Shihab Muhtasim

Student ID: 21301610

MAT 110

ASSIGNMENT 05

SET 6

Ans to the question no 01

Given,

$-15 + 12x - 6y + y^2 = 0$

$\Rightarrow y^2 - 6y + 3^2 = 15 - 12x + 9$

$\Rightarrow (y-3)^2 = -12x + 24$

$\Rightarrow (y-3)^2 = 4(-3)(x-2)$

$\therefore$ Equation into the standard form of the equation of $parabola : (y-3)^2 = 4(-3)(x-2)$

Comparing this equation with $Y^2 = 4pX$ we get,

$Y = y - 3,$

$4p = 12 \Rightarrow p = -3,$

$X = 2 - x$

Vertex:

$Y = 0$

$\Rightarrow y - 3 = 0$

$\Rightarrow y = 3$

Again,

$X = 0$

$\Rightarrow x - 2 = 0$

$\Rightarrow x = 2$

$\therefore$ Vertex$(x, y) = (2, 3)$

Focus:

The focus of the parabola's following $Y^2 = 4pX$ will be on x axis

$\therefore Y = 0$

$\Rightarrow y - 3 = 0$

$\Rightarrow y = 3$

And, $X = p \Rightarrow x - 2 = -3 \Rightarrow x = -1$

$\therefore$ Focus$= (-1, 3)$

Equation of directrix:

$X + p = 0$

$\Rightarrow x - 2 - 3 = 0$

$\Rightarrow x = 5$

Equation of directrix is $x = 5$

Ans to the question no 02

Given,

$256 + 9x^2 - 160y + 16y^2 = 0$

$\Rightarrow 9x^2 + 16y^2 - 160y + 256 = 0$

$\Rightarrow 9x^2 + 16(y^2 - 10y + 25) + 256 - 25 \cdot 16 = 0$

$\Rightarrow 9x^2 + 16(y-5)^2 + 144 = 0$

$\Rightarrow \frac{9x^2}{144} + \frac{16(y-5)^2}{144} = 1$

$\Rightarrow \frac{x^2}{4^2} + \frac{(y-5)^2}{3^2} = 1$

$\therefore$ Equation into the standard form of the equation of $ellipse : \frac{x^2}{4^2} + \frac{(y-5)^2}{3^2} = 1$

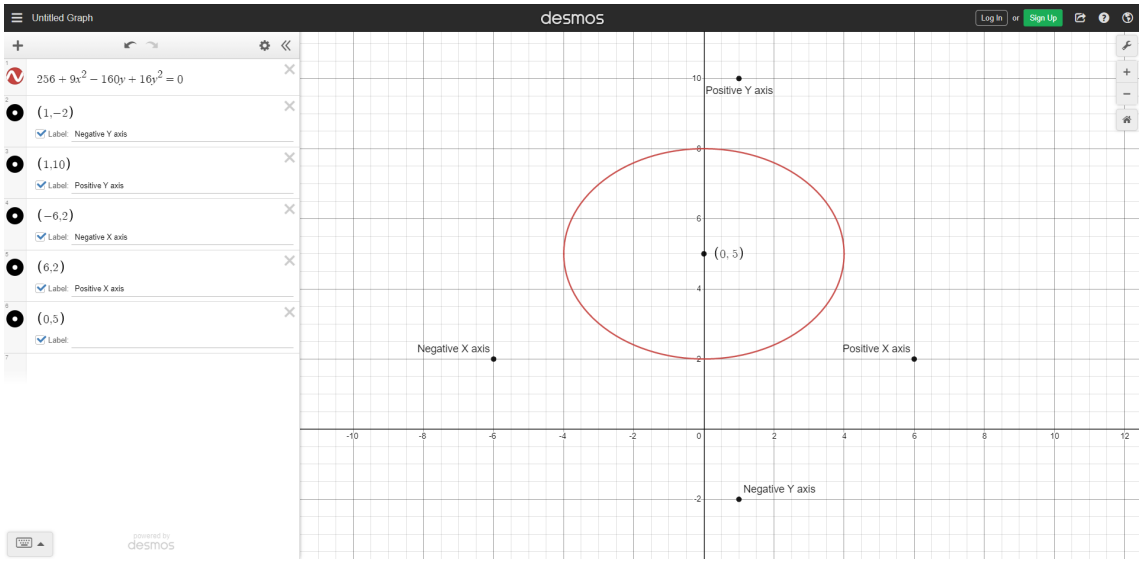
Comparing this equation with the standard form of equation of ellipse $\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$

vertex:

