CMV6111 FD/FC Foundation Mathematics Revision

Section A Multiple Choice questions (20 marks)

Answer All questions. Each question carries 2 marks.

A1. If $x = \frac{1+2b}{1-2b}$, then $b =$

A. $\frac{1+2x}{1-2x}$

B. $\frac{1}{2}\left(\frac{1+x}{1-x}\right)$

C. $\frac{1}{2}\left(\frac{x-1}{x+1}\right)$

D. $\frac{x-1}{2}$

A2. The equation $2x^2 + x - 1 = 0$ has a root between

A. 0 and 1

B. 1 and 2

C. 2 and 3

D. 3 and 4

A3. When $\frac{2x+1}{-3} > 4$, then

A $x < -6.5$

B $x < -5.5$

C $x > -6.5$

D $x > -5.5$

A4. $x^2 - xy + x - y =$

A $(x + 1)(x + y)$

B $(x - 1)(x - y)$

C $(x - 1)(x + y)$

D $(x + 1)(x - y)$

A5. $\sin(180° + A) =$

A $\cos A$

B $\sin A$

C $-\sin A$

D $-\cos A$

A6. The nth term of an arithmetic sequence is (n + 3). The 10 th term equals

A 10

B 11

C 12

D 13

A7. Two fair dice are thrown. The probability that the outcome is an even number on both dice is

A $\frac{1}{2}$

B $\frac{1}{4}$

C $\frac{5}{36}$

D $\frac{7}{36}$

A8. The line 3y = x + 4 passes through the point

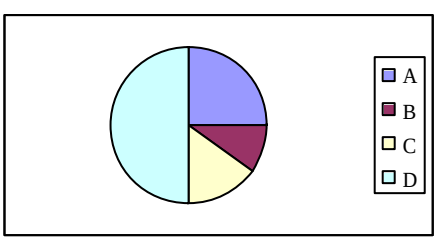
A (-1,1)

B (1,-1)

C (1,1)

D (-1,-1)

A9. The pie-chart shows the expenses of a company consist of 4 components A, B, C and D.Which component comprises 25% of the total?



A component A

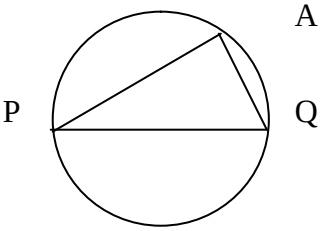
B component B

C component C

D component D

A10. In the figure below, PQ is a diameter of the circle. A is a point on the circumference. ∠APQ would be

A less than 90°
B equal to 90°
C greater than 90°
D greater than 120°



Section B Short Questions (40 marks)

Answer ALL questions in this section. Each question carries 5 marks.

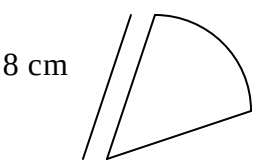
B1 Find x if $2^x = 3$.

B2 Solve the inequality $3x^2 + x + 1 > 3$.

B3 Solve the equation $2\sin^2 x + 3\sin x - 2 = 0$ for $0^o < x < 360^o$.

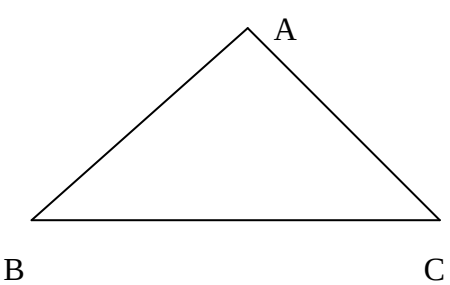
B4 A wire 20 cm long is bent into the form of a sector of radius 8 cm.

(a) Find the arc length of the sector.
(b) Find the sector angle in radians.
(c) Calculate the area of the sector.



B5 In the figure below, ABC is a triangle such that AB = 20m, BC = 30 m and ∠BAC=45°.

(a) Find the length BC.
[Answer correct to 1 decimal place]

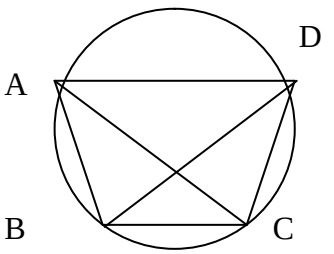


B6 The price of tea X is \$240 per kg and the price of tea Y is \$300 per kg. Tea Z is a mixture of X and Y by weight in the ratio 2 to 1.

