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Department:
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In Bill Gates words, at the Mandela Day 'Living Together' address: "Maintaining the quality of this country's higher education system while expanding access to more students will not be easy. But it's critical to South Africa's future" – working together, we can help achieve this."

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Clifton School	Milnerton High	Rustenburg Girls' High	St Peter's
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Fairmont High	Roedean	St John's DSG	Wynberg Boys' High
Herzlia High	Rondebosch Boys'	St Mary's DSG Kloof	Wynberg Secondary



JULY EXAMINATIONS 2012

MATHEMATICS PAPER II: GRADE 10

Marks: 100

Time: 2 hours

SESSION: 1

Date: 31 July 2012

Name of Learner: _____ **Grade:** _____

Name of Teacher:
(Please circle)

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For Examiner's use only:

	SECTION A						SECTION B						
Question	1	2	3	4	5	6	7	8	9	10	11	12	Total
Learning Outcomes	LO3	LO3	LO3	LO3	LO3	LO3	LO3	LO3	LO3	LO3	LO3	LO3	
Cognitive Levels	1,2	1,2	1,2	1,2	1,2	2	3,4	3,4	3,4	3,4	3,4	3	
Actual Mark													
Possible Mark	9	15	17	3	7	4	6	8	8	12	4	7	100

Read the following instructions carefully:

1. This examination paper consists of **15** pages and **12** questions. Please check that your paper is complete.
2. Read the questions carefully. Take note of the mark allocation and the wording of the questions.
3. Answer **ALL** the questions on the question paper in the spaces provided.
4. Only non-programmable, non-graphical calculators are permitted.
5. **ALL CALCULATIONS AND WORKING DETAILS MUST BE SHOWN.**
6. It is in your own interest to write legibly and to present your work neatly.
7. Unless otherwise stated, round off correct to TWO decimal places, where necessary.

formulae you may need for this examination:

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \quad m = \frac{y_2 - y_1}{x_2 - x_1} \quad \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

SECTION A**QUESTION ONE:****[9 marks]**1.1 If $A = 112,4^\circ$, $B = 48,6^\circ$ and $C = 12,1^\circ$; calculate the following, correct to two decimal places:

1.1.1 $\frac{\sin A}{2}$ (1)

1.1.2 $\cos(A - B)$ (2)

1.1.3 $3 \cot 3C$ (2)

1.1.4 $\operatorname{cosec}\left(\frac{A-B}{2}\right)$ (2)

1.2 Solve for the unknown angle in the equation below:

$3 \cos \beta = 2,1$ (2)

2.1 No calculator is allowed for this question.

If $17\cos\beta + 15 = 0$ and $\sin\beta < 0$, determine, with the aid of a diagram, the value of the following expressions:

2.1.1 $\tan^2\beta + 1$

2.1.2 $2\cos\beta + \frac{1}{2}\sin\beta$ (8)



2.2 In which quadrant does θ lie if $0^\circ < \theta < 360^\circ$ and (2)

2.2.1 $\cos\theta < 0$ & $\sin\theta < 0$?

2.2.2 $\sin\theta > 0$ & $\tan\theta < 0$?

to D is 46° (i.e. $D\hat{P}C$).

2.3.1 Draw a sketch of the above scenario.

(2)

