

Assignment (2)

Section 1: To be completed by the student.

Your Name: _____ Section Number: _____

ID Number: _____ Your Tutor's Name: _____

Section 2 : To be completed by the tutor.

CMA grade (from 40): _____ Cut-off Date: 26 / 5 / 2007

TMA grade (from 60): _____ Date Received _____ Assignment grade

Total: _____

100

CMA Answers Form:

- Write the letter corresponding to the correct answer for each question.
- One answer per question only.
- Each correct answer is worth 2 points.
- Should you think that the correct answer is not among the four choices, write the word: NONE, for none of the above.

Question number	1	2	3	4	5	6	7	8	9	10
Answer										
Question number	11	12	13	14	15	16	17	18	19	20
Answer										

Tutor's Comments:

Question 1:

The grid bearings of B and C from A are 40° and 220° respectively.

The grid bearing of B from C is:

- (a) 35° (b) 45° (c) 40° (d) 225°

Question 2 and Question3:

On your OS map extract there is a cairn at grid reference 147874 and a place called Madwoman's Stones at grid reference 136880

Question (2)

Calculate the ground distance between these two places using Pythagoras' Theorem:

- (a) 12.53 Km (b) 1.253 Km (c) 125.3 Km (d) 1.393Km

Question (3)

If the change in height of the Madwoman's Stones relative to the cairn is 125 meters, find the average math gradient of the straight line from the Cairn to the Madwoman's Stones (correct to 3 decimal places):

- (a) 0.010 (b) 0.100 (c) 0.900 (d) 0.001

Question 4 -6

A map has a scale of 1:50000

Question (4)

A road on the map is 10 cm long. What is the real length of the road in kilometers?

- (a) 5 km (b) 0.5 km (c) 50 km (d) 25 km

Question (5)

The area of a farm on the map is 6 cm^2 . What is the area on the ground in hectares? (1 hectare = $10\,000 \text{ m}^2$)

(a) 150

(b) 30

(c) $15(10)^7$

(d) $15(10)^5$

Question (6)

The area of a rectangular Airfield, on the ground, is 225 hectares.
What is the area on the map?

(a) 12 cm^2

(b) 11 cm^2

(c) 10 cm^2

(d) 9 cm^2

Question (7)

If A is the point (3, 2) and B is the point (6, 6). The length AB is:

(a) 3

(b) 4

(c) 5

(d) 6

Question (8)

If an object is moving at the speed of 66 kilometers per hour, the speed in miles per hour is:

(a) 106

(b) 96

(c) 52

(d) 41

Question (9)

Which one option is nearest to the time in hours predicted by Naismith if the distance walked is 1.08Km and the climb is 180 meters?

(a) 0.5 hour

(b) 1 hour

(c) 3 hours

(d) 2 hours

Question (10)

If the bearing of B from H is 50° , find the bearing of H from B:-

- (a) 230° (b) 150° (c) 210° (d) 60°

Question (11)

In 1994, the magnetic north was 5° west of grid north on your OS map extract and estimated to be decreasing by about 0.5° every 3 years. Use this information to predict the grid north in 2012:-

- (a) 2° west of grid north (b) 2° east of grid north
(c) 3° west of grid north (d) 3° east of grid north

Question (12)

The dose in milligrams d is given by the formula $d = 150 \left(3\sqrt{\frac{W}{80}} \right)^2$

Where w is the weight of the patient (in kg).

If $d = 75$ mg, the weight w , to the nearest kg, is:

- (a) 30 (b) 40 (c) 28 (d) 38

Question (13)

If $\frac{X}{Y-1} = V$, make Y the subject of the equation:

- (a) $Y = \frac{X-Y}{V}$ (b) $Y = \frac{X-1}{V}$
(c) $Y = \frac{X}{V} + 1$ (d) $Y = \frac{X+1}{V}$

Question (14)

The wing of a model airplane is 6 inches long. The model was built using a scale of 1 inch for each 3 feet. What is the actual length of the wing?

