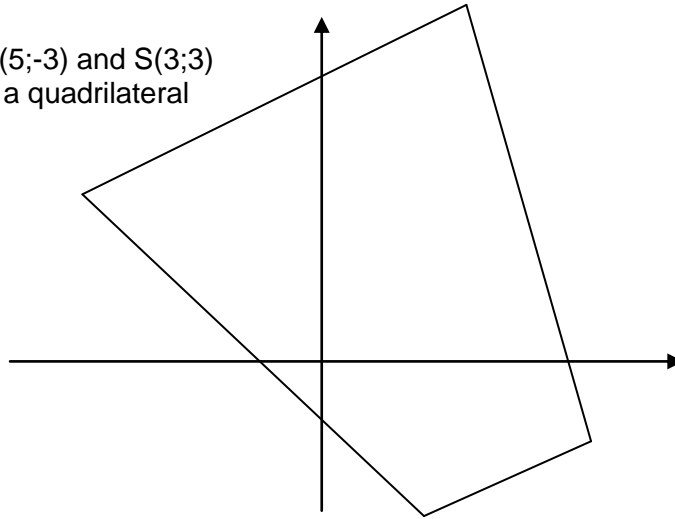


- 1 An answer may receive no marks unless sufficient detail of the working is shown to indicate that a correct method is being used.
- 2 Work in ink, diagrams in pencil. Answers correct to two decimal places, where appropriate.
- 3 Marks will be deducted for incorrect and sloppy setting out.
- 4 Diagrams are not drawn to scale.

Question 1

$P(-3;1)$, $Q(2;-4)$, $R(5;-3)$ and $S(3;3)$
are the vertices of a quadrilateral



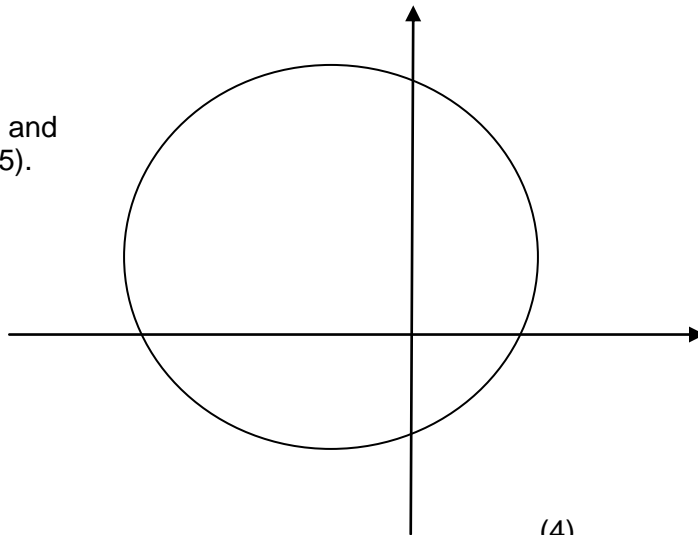
- 1.1 Calculate the length of PS. (2)
- 1.2 Find the equation of the line PQ. (3)
- 1.3 Show that $PS \parallel QR$. (2)
- 1.4 Is PS perpendicular to SR? Give a reason for your answer. (2)
- 1.5 Calculate the inclination of line PQ. (2)
- 1.6 Find the size of angle QPS, correct to the nearest degree. (3)

[14]

Question 2

This circle has centre $C(-2;3)$, and passes through the point $A(2;5)$.

$B(-4;-1)$ is shown.



- 2.1 Find the equation of the circle. (4)
- 2.2 Find the equation of the tangent to the circle at A. (4)

- 2.3 If we assume that the equation of the circle is $(x + 2)^2 + (y - 3)^2 = 20$, show that the line with equation $y + 2x + 11 = 0$ is also a tangent to the circle. (6)
- 2.4 Does a point D with co-ordinates $(-4;6)$ lie on, inside or outside the circle – show the method you used to reach an answer. (3)
- 2.5 Show that the perpendicular bisector of the line AB passes through the centre of the circle. (6)

[23]