$(h, k) = (0, 5)$

$a = 4, b = 3$

sketch of the ellipse:



Ans to the question no 03

Given,

$-24 - 24x + 12x^2 - 3y^2 = 0$

$\Rightarrow 12(x^2 - 2x + 1) - 3y^2 - 24 - 12 = 0$

$\Rightarrow 12(x-1)^2 - 3y^2 = 36$

$\Rightarrow \frac{(x-1)^2}{(\sqrt{3})^2} - \frac{y^2}{(2\sqrt{3})^2} = 1$

$\therefore$ Equation into the standard form of the equation of hyperbola:$\frac{(x-1)^2}{(\sqrt{3})^2} - \frac{y^2}{(2\sqrt{3})^2} = 1$

Comparing this equation with the standard form of equation of hyperbola $\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$,

$a = \sqrt{3}, b = 2\sqrt{3}$

Center:$(h, k) = (1, 0)$

vertices:

The vertices of this hyperbola are on x axis

$\therefore y = k = 0$

And, $x = h \pm a = 1 \pm \sqrt{3}$

$\therefore$ Vertices$= (1 + \sqrt{3}, 0), (1 - \sqrt{3}, 0)$

Eccentricity:

$e = \sqrt{1 + \frac{b^2}{a^2}}$

$= \sqrt{1 + \frac{2\sqrt{3})^2}{(\sqrt{3})^2}}$

$= \sqrt{5}$

Foci:

$(h \pm ae, k) = (1 \pm \sqrt{3} \cdot \sqrt{5}, 0) = (1 \pm \sqrt{15}, 0)$

$\therefore$ Foci=$(1 + \sqrt{15}, 0), (1 - \sqrt{15}, 0)$

Equation of directrices:

$x - h = \pm\frac{a}{e}$

$\Rightarrow x - 1 = \pm\frac{\sqrt{3}}{\sqrt{5}}$

$\Rightarrow x = 1 \pm \frac{\sqrt{3}}{\sqrt{5}}$

$\Rightarrow x = \frac{5 \pm \sqrt{15}}{5}$

$\therefore$ Equation of directrices: $x = \frac{5+\sqrt{15}}{5}, x = \frac{5+\sqrt{15}}{5}$

Ans to the question no 04

Given,

$r = \frac{9}{6+2cos\theta}$

$\Rightarrow r = \frac{\frac{9}{6}}{1+\frac{cos\theta}{3}}$

$\Rightarrow r = \frac{\frac{3}{2}}{1+\frac{1}{3}cos\theta}$

Comparing this equation with $r = \frac{ke}{1+ecos\theta}$,

(a)Eccentricity: $e = \frac{1}{3}$

(b) As we know, for ellipse the eccentricity value is $0 < e < 1$,

$Here, 0 < e = \frac{1}{3} < 1$

$\therefore$ The conic is an ellipse

(c)Equation of directrix:

Here,

$ke = \frac{3}{2}$

$\Rightarrow k = \frac{3}{2} \cdot \frac{3}{1} = \frac{9}{2}$

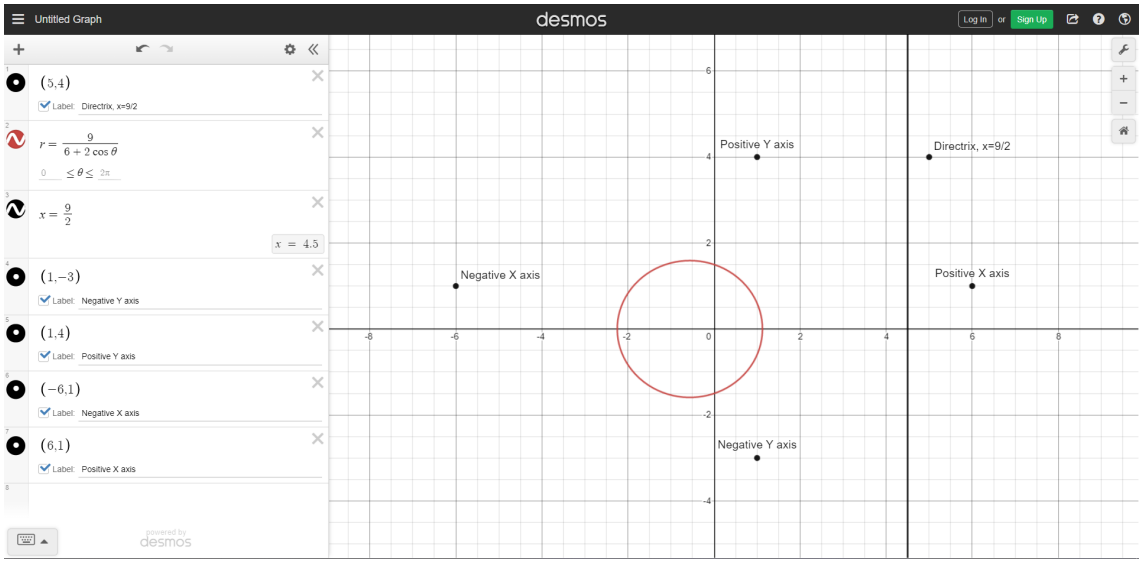
Since we have a positive value the directrix will be,

$x = k$

$\Rightarrow x = \frac{9}{2}$

$\therefore$(c)Equation of directrix:$x = \frac{9}{2}$

(d)Sketch of the conic:



Ans to the question no 05

Given,

The cylindrical coordinates$(r, \theta, z) = (\pi, \frac{\pi}{2}, -2)$

We know in terms of rectangular coordinates,

$x = rcos\theta$

$y = rsin\theta$

$z = z$

Here,

$x = \pi cos\frac{\pi}{2}$

$\Rightarrow x = \pi \cdot 0 = 0$

Again,

$y = \pi sin\frac{\pi}{2}$

$\Rightarrow y = \pi \cdot 1$

$\Rightarrow y = \pi = 3.1416$

And, $z = -2$

$\therefore$ Rectangular coordinates $(x, y, z) = (0, 3.1416, -2)$

Ans to the question no 06

Given,

The spherical coordinates$(2, \theta, \phi) = (\frac{5\pi}{6}, \frac{\pi}{2}, \pi)$