(a) 18 ft

(b) 2 ft

(c) 3 ft

(d) 6 ft

Question (15)

The temperature, in Celsius, which is equivalent to 77° Fahrenheit is:

(a) 91

(b) 43

(c) 30

(d) 25

Question (16)

If you exchange 1000 dollars for 738 Euros, What is the exchange rate, in dollars per euro, to two decimal places?

(a) 1.36

(b) 0.74

(c) 1.74

(d) 1.4

Question (17)

If a plane travels a distance of 187 Km in 17 minutes
The average speed of the plane, in kilometers per hour, is:

(a) 510

(b) 597

(c) 660

(d) 666

Question (18)

The expression that is equivalent to $(3x+2)(4x-3)$ is:

(a) $x^2 - 12x - 6$

(b) $12x^2 - 6x - 1$

(c) $6x^2 - 12x - 6$

(d) $12x^2 - x - 6$

Question (19)

Find the equation of the line passing through the points (2,1) and (4,7)

(a) $y=3x+4$

(b) $y=3x-5$

(c) $y= -3x+3$

(d) $y= -x -3$

Question(20)

Use your calculator to solve the equation: $x^3 -2x^2 +5 = 0$

(a) -1.242

(b) 1.242

(c) -2.142

(d) -1.424

End of CMA 02

TMA 02 starts in the next page

TMA 02 - This assignment covers Units 6-9.

Question 1 [15 points]

This question is based on Unit 6.

The main aims of this question are to assess the following skills and techniques:

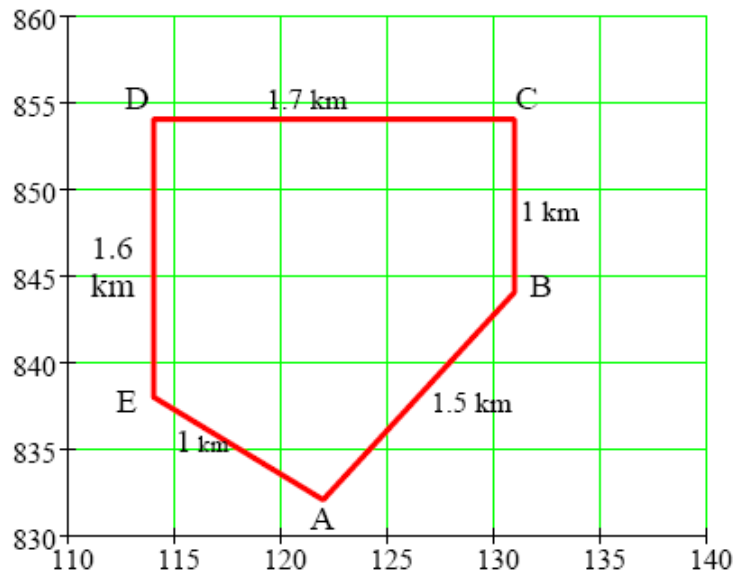
- using grid references',
- using Naismith's rule.
- Using your calculator to draw a line graph.

A walk is planned to start and finish at location A, grid reference (122 832). The walkers are to start from location A toward location B, grid reference (131 844), which is 1.5 km away from A and 108 meters higher than A. From B, they will walk north 1 km toward C (131 854) which is at the same altitude as B. From C, they walk 1.7 km toward D (114 854) which is to the west of C and at an altitude 207 meters higher than B. From D they will descend downhill 1.6 km south toward E (114 838) which is which is at an altitude 126 meters lower than D. Finally, they will climb a hill 1 km toward A.

(a) Complete the table below, write the easting and northing of each location. [3]

Location	Easting	Northing
A	122	832
B	131	844
C	131	854
D	114	854
E	114	838

(b) Draw a line graph representing the route of the walk. Choose appropriate scales and mark locations. [3]



(c) Calculate the distance and the change in altitude for each leg of the journey and complete the following table: [3]

A is higher than E by: $108+207 - 126 = 189$ meter.