Question 3

- 3.1 P is the point $(2;-4)$.
Write down the co-ordinates of P after the following transformations:
- 3.1.1 P is reflected in the line $y = 0$ (1)
- 3.1.2 P is rotated about the origin by 90° in a clockwise direction. (2)
- 3.1.3 P is first reflected in the line $y = x$, and then translated horizontally by -2 . (2)
- 3.2 Describe in words the effect of this transformation on the vertices of any $\triangle ABC : (x;y) \rightarrow (-x+1;y+1)$ (3)
- 3.3 Give the rule for the following transformations:
- 3.3.1 A reflection in the x axis, followed by a reflection in the y axis. (3)
- 3.3.2 A reflection in the y axis, followed by a reflection in the line $y = -x$. (3)
- 3.4 $\triangle ABC$ with vertices $A(-2;4)$, $B(-1;2)$ and $C(-4;1)$ is illustrated on the diagram sheet.
 $\triangle ABC$ undergoes a three stage transformation T to form a new $\triangle A'B'C'$:
- Stage 1 - Reflection in the x axis
Stage 2 - A translation of 3 units to the right and 2 units upwards
Stage 3 - An enlargement through the origin by a factor of 2.
- 3.4.1 Write down the rule for each stage, in the form: $(x;y) \rightarrow \dots$ (6)
- 3.4.2 Hence, write down the single rule for the transformation T. (2)
- 3.4.3 On the diagram sheet, draw and label $\triangle A'B'C'$ (3)
- 3.4.4 If the area of $\triangle A'B'C' = 2,8$ units², what was the area of $\triangle ABC$? (2)

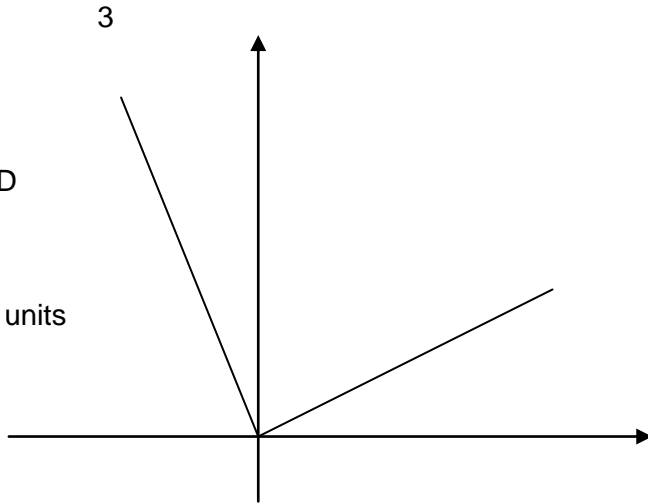
[27]

Question 4

4.1 NO CALCULATOR TO BE USED

In the diagram:

AOX = θ , BOX = β and OB = 13 units
A(8;6) and B(m;12) are shown.
Find the value of the following,
in their simplest form:



- 4.1.1 $\tan \theta$ (2)
- 4.1.2 the value of m (2)
- 4.1.3 $\cos \beta$ (2)
- 4.1.4 $\sin (180^\circ - \beta)$ (2)
- 4.1.5 $\cos (90^\circ + \theta)$ (3)
- 4.1.6 $\cos (\beta - \theta)$ (4)

4.2 Without using a calculator, find the value of:

$$\frac{\sin 120^\circ \cdot \tan (-135^\circ)}{\cos 150^\circ \cdot \sin 420^\circ} \quad (6)$$

4.3 Prove that: $\tan (180^\circ - x) \cdot \cos(180^\circ + x) \cdot \sin x + \cos x \cdot \sin(90^\circ + x) = 1$ (5)

[26]

Question 5

5.1. Without using a calculator, show that $\sin 15^\circ = \frac{\sqrt{2}(\sqrt{3}-1)}{4}$ (4)

5.2.1 Find the general solution for the equation:
 $6 \cos^2 x - 7 \cos x - 5 = 0$ (4)

5.2.2 Give the solutions for the equation in the interval $[-180^\circ; +180^\circ]$ (3)

[13]

Question 6

On the diagram sheet is the graph of $f(x) = \sin (90^\circ + x)$ in the interval $[-90^\circ; 270^\circ]$.

- 6.1 Plot the graph of $g(x) = -2 \cos x$, on the same axes, showing the co-ordinates of all relevant points. (4)
- 6.2 What is the amplitude of $g(x)$? (1)
- 6.3 For what values of x is $f(x) = g(x)$? (3)
- 6.4 Within which interval of x , is $f(x) < g(x)$? (2)

[10]

Question 7

Refer to the diagram sheet:

ABC is a right angle, $A = 54^\circ$, $D_1 = 67^\circ$ and $d = 48$ cm.