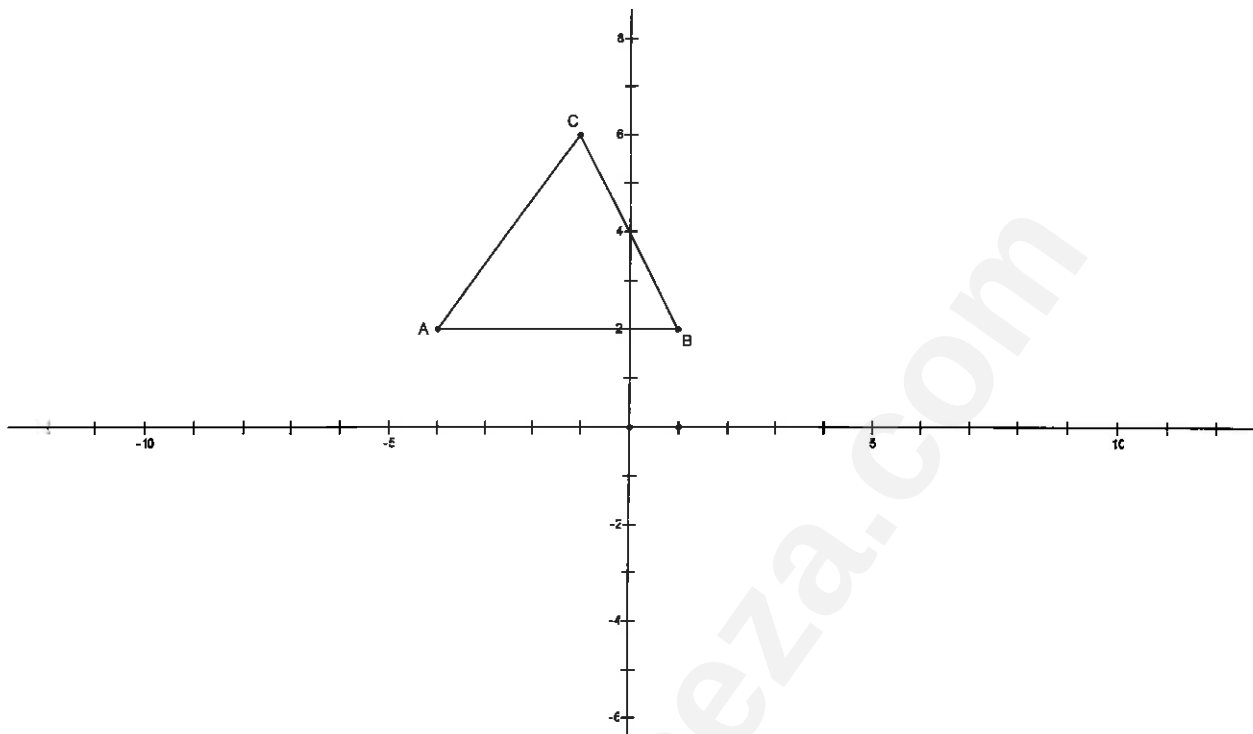


2.3.2 Determine the height of the tower.

(3)



$\triangle ABC$ has co-ordinates $A(-4; 2)$, $B(1; 2)$ and $C(-1; 6)$, and $AC = 5$ units.



3.1 Determine the lengths of AB and BC. Leave your answers in surd form.

(4)

3.2 What kind of triangle is $\triangle ABC$? Give a reason for your answer.

(2)

3.3 Determine the co-ordinates of M, the mid-point of AC.

(4)

3.4 If D is the point $(x; y)$, such that $E(2\frac{1}{4}; 7)$ is the midpoint of CD, determine the co-ordinates of D.

(3)

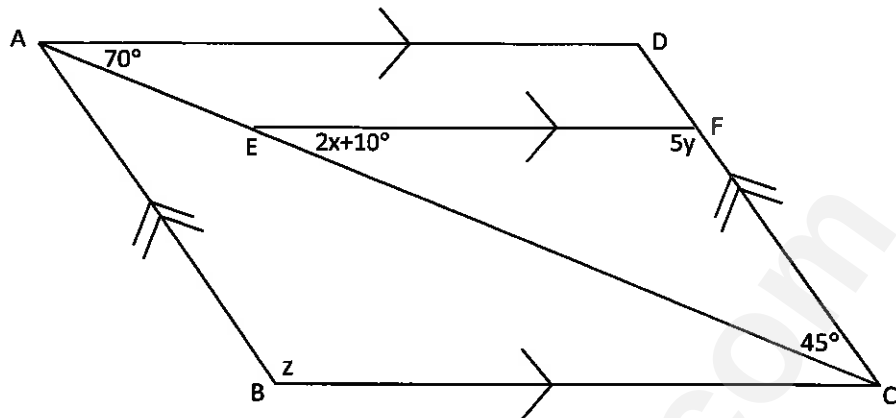
3.5 Determine the gradients of the line segments AC, AB, BD and CD.

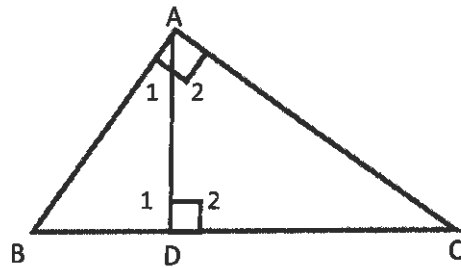
(4)

3.6 What type of quadrilateral is ABDC? Give a reason for your answer.

(2)

Carefully study the diagram below. Calculate the value of x, y and z (in alphabetical order), with reasons.

[illegible]



5.1 Refer to the figure above and prove $\triangle ABC \cong \triangle DBA$.

(4)

Statement	Reason

5.2 Calculate AB if $BC = 15\text{cm}$ and $DC = 8\text{cm}$. Round off your answer to 1 decimal place.

(3)



QUESTION SIX:

[4 marks]

Determine whether $A(-2; 3)$, $B(1; 4)$ and $C(-4; 1)$ are collinear.



"I'm thinking of a number between $(3 \times 2) + 6$ and $(7 \times 9) + (8 \times 2)$."

