

Surname	Centre Number	Candidate Number
Other Names		0



GCSE LINKED PAIR PILOT

4364/02

**METHODS IN MATHEMATICS
UNIT 2: METHODS (CALCULATOR)
HIGHER TIER**

P.M. TUESDAY, 19 June 2012

2 hours

ADDITIONAL MATERIALS

A calculator will be required for this paper.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

Take π as 3.14 or use the π button on your calculator.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

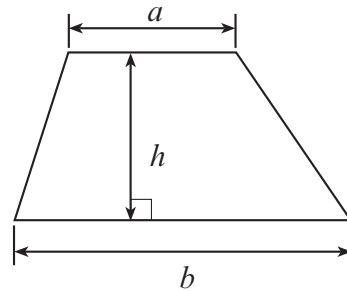
You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question 6.

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	10	
2	5	
3	10	
4	8	
5	8	
6	7	
7	4	
8	5	
9	5	
10	7	
11	4	
12	9	
13	5	
14	5	
15	5	
16	3	
TOTAL MARK		

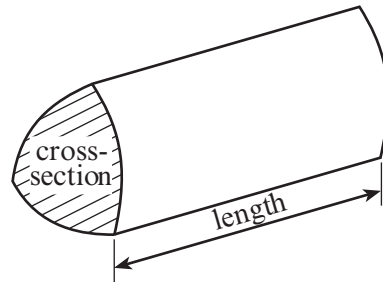
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Formula List

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

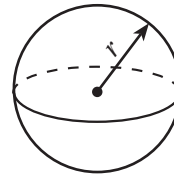


Volume of prism = area of cross-section \times length



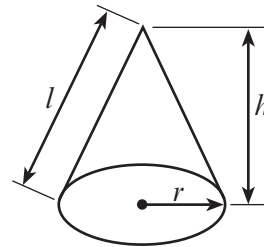
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

Curved surface area of cone = $\pi r l$

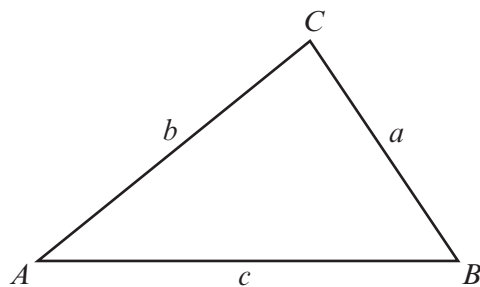


In any triangle ABC

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 = $\frac{1}{2}ab \sin C$



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. (a) Solve $\frac{3x}{4} = 24$.

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..... [2]

(b) Solve $\frac{8}{x} = 16$.

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..... [1]

(c) Solve $7(5x - 4) = 77$.

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..... [3]

(d) Solve the inequality $6x + 5 < 47$.

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(e) Write down the smallest whole number that satisfies the inequality $3x > 67$.

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..... [2]

2. (a) The perimeter of a rectangle is P cm and the area is A cm².
The width of the rectangle is w cm.
The length of the rectangle is $5w$ cm.

- Write down and simplify an equation for the perimeter P , in terms of w .
- Write down and simplify an equation for the area A , in terms of w .

Perimeter

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Area

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[3]

(b)

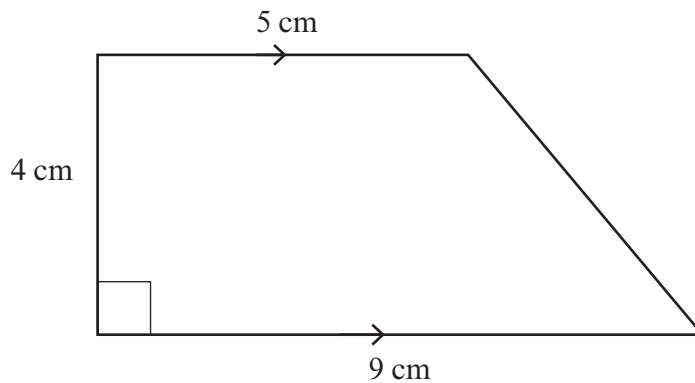


Diagram not drawn to scale

Calculate the area of the trapezium.

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[2]

3. (a) Write 432 as a percentage of 960.

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[2]

- (b) Decrease 820 by 24%.

