Name: _____

Year 10 Advanced Mathematics
(MARIST BROS PAGEWOOD)

Test 3: Ch 3, 4, 5.

Complete all questions.
Answers to be given in exact form unless otherwise stated.
Show all working.

1. Solve by factorising.

(a) $x^2 - 5x - 36 = 0$ (b) $m^2 + 5m = 0$

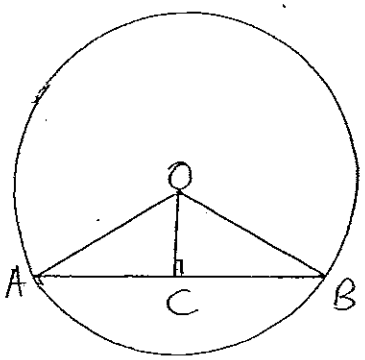
2. Solve by completing the square. *(3 marks)*

(a) $x^2 + 6x = 11 - 2x$

3. Solve, using the quadratic formula. *(3 marks)*

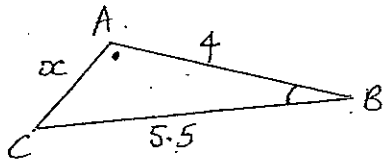
(a) $3x^2 = 4x + 1$

4. O is the centre of the circle. Prove that OC bisects AB. *(5 marks)*

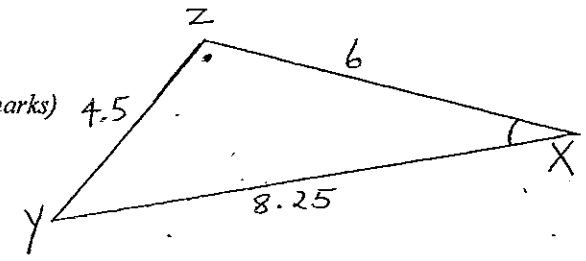


5. The following pairs of triangles are similar.

(a) Write a similarity statement, naming the vertices in corresponding order. *(1 mark)*



(b) Find the value of x. *(2 marks)*



6. Solve each of the following equations, rounding answers to 3 decimal places where appropriate. *(3 marks each)*

(a) $(x+3)^2 = 25$

(b) $x^4 - 7x^2 + 10 = 0$

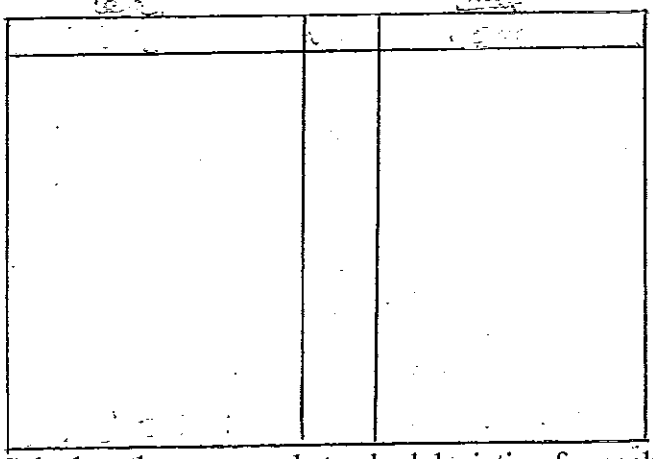
7. Find the interquartile range of the following set of data: *(2 marks)*

4.5 5.3 6.2 4.3 4.7 5.1 6.4 4.7 5.3 6.1

8. Two golfers recorded the following scores for their previous ten rounds.

Greg	74	68	70	72	71	71	67	73	71	78
Tiger	70	66	68	72	70	74	67	71	71	70

(i) Construct a back-to-back stem and leaf plot. *(3 marks)*



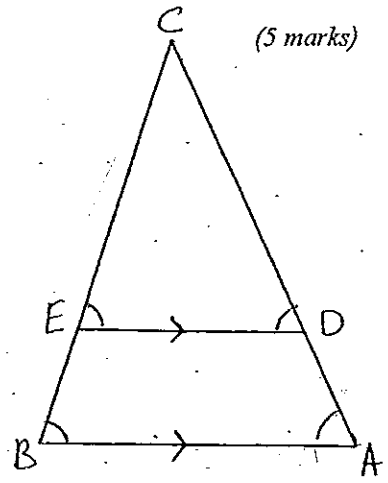
(ii) Calculate the mean and standard deviation for each player. *(4 marks)*

