Name:_____ Teacher:_____

ST MARK'S COPTIC ORTHODOX COLLEGE

Mathematics Department

2011

Year 11 Extension 1

Assessment Task One

GENERAL INSTRUCTION

- **Working Time – 1 hour**
- **Write in black or blue pen only**
- **Approved calculators may be used**
- **All necessary working must be shown**
- **Begin each question on a new booklet**
- **Attempt all questions**

Question	1	2	3	4	Total	%
Marks	/14	/~~14~~ 11	/15	/15	/~~58~~ 55	

Question 1 (14 Marks) **Mark**

a) **Find the domain & range of the function:** $y = \sqrt{x-5}$ **2**

b) **Simplify** $\frac{x^2+2x-15}{(x+5)^2} \div \frac{x^2-9}{x^3+27}$. **3**

c) **Solve for x:** $12 + 5x - 2x^2 \leq 0$ **3**

d) **If** $x = \frac{\sqrt{7}+\sqrt{5}}{\sqrt{7}-\sqrt{5}}$ **, find the value of** $x - \frac{1}{x}$. **3**

e) **Simplify** $\frac{4x-3}{2x+1} \geq 3$ **3**

Question 2 (14 Marks) ***Start work on a new page***

Mark

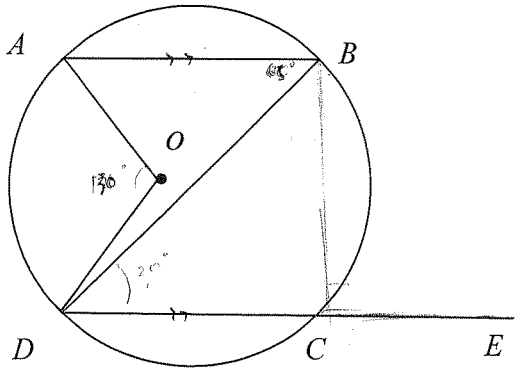
a) **Factorise fully** $y^4 - 50y^2 + 49$ **2**

b) **Simplify** $\frac{a+1}{a^2-a} - \frac{a+1}{a^2-1}$ **3**

c) **Solve for** x **:** $2 \leq |2x + 3| \leq 11$ **3**

d) **In the diagram below,** $AB \,//\, CD$ **and** O **is the centre of the circle.** $\angle AOD = 130^\circ$, **3**
$\angle CBD = 20^\circ$. **Find** $\angle BCE$, **giving all reasons.**

3



Question 3 (15 Marks) ***Start work on a new page*** **Marks**

a) **Simplify by expressing your answer in its lowest bases:** **3**

$$\frac{4^{3-x} \times 12^{2x-1}}{8^{x} \times 15^{-2x}}$$

b) **Solve simultaneously:** $2x - y - z = 11$ **4**

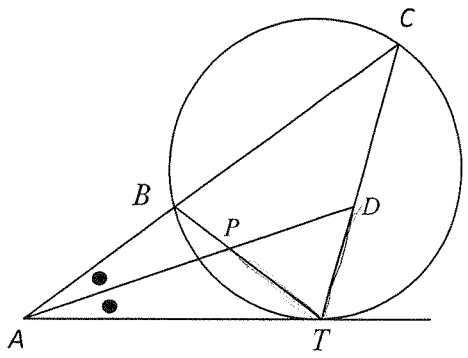
$$x + 3y + z = -2$$

$$3x - 2y + z = 23$$

c) **(i) Find the domain & range of the function** $y = \sqrt{25 - x^2}$. **2**

(ii) Hence sketch the region $y \leq \sqrt{25 - x^2}$. **2**

d) **In the figure shown,** AT **is a tangent to the circle at** T.
ABC **is a secant to the circle and** AD **bisects** $\angle CAT$.
Prove that $TP = TD$. **4**



Question 4 (15 Marks) *Start work on a new page* **Marks**

a) (i) **Determine algebraically whether the function** $f(x) = \frac{2}{1-x^2}$ **2**

is odd, even or neither.

(ii) Hence sketch the function, showing all main features. **3**

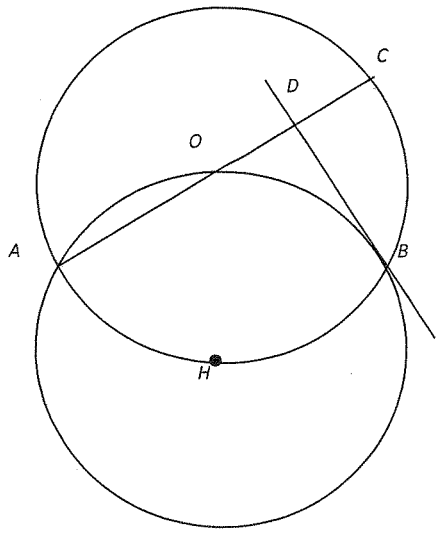
b) $$f(x) = \begin{cases} x^2 - 2x - 8 & x < 0 \\ 2x - 8 & 0 \le x \le 5 \\ 2 & x > 5 \end{cases}$$

(i) Evaluate *f(-1)* **and** *f(4)* **2**

(ii) Is this function continuous at $x = 5$**, give reasons.** **1**

(iii) Sketch the function showing all points of intersection with both *x and y – axis.* **3**

c) **Two equal circles intersect at** A **and** B **such that each circle passes through the centre of the other circle.** O **and** H **are the centres of the two circles.** AOC **is the diameter of the upper circle. The tangent to the lower circle at** B **meets** AC **in** D**.**
Prove that $AC \perp BD$**. Copy this diagram in your answer booklet and show your working steps on it.** **4**



END OF EXAM