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[2]

- (c) Find the value of $\sqrt{\frac{5 \cdot 67^2 + 6 \cdot 72}{2 \cdot 3 + 4 \cdot 56 \times 2 \cdot 4}}$ giving your answer correct to one decimal place.

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[3]

- (d) Find the sum of $1\frac{2}{3}$ of 381 and $2\frac{3}{7}$ of 4970.

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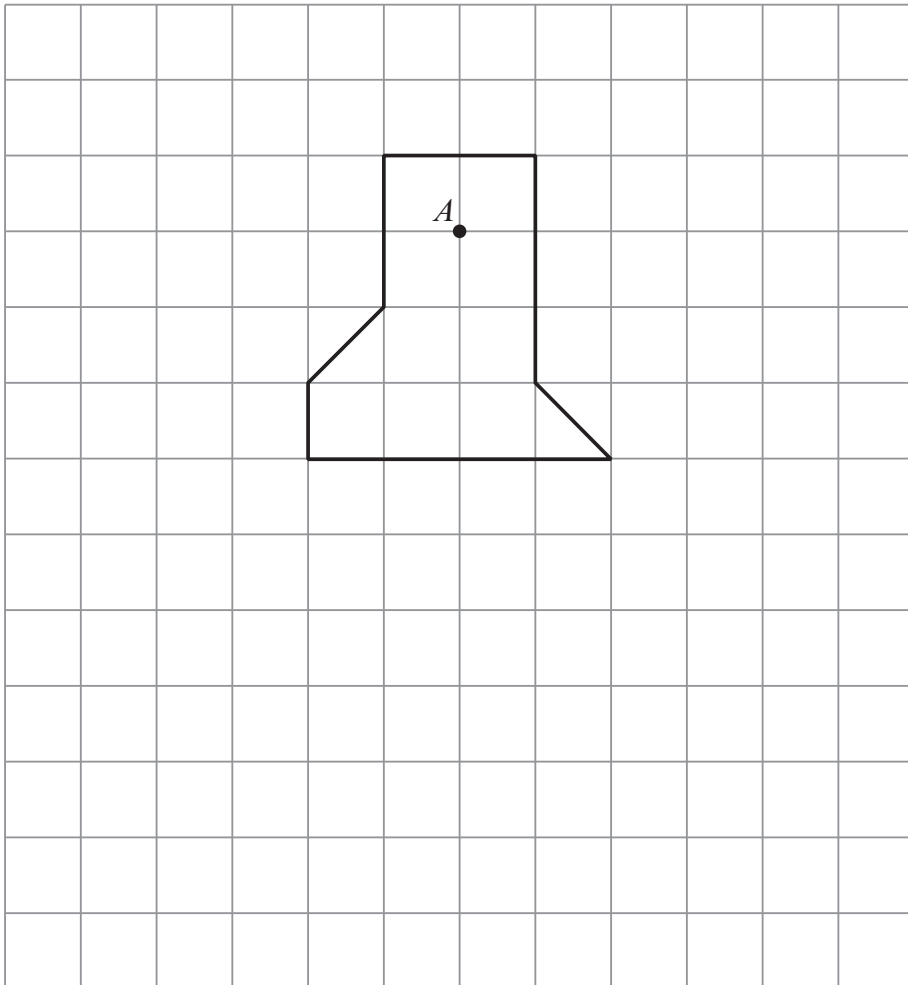
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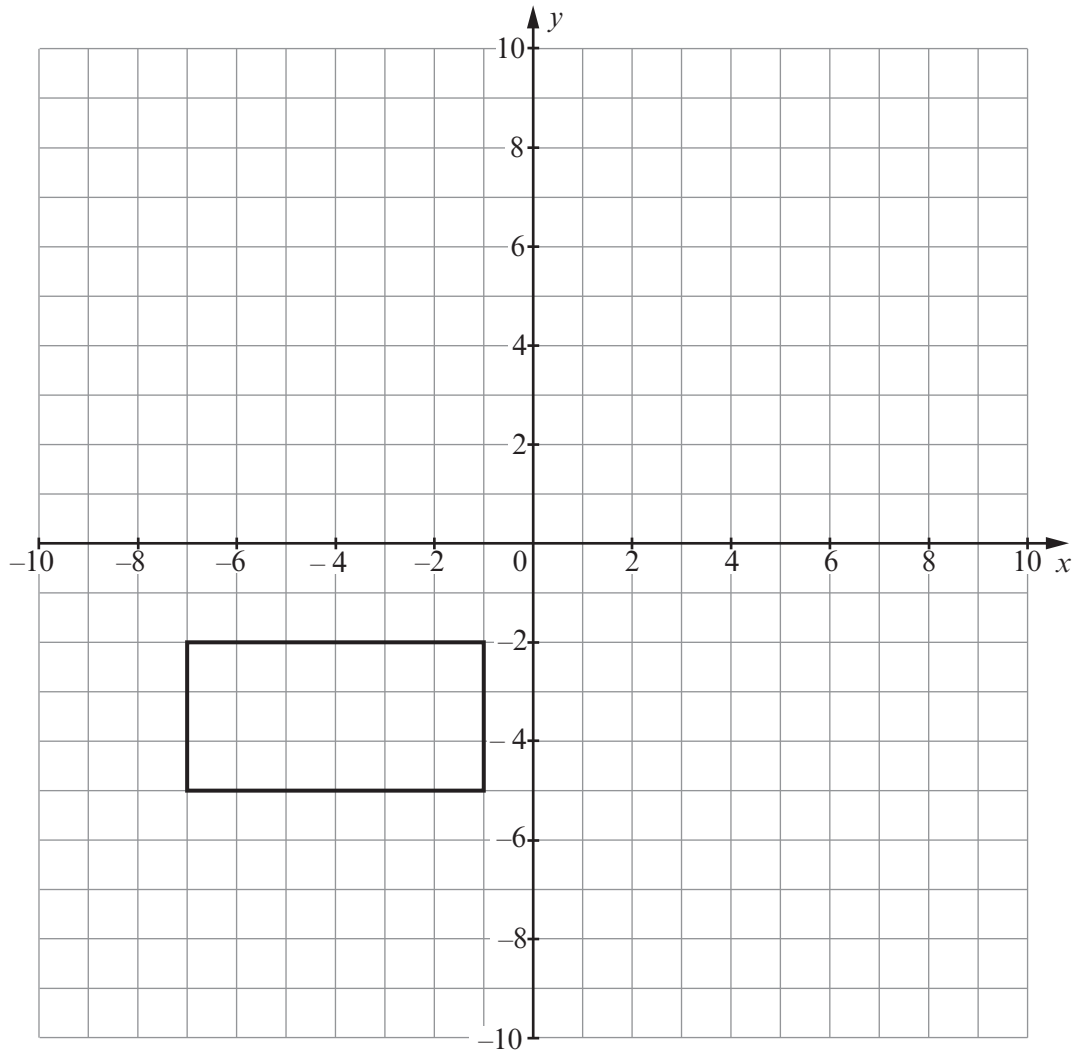
[3]