(iii) Which golfer is the better player? *(2 marks)*

9. By using the discriminant, determine whether the equations has no real solutions, one solution or two solutions. *(2 marks each)*

(a) $x^2 + 11x + 9 = 0$ (b) $x^2 - 3x + 4 = 0$

10. Prove that $\Delta ABC \;|||\; \Delta EDC$. *(5 marks)*



11. The length of a rectangle is 8 cm longer than its width. If its area is 240 cm^2, find the dimensions of the rectangle. *(3 marks)*

41/49 4th

Name: JOHN ZHANG

Year 10 Advanced Mathematics

Test 3: Ch 3, 4, 5.

Complete all questions.
Answers to be given in exact form unless otherwise stated.
Show all working.

1. Solve by factorising.

(a) $x^2 - 5x - 36 = 0$ P=36 S=-5 F=4,-9

$x^2-9x+4x-36=0$

$x(x-9)+4(x-9)=0$

$(x+4)(x-9)=0$

$x+4=0$ or $x-9=0$

$x=-4$ or $x=9$

(b) $m^2 + 5m = 0$

$m(m+5)=0$

$m=0$ or $m+5=0$

$m=-5$

(c) $9x^2 - 16 = 0$

$9(x+4)(x-4)=0$

$9x+4=0$ $9x-4=0$

$9x=-4$ or $9x=4$

$x=-\frac{4}{9}$ $x=\frac{4}{9}$

$\frac{x^2-16}{9}=0$

$\frac{(x+4)(x-4)}{9}=0$ X

$(3x+2)(3x+2)$

(3 marks)

$9x^2-16=0$

$9(x+4)(x-4)=0$

$x+4=0$ or $x-4=0$

$x=-4$ $x=4$

4 (6 marks)

2. Solve by completing the square.

(a) $x^2 + 6x = 11 - 2x$

$x^2+6x+2x-11=0$

$x^2+8x-11=0$

$x^2+8x=11$

P=16 S=8 F=4,4

$x^2+8x+16=11+16$

$(x+4)^2=25$ 27

$x+4=\pm\sqrt{25}$

$x=-4\pm\sqrt{25}$

$x=-4+5$ or $x=-4-5$

$x=1$ $x=-9$

3. Solve, using the quadratic formula. (3 marks)

(a) $3x^2 = 4x + 1$

$3x^2-4x-1=0$

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

$x=\frac{4\pm\sqrt{4^2-4\times3\times-1}}{2\times3}$

$x=\frac{4\pm\sqrt{16+12}}{6}$

$x=\frac{4\pm\sqrt{28}}{6}$

$x=\frac{2(2\pm\sqrt{7})}{6}$

$x=\frac{2\pm\sqrt{7}}{3}$

9 11

JOHN ZHANG

4. O is the centre of the circle. Prove that OC bisects AB. (5 marks)

In $\triangle OAC$ and $\triangle OCB$

O is the centre of the circle (given)

$\angle OCB = 90°$ (given)

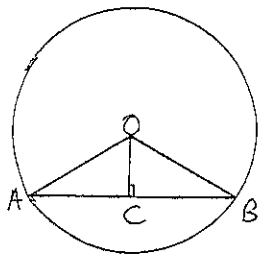
OC is common

~~AC = CB (OC is the centre)~~

$\therefore \angle OAC = 90°$ (right angle)

$\therefore$ OC bisects AB

3



5. The following pairs of triangles are similar.

(a) Write a similarity statement, naming the vertices in corresponding order. (1 mark)

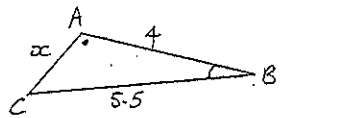
$\triangle ABC \equiv \triangle XYZ$ (SSS)

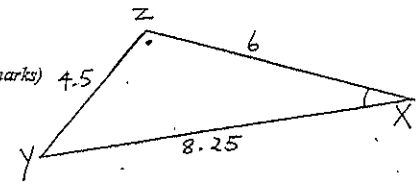
1/2

(b) Find the value of x. (2 marks)