SECTION B**QUESTION SEVEN:****[6 marks]**

Solve for the unknown angles in the equations below:

7.1 $\frac{\cot\theta + 5}{2} = 5$

(3)

7.2 $3 \sin\left(\frac{\beta}{2} - 40^\circ\right) = 2$

(3)

QUESTION EIGHT:**[8 marks]**Calculate α in each of the following cases:

8.1 The distance between $(2; 3)$ and $(6; \alpha)$ is 5 units.

(5)

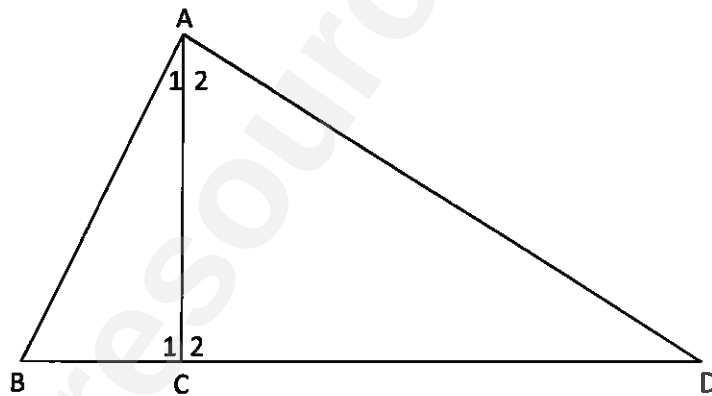
8.2 PQ has a gradient of $-\frac{2}{3}$ where $P(2; a)$ and $Q(3; -6)$.

(3)

QUESTION NINE:**[8 marks]**

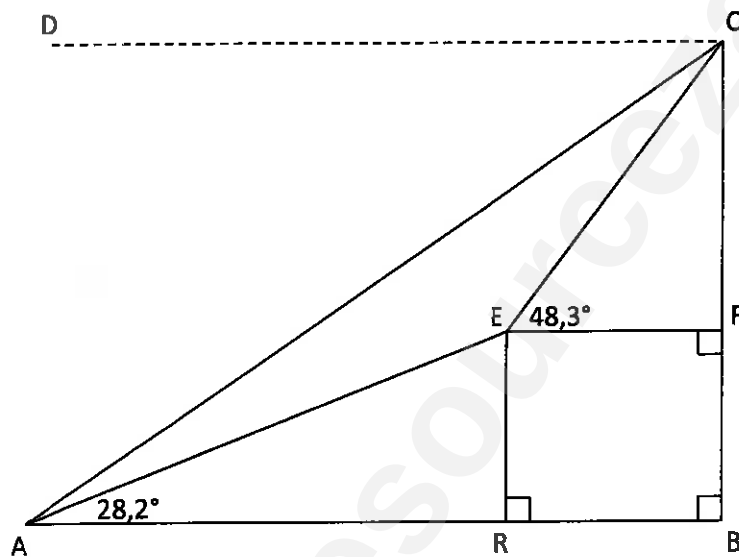
Given: $\hat{A}D = 90^\circ$, $AC \perp BD$, $B = 70^\circ$ and $AB = 40\text{mm}$.

Calculate the length of CD .



QUESTION TEN:

[12 marks]



In the diagram it is given that: $DC \parallel AB$;
 $AE = 64,8 \text{ m}$;
 $AB = 98,4 \text{ m}$ and
 $EFBR$ is a square

Determine the following:

10.1 Length RB .

(3)

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10.3 *CÂE*

(3)

10.4 *DÇA*

(2)

Figure 1

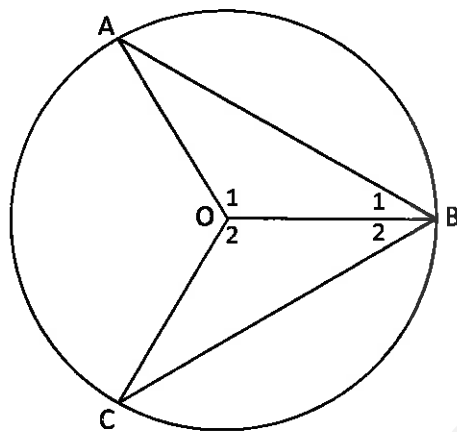
The diagram shows a right-angled triangle ABC with the right angle at vertex A . The side AB is labeled 150 m and the side AC is labeled $173,2\text{ m}$. A point D is located on the side AC such that the segment AD is perpendicular to the hypotenuse BC , as indicated by the right-angle symbol at D . The segment DC is labeled 10 m . The diagram is set against a background of a windmill, a house, and trees.

[illegible]

QUESTION TWELVE:

[11 MARKS]

OB bisects $\widehat{ABC}$. O is the centre of the circle and $\widehat{ABC} = 60^\circ$.



12.1 Calculate $\widehat{B}_1$ and $\widehat{B}_2$ (1)

Statement	Reason

12.2 Calculate $\widehat{O}_1$ and $\widehat{O}_2$ (2)

Statement	Reason

12.3 Hence prove $\triangle OAB \equiv \triangle OCB$ (4)

Statement	Reason