4. (a) Enlarge the shape shown on the grid by a scale factor of 2 using A as the centre for the enlargement.



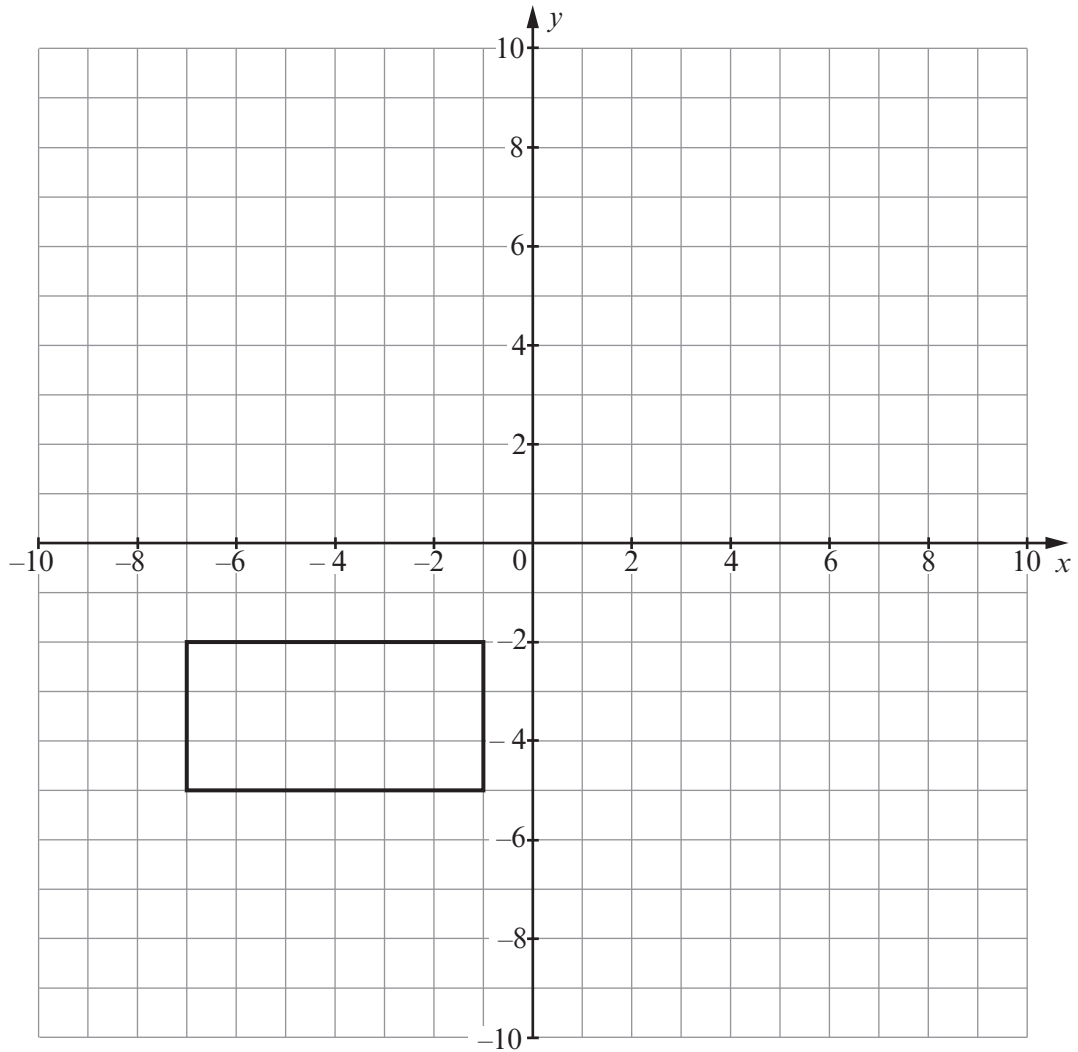
[3]

(b) Reflect the rectangle in the line $y = 2$.



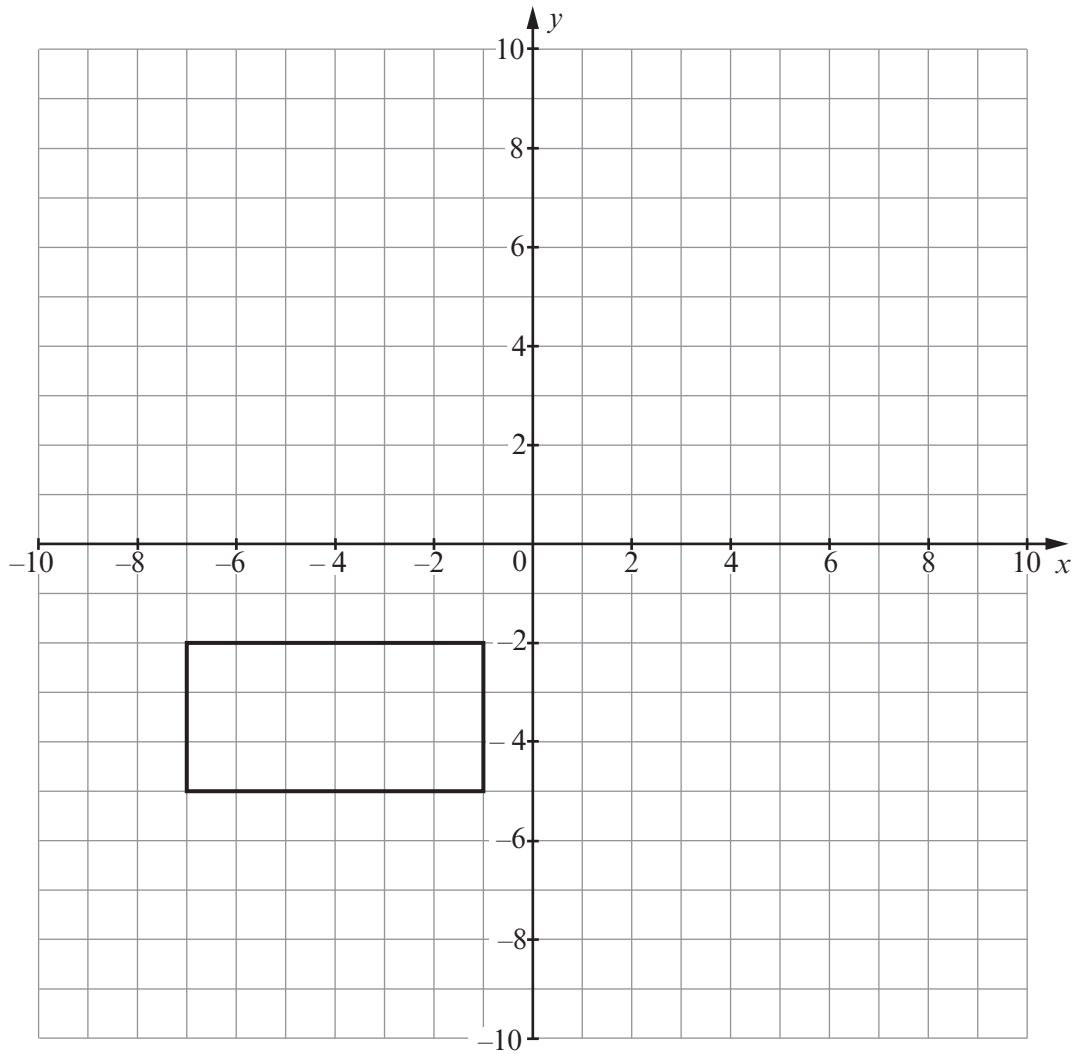
[2]