$x = 4.5 \div 1.5$

$x = 3$





6. Solve each of the following equations, rounding answers to 3 decimal places where appropriate. (3 marks each)

(a) $(x+3)^2 = 25$

$x^2+6x+9=25$

$x^2+6x-16=0$

$let (x+3)=u$

$u^2=25$ $u=\pm\sqrt{25}$

$u=\sqrt{25}$

$u=\pm5$

$u=5$ or $x+3=-5$

$x+3=5$ $x=-8$

$x=2$

(b) $x^4 - 7x^2 + 10 = 0$

$let x^2=u$

$u^2-7u+10=0$ P=10 S=-7 F=-2,-5

$u^2-2u-5u+10=0$

$u(u-2)-5(u-2)=0$

$(u-5)(u-2)=0$

$u-5=0$ or $u-2=0$

$u=5$ $u=2$

2 1/2 sub

$x^2=5$ $x^2=2$

$x=\sqrt{5}$ $x=\sqrt{2}$

$x=\pm2.236$ (c.t. 3.d.p) $x=\pm1.414$ (c.t. 3.d.p)

John Zhang

7. Find the interquartile range of the following set of data: *(2 marks)*

4.5 5.3 (6.2) 4.3 4.7 | 5.1 6.4 (4.7) 5.3 6.1

IQR = Q3 − Q1
IQR = 4.7 − 6.2
IQR = −1.5

4.3 4.5 (4.7) 4.7 5.1 | 5.3 5.3 (6.1) 6.2 6.4

IQR = Q3 − Q1
= 6.1 − 4.7
= 1.4

8. Two golfers recorded the following scores for their previous ten rounds.

Greg 74 68 70 72 71 71 67 75 71 78

Tiger 70 66 68 72 70 74 67 71 71 70

(i) Construct a back-to-back stem and leaf plot. *(3 marks)*

Greg (Leaf)	Stem	Tiger (Leaf)
	1	
	2	
	3	
	4	
	5	
8 7	6	6 7 8
8 4 3 2 1 1 0	7	0 0 0 1 1 2 4

(ii) Calculate the mean and standard deviation for each player. *(4 marks)*

Greg - mean: 71.5
Standard deviation: 2.94 (c.t.2.d.p)

Tiger: mean: 69.9
Standard deviation: 2.26 (c.t.2.d.p)

(iii) Which golfer is the better player? *(2 marks)*

I think, Tiger is the better player because he received a lower score among the two players.

Tiger is more consistant ×

10

John Zhang

9. By using the discriminant, determine whether the equations has no real solutions, one solution or two solutions. *(2 marks each)*

(a) $x^2 + 11x + 9 = 0$

$b^2 - 4ac$

$11 - 4 \times 1 \times 9$

$11 - 36$

$= -25$

$-25 < 0$ ×

∴ no real solution

(b) $x^2 - 3x + 4 = 0$

$b^2 - 4ac$

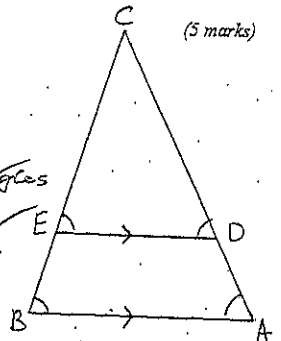
$9 - 4 \times 1 \times 4$

$= 9 - 16$

$= -7$

∴ no real solution

10. Prove that $\Delta ABC \,|||\, \Delta EDC$. *(5 marks)*



Aim: Prove that $\Delta ABC \,|||\, \Delta EDC$

Prove: In ΔCED and ΔCBA

ED // BA (given)

$\angle CED = \angle CBA$ (corresponding angles are equal)

$\angle CDE = \angle CAB$ (corresponding angles are equal)

3rd Angle ?

∴ $\Delta ABC \,|||\, \Delta EDC$ (AAA or equiangular)

5

11. The length of a rectangle is 8 cm longer than its width. If its area is 240 cm^2, find the dimensions of the rectangle. *(3 marks)*

3

$L = w + 8$

$L \times w = 240 cm^2$

$(w+8) \times w = 240 cm^2$

$w^2 + 8w = 240 cm^2$

$w^2 + 8w - 240 = 0$ $p = -240$, $s = 8$, $f = +20, -12$

$w^2 + 20w - 12w - 240 = 0$

$w(w+20) - 12(w+20) = 0$

$(w-12)(w+20) = 0$

$w - 12 = 0$ or $w + 20 = 0$

$w = 12$

$w = 12 cm$ $w = -20 cm$

Sub $L = w + 8$

$L = 12 + 8$

$L = 20 cm$

11