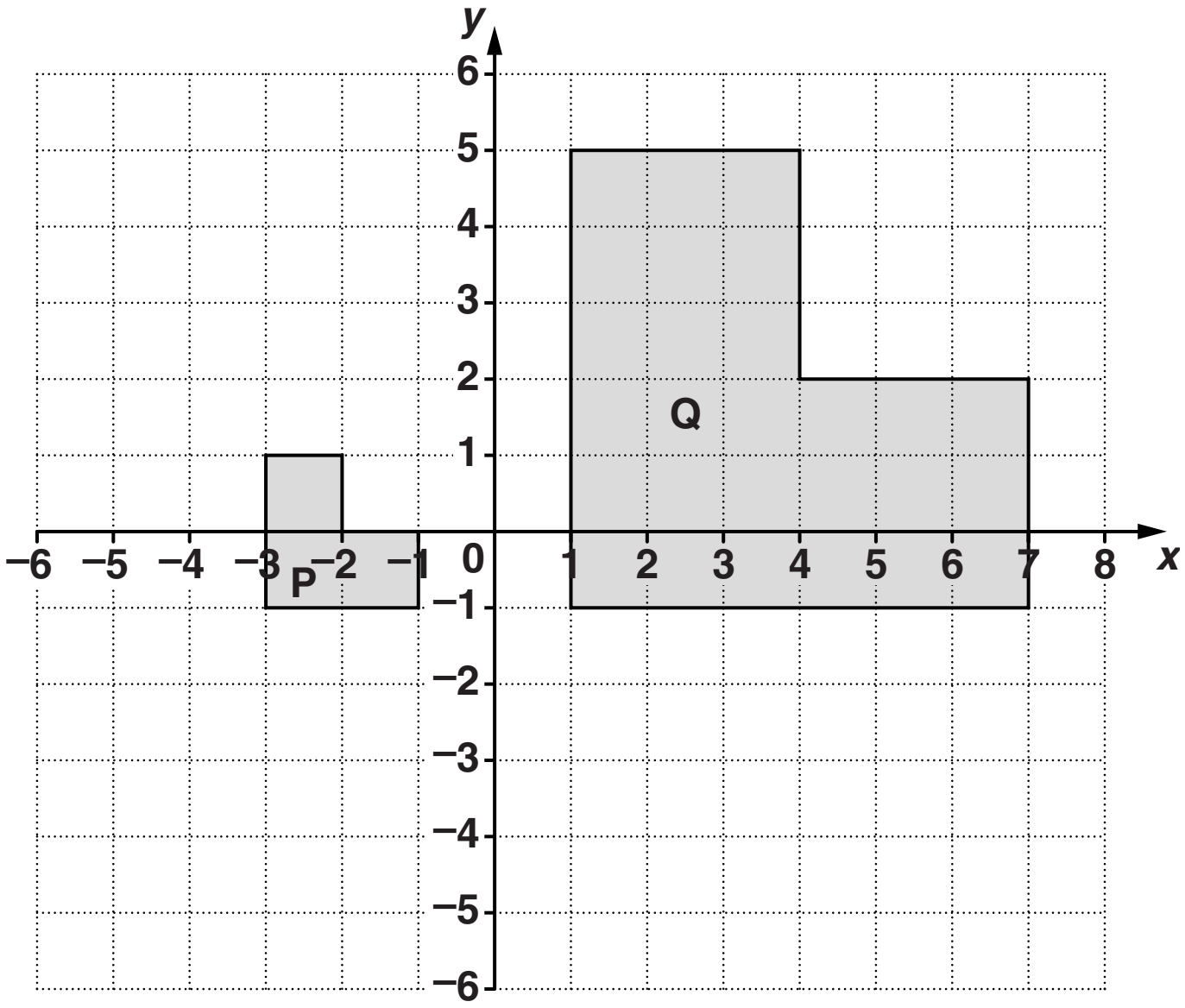
(a) $\frac{3}{4} - \frac{2}{5}$

(a) _____ **[2]**

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

(b) _____ **[2]**

6 Use the grid below to answer the questions that follow.



(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.

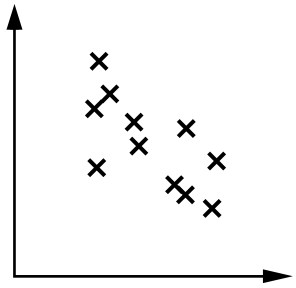
(a) Write an inequality in x to show this information.

(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 correlations shown in each of the three scatter graphs below.



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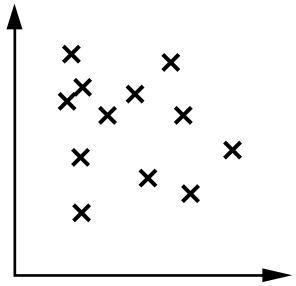

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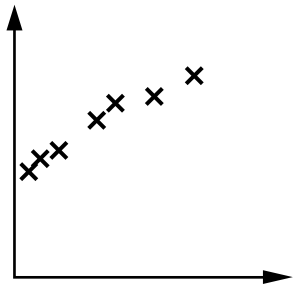

_____

_____

[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) $\frac{\sqrt{45}}{3}$

(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]**