- (c) Translate the rectangle shown below by $\begin{pmatrix} 4 \\ -2 \end{pmatrix}$.



[1]

- (d) Rotate the rectangle shown on the grid below through 90° clockwise about the origin.



[2]

5. (a) The ratio of black beads to yellow beads in a bag is 2 : 3.
Write down the fraction of the beads that are

(i) black,

..... [1]

(ii) yellow.

..... [1]

- (b) In a class of 49 pupils, there are 21 boys.

(i) Write down the ratio of girls to boys in its simplest form.

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(ii) What percentage of the class are girls? Give your answer correct to 3 significant figures.

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- (c) Express, in its simplest form, the ratio 12 : 30 in the form 1 :

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7. You are given the following clue to find the number x .

Five times the number added to a quarter of the number is 18.9.

Use the clue to find the value of x .

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[4]

8. A circle of radius 8.2 cm is cut out of a square piece of card.
The length of the side of the square is 23.4 cm.
What percentage of the card remains after the circle is cut out?

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9. (a) Calculate the size of the angle marked x in the diagram.

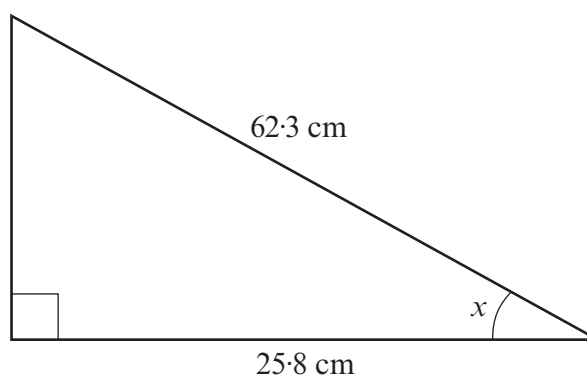


Diagram not drawn to scale

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[3]

- (b) Sam is working on a different calculation but she has forgotten her calculator.

She has just written “ $\tan 34^\circ = \frac{z}{14.3}$ ” in her book.

Complete the calculation to find the value of z for Sam.

$$\tan 34^\circ = \frac{z}{14.3}$$

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[2]

10. (a) It takes eight workers six days to lay paving slabs to make a 230 metre straight path.

(i) Express the length of the path in millimetres, giving your answer in standard form.

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[2]

(ii) How long would it take 3 workers to make the path?
You may assume that all workers work at the same rate.

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[2]

(b) It takes x workers d days to lay paving slabs to make a straight path.
Write an equation to give the time T , in days, that it would take w workers, working at the same rate, to make a path of the same length.

