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**EXAM PREPARATION PAPER 2 (B)**

**! Learner Note:** In this session you will be given the opportunity to work on a past examination paper (Feb/Mar 2010 DoE Paper 2). The paper consists of 12 questions. Question 4, 5 and 6 will be dealt with in this session.

**Structure of Paper 2**

| TOPIC               | APPROXIMATE MARK ALLOCATION |
|---------------------|-----------------------------|
| Coordinate Geometry | 40                          |
| Transformations     | 25                          |
| Trigonometry        | 60                          |
| Data Handling       | 25                          |
| TOTAL               | 150                         |

Before writing the maths examination, it is essential for you to have at least two blue pens, a pencil, a ruler and a workable scientific calculator (non-programmable and non-graphical). You will be given time to read through the paper prior to starting. It is essential that you read the instructions carefully and ensure that the paper is complete.

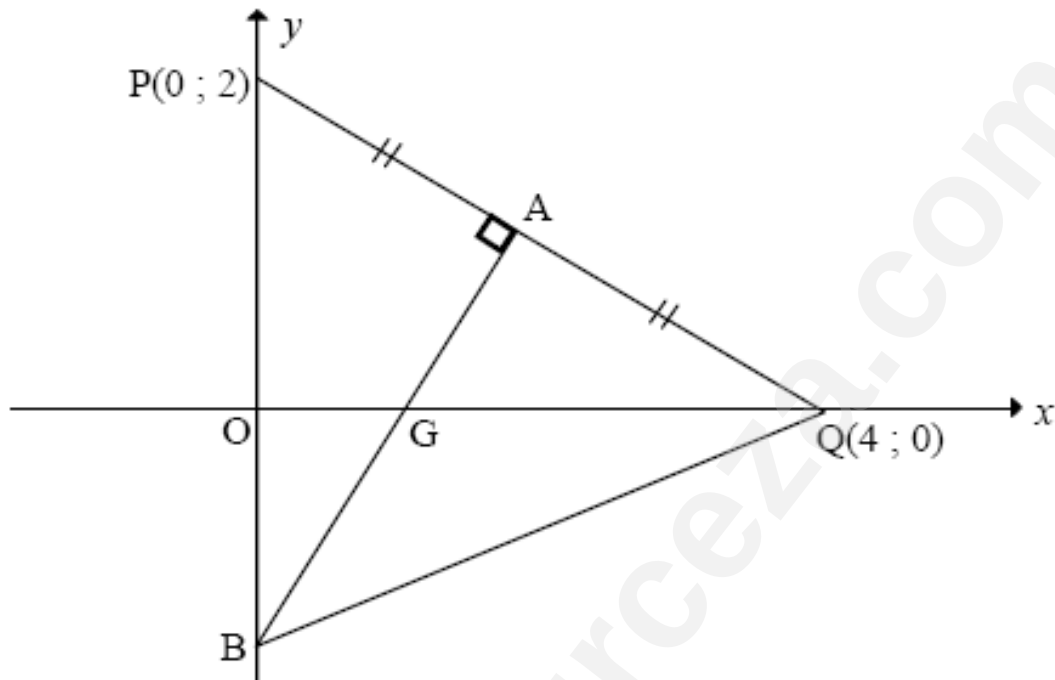
Don't waste time on a specific question. If you cannot do that question, rather move on to the next question. Remember to number the questions correctly. You might wish to start with Question 3. This is fine, provided that the question is clearly indicated.

**SECTION A: TYPICAL EXAM QUESTIONS (QUESTION 4, 5 AND 6)**
**Important information regarding Question 4, 5 and 6**

It is essential for you to master all of the basic formulae in Analytical Geometry. Make sure that they know the properties of quadrilaterals.