- 7.1 Calculate the size of a. (3)
 7.2 Find the area of quadrilateral ABCD. (4)
 7.3 What is the size of b? (4)
 7.4 If the perimeter of quadrilateral ABCD is 148.6cm, what is the size of m? (2)

[13]

Question 8

At a lecture on "You Are what You Eat", people were asked how much they spent on Junk Food per week. The data below shows their amounts in Rand:

315	425	350	127	98	107	290	150	169	110
276	295	82	75	180	411	130	280	163	209

- 8.1 Give the range of the data. (2)
 8.2 Calculate the mean value. (2)
 8.3 Find the standard deviation. (5)
 8.4 How many of the 'eaters' fall within one standard deviation of the mean? (2)

[11]

Question 9

Refer to the diagram sheet, where the Tenth Grade Mathematics marks for June 2008 are recorded as percentages:

- 9.1 Complete the table on the diagram sheet. (4)
 9.2 On the grid provided, draw the ogive to represent these data. (4)
 9.3 From your graph estimate the median value – show your method clearly on the diagram. (3)

[11]

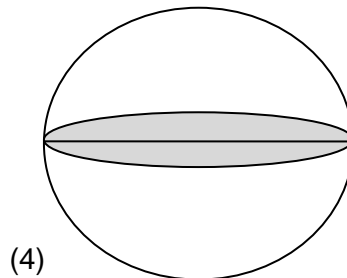
Question 10

The formula for the volume of a sphere is:

$$V = \frac{4}{3} \pi r^3$$

The circular cross section of this sphere (shaded) has an area of 49.8 cm^2 .

Find the radius, and the volume of this sphere.



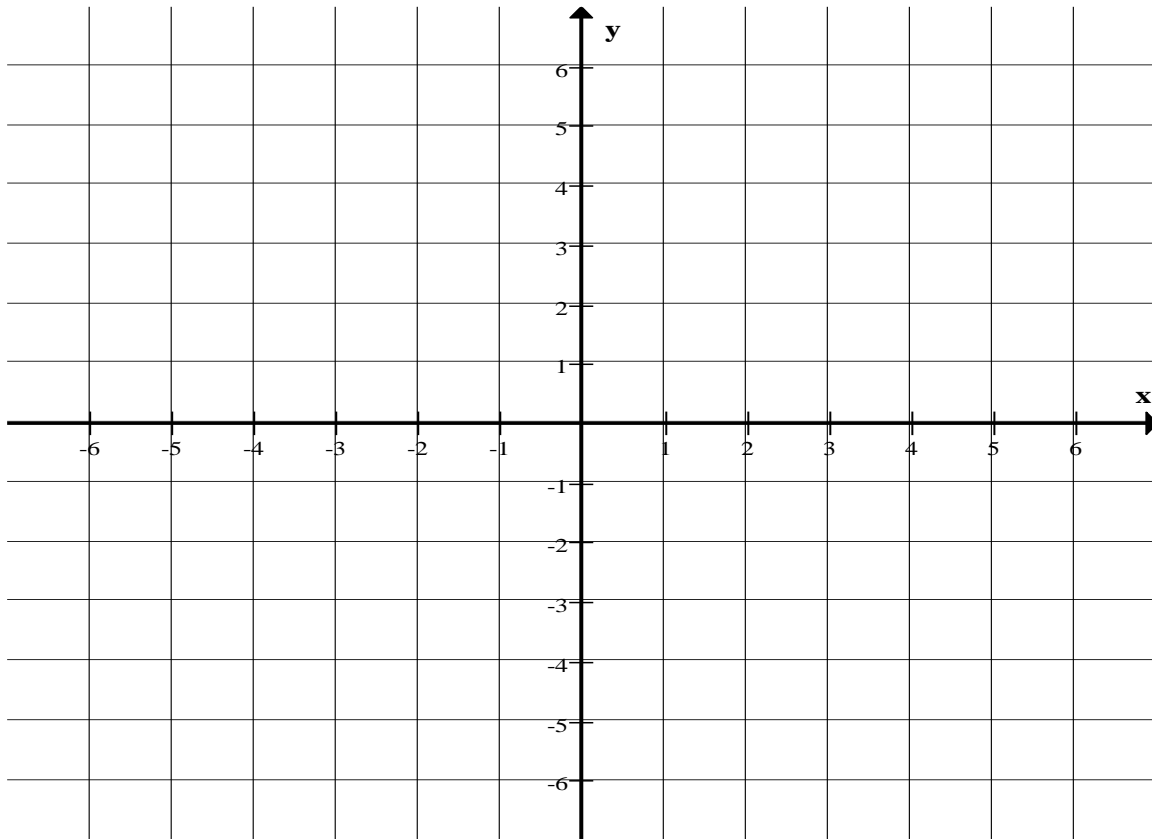
(4)