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[3]

11.

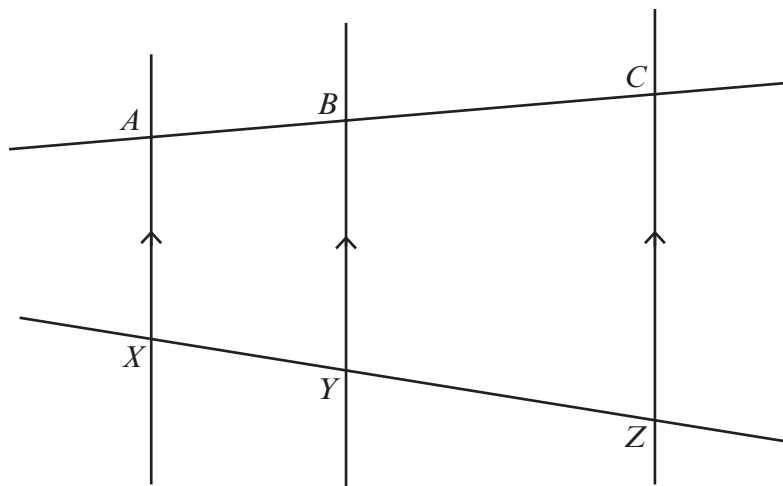


Diagram not drawn to scale

Given that $XY = 3.25$ cm, $YZ = 4.55$ cm and $AC = 9.6$ cm, calculate the lengths of AB and BC .

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[4]

- (b) Use the formula method to solve $2x^2 + 5x - 4 = 0$, giving your answer correct to 2 decimal places.

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[3]

13. A shopkeeper calculates the selling price of a coat by increasing the manufacturer's price by 18%.
In a sale, the shopkeeper reduced the selling price of the coat by 15%. The sale price of the coat was £90.27.
Calculate the manufacturer's price for the coat.

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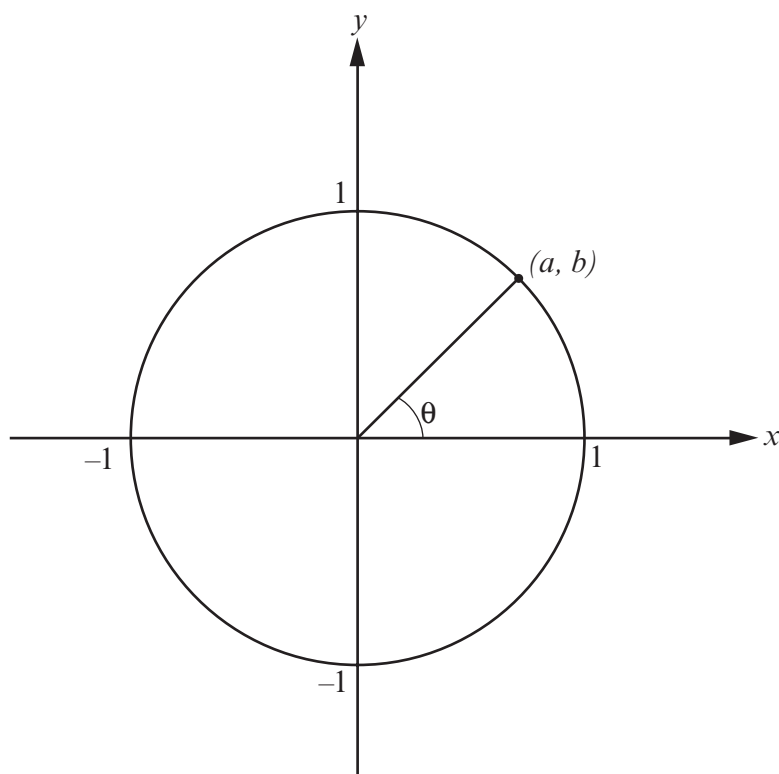
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[5]

14. The sketch below shows a circle with its centre at the origin and radius 1 unit. The point (a, b) is a point on the circumference of the circle.



- (a) The angle θ is shown on the diagram. Complete the following statements, in terms of a and b .

(i) $\sin \theta =$

(ii) $\tan \theta =$

[3]

- (b) Consider a general point (x, y) on the circumference of the circle to write down an equation of the circle in terms of x and y .

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[2]