## QUESTION 4

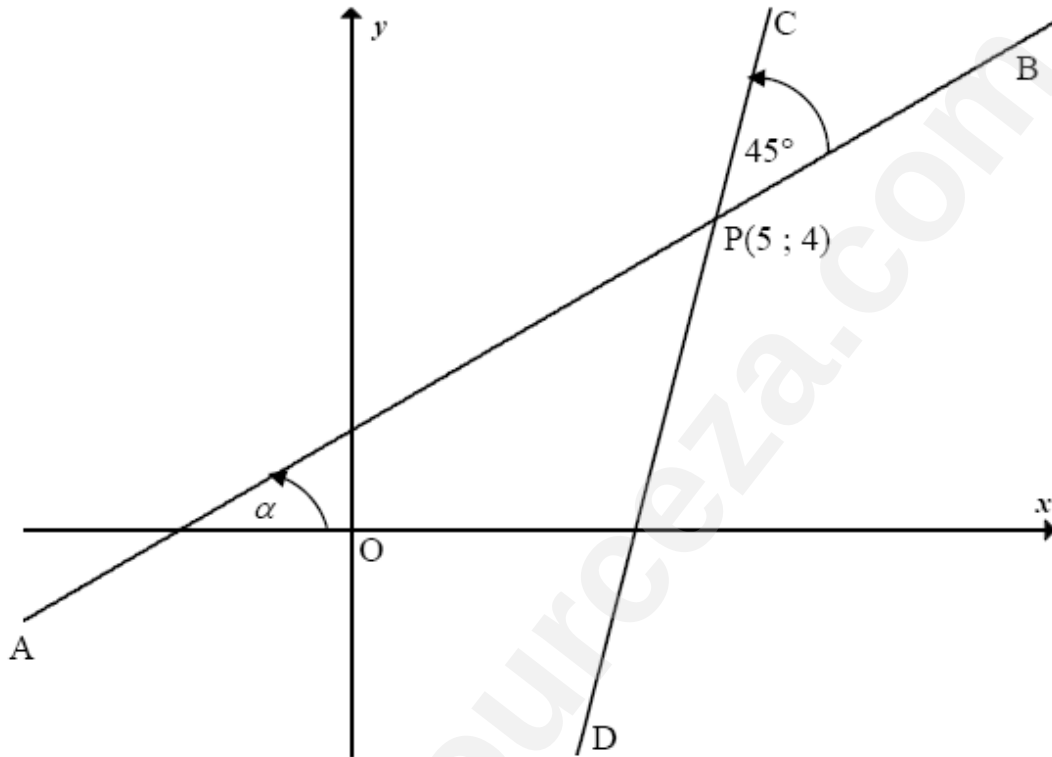
The diagram below shows the points  $P(0 ; 2)$  and  $Q(4 ; 0)$ . Point  $A$  is the midpoint of  $PQ$ . The line  $AB$  is perpendicular to  $PQ$  and intersects the  $x$ -axis at  $G$  and the  $y$ -axis at  $B$ .



- 4.1 Show that the gradient of  $PQ$  is  $-\frac{1}{2}$  (1)
- 4.2 Determine the coordinates of  $A$ . (2)
- 4.3 Determine the equation of the line  $AB$  (5)
- 4.4 Calculate the length of  $BQ$ . (3)
- 4.5 Show that  $\triangle BPQ$  is isosceles. (2)
- 4.6 If  $PBQR$  is a rhombus, determine the coordinates of  $R$ . (3)

**QUESTION 5**

The straight line AB has the equation  $5y - 3x - 5 = 0$ . Another straight line CD is drawn to intersect AB at  $P(5; 4)$  such that the acute angle between AB and CD is  $45^\circ$ .



- 5.1 Determine the gradient of the line CD. (5)
- 5.2 Hence, or otherwise, determine the equation of the line CD. (2)

**QUESTION 6**

- 6.1 Determine the centre and radius of the circle with the equation defined by  $x^2 + y^2 + 8x + 4y - 38 = 0$ . (4)
- 6.2 A second circle has the equation  $(x - 4)^2 + (y - 6)^2 = 26$ . Calculate the distance between the centres of the two circles. (2)
- 6.3 Hence, show that the circles intersect each other. (3)
- 6.4 Show that the circles intersect along the line  $y = -x + 4$ . (4)

## SECTION B: SOLUTIONS AND HINTS TO SESSION 38

## QUESTION 1

|       |                                                                                                                                                                                |                                         |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| 1.1   | Range = $26 - 4 = 22$                                                                                                                                                          | ✓ max and min values<br>✓ answer<br>(2) |
| 2.2   | $\frac{4 + 5 + 8 + 13 + 19 + 22 + 25 + 26 + 23 + 17 + 14 + 7}{12}$ $= \frac{183}{12}$ $= 15,25$                                                                                | ✓ method<br>✓ 183<br>✓ answer<br>(3)    |
| 1.3   | standard deviation = 7,6                                                                                                                                                       | ✓ ✓ answer<br>(2)                       |
| 1.4.1 | Increase in mean<br>$\frac{9 + 10 + 9 + 14 + 20 + 23 + 26 + 27 + 24 + 18 + 15 + 12}{12}$ $= \frac{207}{12}$ $= 17,25$ $\therefore \text{mean increases by } 2^{\circ}\text{C}$ | ✓ method<br>✓ answer<br>(2)             |