We know in terms of rectangular coordinates,

$x = e \cdot sin\phi cos\theta$

$y = e \cdot sin\phi sin\theta$

$z = e \cdot cos\phi$

Here,

$x = \frac{5\pi}{6} sin\pi cos\frac{\pi}{2}$

$\Rightarrow x = \frac{5\pi}{6} \cdot 0 \cdot 0 = 0$

Again,

$y = \frac{5\pi}{6} sin\pi sin\frac{\pi}{2}$

$\Rightarrow y = \frac{5\pi}{\cdot} 0 \cdot 1 = 0$

$And, z = \frac{5\pi}{6} cos\pi$

$\Rightarrow z = -\frac{5\pi}{6}$

$\Rightarrow z = -\frac{5 \cdot 3.1416}{6}$

$\Rightarrow z = -2.618$

$\therefore$ Rectangular coordinates $(x, y, z) = (0, 0, -2.618)$

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\usepackage{amsmath}
\usepackage{amssymb}
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    \huge{\bfseries Shihab Muhtasim}\\
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    \textsc{\Large Student ID: 21301610}\\
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    [0.5 cm]
    \textsc{\LARGE ASSIGNMENT 05}\\
    [0.5 cm]
    \textsc{\LARGE SET 6}\\
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    \textsc{Problem 1}\\
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\end{center}
\Large {Given, \\[3mm]
$-15+12x-6y+y^2=0\\[3mm]
\Rightarrow y^2-6y+3^2=15-12x+9\\[3mm]
\Rightarrow (y-3)^2=-12x+24\\[3mm]
\Rightarrow (y-3)^2=4(-3)(x-2)\\[3mm]
```

Shihab Muhtasim

Student ID: 21301610

MAT 110

ASSIGNMENT 05

SET 6

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\Rightarrow (y-3)^2=-12x+24\\[3mm]
\Rightarrow (y-3)^2=4(-3)(x-2)\\[3mm]
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Comparing this equation with $Y^2=4pX$ we get,\\[3mm]
$Y=y-3,\\[3mm]
4p=12\Rightarrow p=-3,\\[3mm]
X=2-x\\[3mm]$
Vertex:\\[3mm]
$Y=0\\[3mm] \Rightarrow y-3=0 \\[3mm]\Rightarrow y=3\\[3mm]$
Again,\\[3mm]
$X=0 \\[3mm] \Rightarrow x-2=0 \\[3mm] \Rightarrow x=2\\[3mm]
\therefore$ Vertex$(x,y)= (2,3)$\\[5mm]
Focus: \\[3mm]
The focus of the parabola's following $Y^2=4pX$ will be on x
axis\\[3mm]
$\therefore Y=0\\[3mm] \Rightarrow y-3=0\\[3mm] \Rightarrow y=3\\[3mm]