From	To	Distance (km)	Change in altitude (m)
A	B	1.5	108
B	C	1	0
C	D	1.7	207
D	E	1.6	-126
E	A	1	189

(d) Use Naismith's rule to estimate the time it will take to complete the walk. [3]

Time it will take to complete the walk = walking time + extra climbing time

$$= (\text{distance in km}) / 5 + (\text{total ascent in m}) / 600$$

$$= (1.5+1+1.7+1.6+1) / 5 + (108+207+189) / 600$$

$$= 2.2 \text{ hrs}$$

$$= 2 \text{ hrs } 12 \text{ minutes}$$

(e) Estimate the time it will take to complete the walk if all the points had the same altitude. [3]

$$\begin{aligned} &= (\text{distance in km}) / 5 \\ &= (1.5+1+1.7+1.6+1) / 5 \\ &= 1.36 \text{ hrs} \\ &= 1 \text{ hr } 22 \text{ min} \end{aligned}$$

Question 2 [15 points]

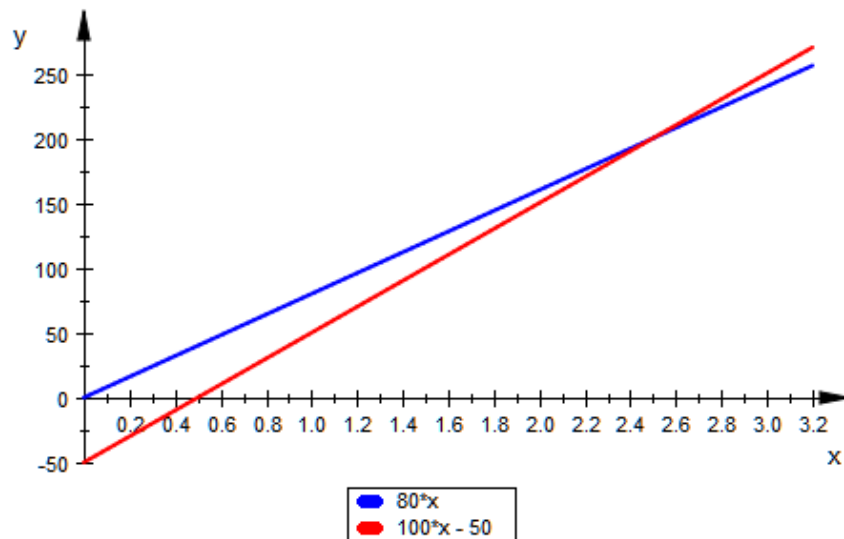
This question is based on Unit 7.

The main aims of this question are to assess your ability to:

- draw and interpret distance-time graphs;
- use algebra to describe motion;

The distance between two cities A and B is 250 kilometers. A bus leaves city A at 10:00 AM toward city B at the constant speed of 80 km / hr. 30 minutes later, a car leaves city A toward city B at the constant speed of 100 km / hr.

(a) Use your calculator to sketch a distance-time graph for the bus and the car (on the same graph). Show all details. [4]



- (b) (i) Explain , briefly, how to use your calculator to find the intersection of the two curves in your graph above. [2]

The 'trace' feature can be used or 'intersect' in the calc menu (option 5)

- (ii) Use your graph find the time and the position where the car and bus will meet. [2]

Intersection point is (2.5, 200)

The car will catch up with the bus at 12:30 pm, 200 km from city A

- (c) Find the time when the bus reaches city B and the time when the car reaches city B. [2]

Time needed for bus to travel 250 km = $(250/80)$ hrs = 3.125 hrs
= 3 hrs: 8 min

Bus arrives at city B at 1: 08 PM (to the nearest minute)

Time needed for car to travel 250 km = $(250/100)$ = 2 hrs: 30 min

Car arrives at city B at 1: 00 PM

- (d) Write two equations that describe the position of the bus and the taxi as a function of time. [2]

Bus $y = 80 X$ $X \geq 0$

Car $y = 100(X - 0.5)$ $X \geq 0.5$

- (e) Solve the two equations in (c) to find the intersection of the two curves . How does this solution compare to your results in (b) (ii)? [3]

$$80 X = 100 X - 50$$

$$20 X = 50 \text{ or } X = 2.5$$

$$y = (80)(2.5) = 200$$

intersection point is (2.5, 200)

This result is the same as the result in (b) (ii) (or very close to it)

Question 3 [20 points]

This question is based on your study of the course up to and including Unit 8 and chapter 8 of the calculator book.