## QUESTION 2

2.1.1



|       |                                                                                                                                                                                                                                                                                                                |                                                                                     |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 2.1.1 | see diagram                                                                                                                                                                                                                                                                                                    | ✓✓✓ plotting point<br>(3)                                                           |
| 2.1.2 | A (indicated on diagram)                                                                                                                                                                                                                                                                                       | ✓ answer<br>(1)                                                                     |
| 2.1.3 | 8 goals                                                                                                                                                                                                                                                                                                        | ✓✓ answer<br>(2)                                                                    |
| 2.2   | <p>Let the mean time for all 560 learners be <math>x</math>.<br/>Therefore the mean time for the learners in C is also <math>x</math></p> $\therefore x = \frac{(135 \times 24) + (225 \times 32) + (200 \times x)}{560}$ $\therefore 560x = 3240 + 7200 + 200x$ $\therefore 360x = 10440$ $\therefore x = 29$ | <p>✓ equal mean times<br/>✓ numerator<br/>✓ simplification<br/>✓ answer<br/>(4)</p> |

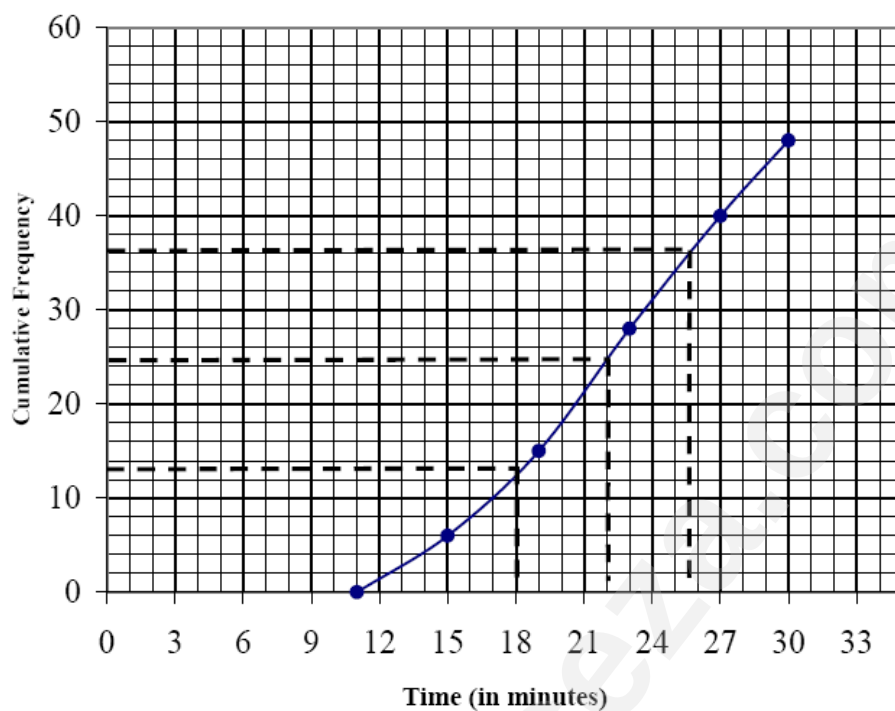
### QUESTION 3

3.1

| Time (in minutes)   | Frequency | Cumulative frequency |
|---------------------|-----------|----------------------|
| $11 \leq t < 15$    | 6         | 6                    |
| $15 \leq t < 19$    | 9         | 15                   |
| $19 \leq t < 23$    | 13        | 28                   |
| $23 \leq t < 27$    | 12        | 40                   |
| $27 \leq t \leq 30$ | 8         | 48                   |

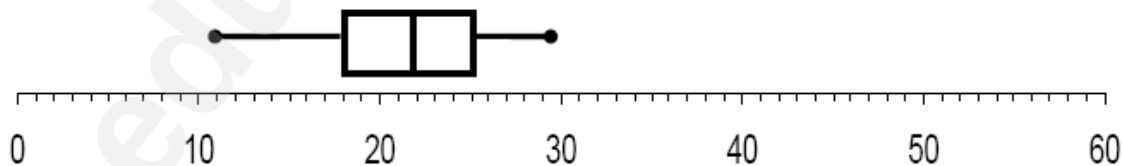
|     |           |                          |
|-----|-----------|--------------------------|
| 3.1 | see table | ✓ cum freq column<br>(1) |
|-----|-----------|--------------------------|

3.2



|     |                                   |                                       |
|-----|-----------------------------------|---------------------------------------|
| 3.2 | see above diagram                 | ✓✓✓ plotting points<br>✓ curve<br>(4) |
| 3.3 | Median = 22<br>LQ = 18<br>UQ = 26 | ✓ median<br>✓ LQ<br>✓ UQ<br>(3)       |

3.4



|     |                    |                            |
|-----|--------------------|----------------------------|
| 3.4 | see above diagram  | ✓ box<br>✓ whiskers<br>(2) |
| 3.5 | skewed to the left | ✓ answer<br>(1)            |