[4]

DIAGRAM SHEET NUMBER ONE

NAME:

Question 3.4



Question 6

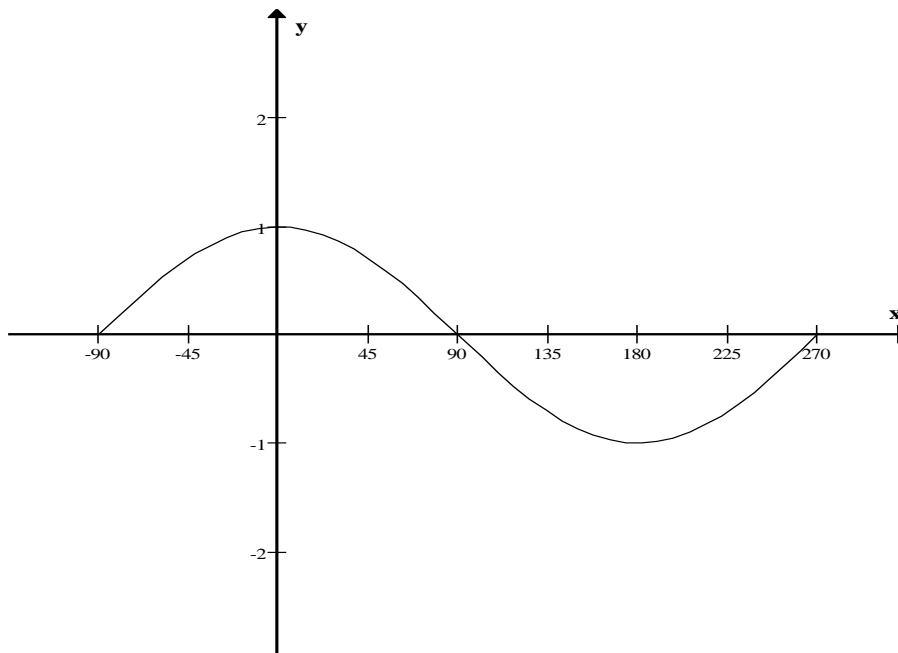
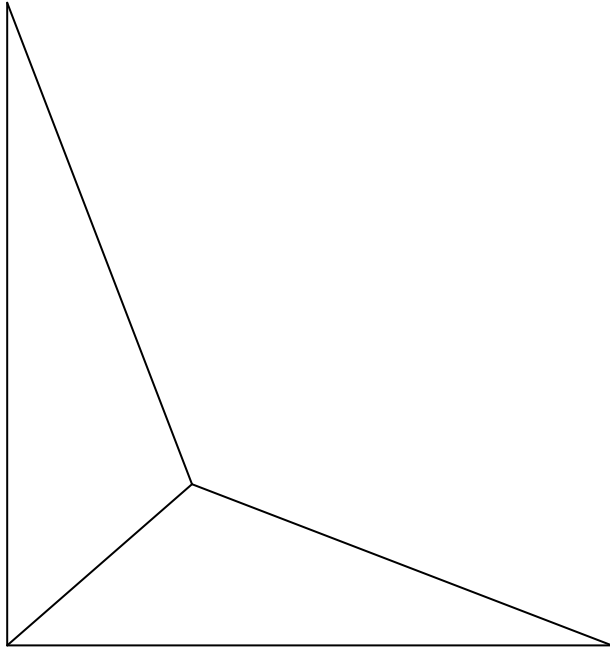


DIAGRAM SHEET NUMBER TWO

NAME:

Question 7



Question 9.1

Marks %	Frequency	Cumulative Frequency
$0 \leq x \leq 10$	0	
$10 \leq x \leq 20$	2	
$20 \leq x \leq 30$	6	
$30 \leq x \leq 40$	7	
$40 \leq x \leq 50$	14	
$50 \leq x \leq 60$	20	
$60 \leq x \leq 70$	35	
$70 \leq x \leq 80$	29	
$80 \leq x \leq 90$	6	
$90 \leq x \leq 100$	1	

Question 9.2