The main aims of this question are to assess your ability to:

- simplify an algebraic expression or formula;
- change the subject of a formula;
- Use your calculator to sketch the graph of a function;
- Use your calculator to solve equations.

(a) Expand and simplify the following:

(I) $(X - 1)^2 + (X + 1)^2 =$ [2]

$$2X^2 + 2$$

(II) $3(X + 1)(2X - 2) =$ [2]

$$6X^2 - 6$$

(b) Rearrange to make X the subject :

(I) $y = \frac{2}{7}X + 1$ [2]

$$X = \frac{7}{2}(y - 1)$$

(II) $y = \frac{2}{x + 4}$ [3]

$$X = \frac{2 - 4Y}{Y}$$

(c) Solve the following equations:

(I) $\frac{4}{x} - 1 = 0$ [2]

$$X = 4$$

(II) $\frac{2}{3}x - 3 = 3$ [2]

$x = 9$

(d) Find the two solutions of the equation

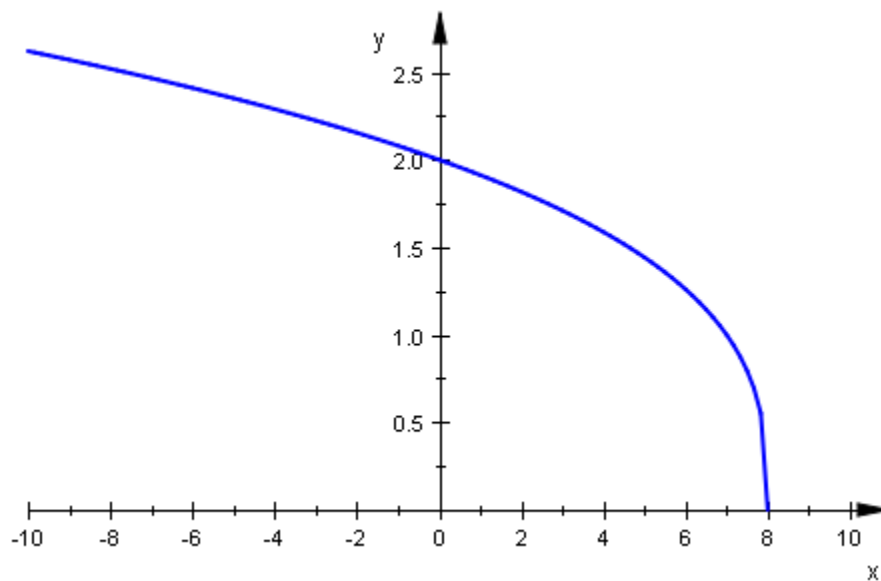
$\sqrt{49 - x^2} = 0$ [2]

$x = -7$ OR $x = 7$

(e) (i) Find the x-intercept and the Y-intercept for the function $Y = \sqrt[3]{8 - x}$. [2]

X-intercept: (8,0) Y-intercept: (0, 2)

(ii) Sketch the graph of the function in (i) , showing the X and Y intercepts. [3]



Question 4: [10 points]

This question is based on your study of the course up to and including Unit 9 and Chapter 9 of the Calculator Book.

The main aims of this question are to assess your ability to.

- appreciate the units used for measuring angles;
- use the notion of period;
- appreciate the likely period of the sum of two sines.

(a) Convert the following angles from degrees to radian. [3]

(i) 55°

(ii) 145°

(iii) 195°

(i) 0.96 radian

(ii) 2.53 radian

(iii) 3.40 radian

(b) Convert the following angles from radian to degrees. [3]

(i) 1.4π radian

(ii) $\frac{3\pi}{5}$ radian

(iii) 4 radian

(i) 252°

(ii) 108°

(iii) 229°

(c) Find the period of the following functions:

(i) $y = \sin(2X) + \sin(3X)$ [2]

Period = 2π

(ii) $y = \sin(4X) + \sin(6X)$ [2]

Period = π

-End of assignment-