And$, $X=p\Rightarrow x-2=-3 \Rightarrow x=-1\\[3mm]
\therefore$ Focus$=(-1,3)\\[3mm]$
Equation of directrix:\\[3mm]
$X+p=0\\[3mm] \Rightarrow x-2-3=0\\[3mm] \Rightarrow x=5\\[3mm]$
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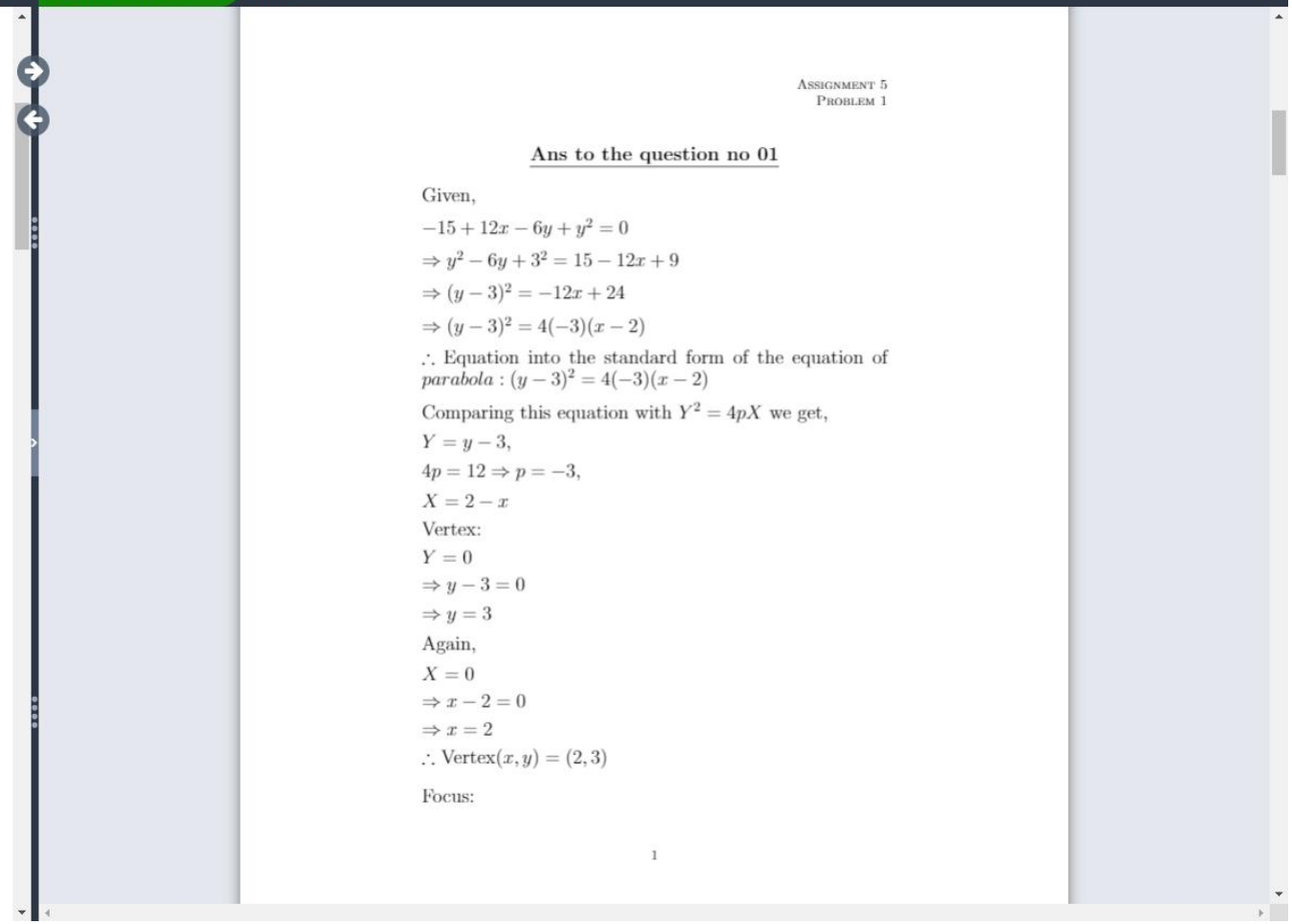

Assignment 5
Problem 1

Ans to the question no 01

Given,

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$\Rightarrow y^2 - 6y + 3^2 = 15 - 12x + 9$

$\Rightarrow (y-3)^2 = -12x + 24$

$\Rightarrow (y-3)^2 = 4(-3)(x-2)$

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$Y = y - 3,$

$4p = 12 \Rightarrow p = -3,$

$X = 2 - x$

Vertex:

$Y = 0$

$\Rightarrow y - 3 = 0$

$\Rightarrow y = 3$

Again,

$X = 0$

$\Rightarrow x - 2 = 0$

$\Rightarrow x = 2$

$\therefore \text{Vertex}(x, y) = (2, 3)$

Focus:

1

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Focus: \\[3mm]
The focus of the parabola's following $Y^2=4pX$ will be on x
axis\\[3mm]
$\therefore Y=0\\[3mm] \Rightarrow y-3=0\\[3mm] \Rightarrow y=3\\[3mm]
And$, $X=p\Rightarrow x-2=-3 \Rightarrow x=-1\\[3mm]
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Equation of directrix:\\[3mm]
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Equation of directrix is $x=5$ \\[3mm]}
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\Large {Given, \\[3mm]
$256+9x^2-160y+16y^2=0\\[3mm]
\Rightarrow 9x^2+16y^2-160y+256=0 \\[3mm]
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\Rightarrow \frac{9x^2}{144}+\frac{16(y-5)^2}{144}=1 \\[3mm]
\Rightarrow \frac{x^2}{4^2}+\frac{(y-5)^2}{3^2}=1 \\[3mm]
\therefore$ Equation into the standard form of the equation of $
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Comparing this equation with the standard form of equation of ellipse
$\frac{(x-h)^2}{a^2}+ \frac{(y-k)^2}{b^2}=1\\[3mm]$
vertex:\\[3mm]
$(h,k)=(0,5)\\[3mm]
a=4, b=3\\[10 cm]$
sketch of the ellipse: \\[3mm]}
\includegraphics[width=15cm]{sketch question 2}
```