(a) What is the price of 1 kg of tea Z?

(b) A new type of tea is made by adding 1 kg of tea X is added to 3 kg of tea Z. What is the price of 1 kg of the new type of tea?

B7 ABCD are points on the circumference of a circle. Given $\angle BAC=27^o$ and $\angle ADB=46^o$. Find (a) $\angle BDC$ and (b) $\angle ABC$.



B8 There are 5 red balls, 6 white balls and 7 green balls in a box. A ball is randomly drawn from the box. Find the probability that the

(a) ball is red.

(b) What is the probability that at least 1 red ball is drawn in 2 successive random selections assume no replacement is allowed?

Section C Structure Questions (40 marks)

Answer ANY FOUR questions in this section. Each question carries 10 marks.

C1 A function is given by $y = 2x^3 - 9x^2 + 12x - 3$.

(a) Copy and complete the table below in your answer book. (4 marks)

x	-1	0	0.5	1	1.5	2	2.5	3
y								

(b) Plot a graph of y aginst x for $-1 \le x \le 3$. (3 marks)

(c) Solve the equation $2x^3 - 9x^2 + 12x - 5 = 0$. (3 marks)

[Answer correct to 2 decimal places]

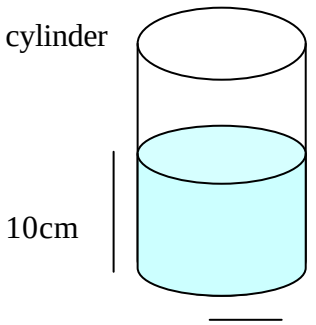
C2 The consumption of fuel per km of a hover boat is partly constant and partly varies as the square of the speed of the boat. When the speed is 40 km per hour, the fuel consumption is 9.2 litre per km. When the speed is 50 km per hour, the fuel consumption is 13.7 litre per km.

(a) Find an equation connecting the fuel consumption and the speed of the boat. (6 marks)

(b) If the fuel consumption is 6.32 litre per km, calculate the speed of the boat. (2 marks)

What is the fuel consumption in litre per km when the speed of the boat is 60 km per hour ? (2 marks)

C3 A cylinder has a radius 8 cm is filled with water up to a level of 10 cm.



(a) Calculate the cross-sectional area of the cylinder. (3 marks)

A sphere of radius 4 cm is dropped into the cylinder and sinks to the bottom.

(b) Find the volume of the sphere. (3 marks)

(c) Find the rise in water level in the cylinder. (4 marks)

[All answers correct to 1 decimal place]

C4 Alex deposits $2000 in a bank on 1 Jan 200X. The investment is compounded monthly at a rate 1.2% per year.

(a) Calculate the interest earned on 31 Dec 200X. (4 marks)

(b) Alex agrees with the bank to deposit $2000 on the first day of each month for the whole year of 200X. Calculate the total interest earned on 31 Dec 200X. (6 marks)

C5 A(3,4), B(0,1) and C(4,1) form a triangle on the x – y plane.

(a) If D is the mid-point of BC, find the coordinates of D. (2 marks)

(b) Find the distance between A and B. (3 marks)

(c) Find the perpendicular distance between A and the line BC. (1 mark)
[Hint: sketch the points A, B and C.]

(d) Find the equation of the line passing through the points A and B. (3 marks)

C6 The frequency distribution of the lengths of 100 butterflies (to the nearest mm) is as follows:

length/mm	Frequency
15 to 19	15
20 to 24	25
25 to 29	35
30 to 34	15
35 to 39	10

(a) What is the probability that a butterfly randomly chosen from the above sample has a length between 14.5 mm and 19.5 mm? (3 marks)

(b) Complete the table below and construct a cumulative frequency polygon for the distribution. (6 marks)

Length up to /mm	cumulative frequency
14.5	
19.5	
24.5	
29.5	
34.5	
39.5	

(c) Read from your cumulative frequency polygon the median of the distribution. (1 mark)

*** END OF PAPER ***