FOUNDATION DIPLOMA/CERTIFICATE
Assignment I (02/03)

Module Title	:	Foundation Mathematics
Module Code	:	CMV6111
Hand out	:	Week 14
Hand in	:	Week 16

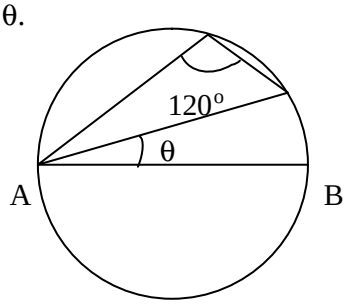
Section A Multiple Choice (20 marks)

Answer ALL questions in this section.. Each question carries 4 marks.

1. If $\frac{5x+2y}{x+2y}=3$, express *x* in terms of *y*.

   a. x = 2y
   b. x = -2y
   c. x = 3y
   d. x= -3y

2. In the figure, AB is a diameter. Find θ.



   A. 20°
   B. 30°
   C. 40°
   D. 60°

3. $a^4 - y^4$ =
   A. $(a + y)(a-y)(a^2 - y^2)$
   B. $(a - y)(a+y)(a^2 + y^2)$
   C. $(a + 2y)(a-2y)(a^2 - y^2)$
   D. $(a^2 + y^2)(a^2 - 2ay-y^2)$

4. $x^2 - 3x - 18$ equals
   A. $(x + 2)(x - 9)$
   B. $(x -2)(x+ 9)$
   C. $(x + 3)(x - 6)$
   D. $(x -3)(x + 6)$

5. If a : b=2:3 and c: a =3:1, then a: b: c equals
   A. 2:3:1
   B. 3:3:1
   C. 6:3:2
   D. 2:3:6

Section B Short Questions (40 marks)

Answer ALL questions in this section. Each question carries 10 marks.

6. (a) Factorize $x^2 - 9x - 36$. (4 marks)
   (b) Hence, factorize $y^4 - 9y^2 - 36$. (6 marks)

7. Solve the simultaneous equations:

$$\begin{cases} 2x - y = 5 \\ x^2 + xy = 2 \end{cases}$$

(10 marks)

8. In figure 1, AB is a diameter of the circle and A,B C, D and E are points on the circumference of the circle. Given $\angle CAB = 33^o$,
   (a) find $\angle ABC$ (4 marks)
   (b) find $\angle ADC$ (4 marks)
   (c) find $\angle AEC$ (2 marks)

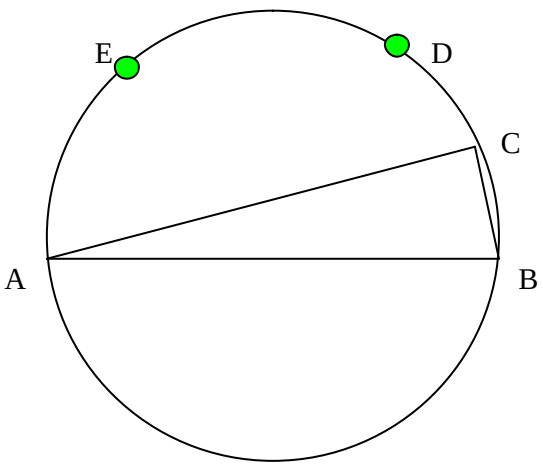


figure 1

9. Solve the following inequalities:
   (a) $\frac{2x+1}{3} > 1 - x$ (4 marks)
   (b) $2x^2 - 7x > -6$ (6 marks)

Section C Long Questions (40 marks)

Answer All questions in this section. Each question carries 20 marks.

10. Given $10x^2 + 4x + 1 = 2ax(2-x)$

(a) Find the range of values of a for which the equation has real roots. (10 marks)

(b) Find the values of a for which the equation has repeated (equal) roots. (5 marks)

(c) Find the range of values of a for which the equation has no real roots. (5 marks)

11. The unit cost of a lunch box is partly constant and partly varies inversely as the number of people buying lunch boxes. The unit cost is \$15 when 100 people buy lunch boxes and the unit cost is \$25.50 when the number of people becomes 50.

(a) Find a mathematical formula connecting the unit cost of a lunch box and the number of people buying lunch boxes. (10 marks)

(b) Calculate the unit cost of a lunch box when the number of people become 200. (4 marks)

(c) Calculate the minimum number of people buying lunch boxes when the unit cost is \$13. (6 marks)

END OF ASSIGNMENT I

Suggested Solutions to Assignment I (02/03)

1.A 2.B 3.B 4.C 5.D

6. (a) $x^2 - 9x - 36 = (x-12)(x+3)$

(b) Let $y^2 = x$,

$y^4 - 9y^2 - 36 = x^2 - 9x - 36$

$= (x-12)(x+3)$

Substitute $y^2 = x$,

$y^4 - 9y^2 - 36 = (y^2 - 12)(y^2 + 3)$

7. $2x - y = 5 \Rightarrow y = 2x - 5$

Substitute into $x^2 + xy = 2$

$x^2 + (2x^2 - 5x) = 2$

$3x^2 - 5x - 2 = 0$

$(x - 2)(3x + 1) = 0$

$x = 2$ or $x = -\frac{1}{3}$

$x = 2, \quad y = -1$ or $x = -\frac{1}{3}, \quad y = -\frac{17}{3}$

8.

(a) $\angle ACB = 90^o$

$\angle ABC + 90^o + 33^o = 180^o$

$\angle ABC = 57^o$

(b) $\angle ADC + \angle ABC = 180^o$

$\angle ADC = 123^o$

(c) $\angle AEC = \angle ADC = 123^o$

9. (a) From $\frac{2x+1}{3} > 1 - x$

$2x + 1 > 3 - 3x$

$x > 0.4$

(b) From $2x^2 - 7x > -6$

$2x^2 - 7x + 6 > 0$

$(2x - 3)(x - 2) > 0$

$x > 2$ or $x < 1.5$

10. (a) Equation is $(10+2a)x^2 + (4-4a)x+1=0$,]

discriminant = $4^2(1-a)^2 - 4.2(a+5)$

$=8(2a+1)(a-3)$

For real roots, discrininant ? 0

a? 3 or a? -1/2

(b) For equal roots, discriminant =0

a =3 or –1/2

(c) For no real roots, discrininant <0

-1/2<a<3

7. (a) Let c = unit cost; n = number of people; a = constant; k = proportionality constant

Hence, $c = a + \frac{k}{n}$; from data $15 = a + \frac{k}{100}$ …(1) and $25.5 = a + \frac{k}{50}$ …(2)

Solving, k = 1050 and a = 4.5

(b) From $c = 4.5 + \frac{1050}{n}$ and n = 200, unit cost = \$9.75

(c) From $c = 4.5 + \frac{1050}{n}$ and c = 13, minimum number is 124

END OF ASSIGNMENT I