The focus of the parabola's following $Y^2 = 4pX$ will be on x axis

$\therefore Y = 0$

$\Rightarrow y - 3 = 0$

$\Rightarrow y = 3$

And, $X = p \Rightarrow x - 2 = -3 \Rightarrow x = -1$

$\therefore$ Focus$= (-1, 3)$

Equation of directrix:

$X + p = 0$

$\Rightarrow x - 2 - 3 = 0$

$\Rightarrow x = 5$

Equation of directrix is $x = 5$

```
$X+p=0\\[3mm] \Rightarrow x-2-3=0\\[3mm] \Rightarrow x=5\\[3mm]$
Equation of directrix is $x=5$ \\[3mm]}
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    \textsc{Problem 2}\\
    [1 cm]
    \end{flushright}
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$\frac{(x-h)^2}{a^2}+ \frac{(y-k)^2}{b^2}=1\\[3mm]$
vertex:\\[3mm]
$(h,k)=(0,5)\\[3mm]
a=4, b=3\\[10 cm]$
sketch of the ellipse: \\[3mm]}
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    \textsc{Assignment 5}\\
    \textsc{Problem 3}\\
    [1 cm]
```


Ans to the question no 02

Given,

$256 + 9x^2 - 160y + 16y^2 = 0$

$\Rightarrow 9x^2 + 16y^2 - 160y + 256 = 0$

$\Rightarrow 9x^2 + 16(y^2 - 10y + 25) + 256 - 25 \cdot 16 = 0$

$\Rightarrow 9x^2 + 16(y - 5)^2 + 144 = 0$

$\Rightarrow \frac{9x^2}{144} + \frac{16(y-5)^2}{144} = 1$

$\Rightarrow \frac{x^2}{4^2} + \frac{(y-5)^2}{3^2} = 1$

$\therefore$ Equation into the standard form of the equation of $ellipse : \frac{x^2}{4^2} + \frac{(y-5)^2}{3^2} = 1$

Comparing this equation with the standard form of equation of ellipse $\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$

vertex:

$(h, k) = (0, 5)$

$a = 4, b = 3$

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vertex:\\[3mm]
$(h,k)=(0,5)\\[3mm]
a=4, b=3\\[10 cm]$
sketch of the ellipse: \\[3mm]}
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    \textsc{Problem 3}\\
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\begin{center}
  \textbf{\Large \underline {Ans to the question no 03}}\\
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\end{center}
\Large {Given, \\[3mm]
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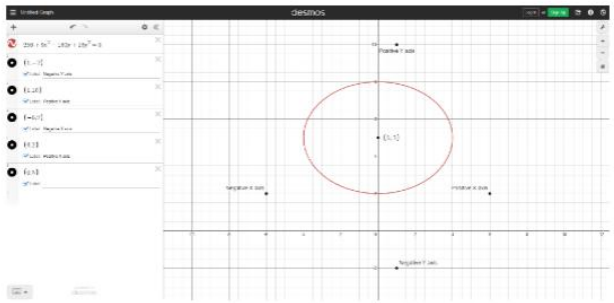
\Rightarrow 12(x^2-2x+1)-3y^2-24-12=0 \\[3mm]
\Rightarrow 12(x-1)^2-3y^2=36 \\[3mm]
\Rightarrow \frac{(x-1)^2}{(\sqrt{3})^2}-\frac{y^2}{(2\sqrt{3})^2}=1
```

sketch of the ellipse:



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76  $(h,k)=(0,5)\\[3mm]
77  a=4, b=3\\[10 cm]$
78  sketch of the ellipse: \\[3mm]}
79  \includegraphics[width=15cm]{sketch question 2}
80  \end{newpage}
81  \begin{newpage}
82      \begin{flushright}
83      \textsc{Assignment 5}\\
84      \textsc{Problem 3}\\
85      [1 cm]
86      \end{flushright}
87  \begin{center}
88    \textbf{\Large \underline {Ans to the question no 03}}\\
89    [0.5 cm]
90  \end{center}
91  \Large {Given, \\[3mm]
92  $-24-24x+12x^2-3y^2=0\\[3mm]
93  \Rightarrow 12(x^2-2x+1)-3y^2-24-12=0 \\[3mm]
94  \Rightarrow 12(x-1)^2-3y^2=36 \\[3mm]
95  \Rightarrow \frac{(x-1)^2}{(\sqrt{3})^2}-\frac{y^2}{(2\sqrt{3})^2}=1
    \\[3mm]
96  \therefore$ Equation into the standard form of the equation of
    hyperbola:$\frac{(x-1)^2}{(\sqrt{3})^2}-\frac{y^2}{(2\sqrt{3})^2}=1\\[3
    mm]$
97  Comparing this equation with the standard form of equation of hyperbola
    $\frac{(x-h)^2}{a^2}- \frac{(y-k)^2}{b^2}=1,\\[3mm]
98  a=\sqrt{3},b=2\sqrt{3}\\[3mm]$
99  Center:$(h,k)=(1,0)\\[3mm]$
100 vertices:\\[3mm]
101 The vertices of this hyperbola  are on x axis\\[3mm]
102 $\therefore y=k=0$\\[3mm]
103 And, $x=h\pm a=1 \pm \sqrt{3}\\[3mm]
104 \therefore  $ Vertices= $(1+\sqrt{3},0),(1-\sqrt{3},0)$\\[3cm]
105 Eccentricity:\\[3mm]
106 $e=\sqrt{1 + \frac{b^2}{a^2} }\\[3mm]
107 =\sqrt{1+\frac{2\sqrt{3})^2}{(\sqrt{3})^2}}\\[3mm]
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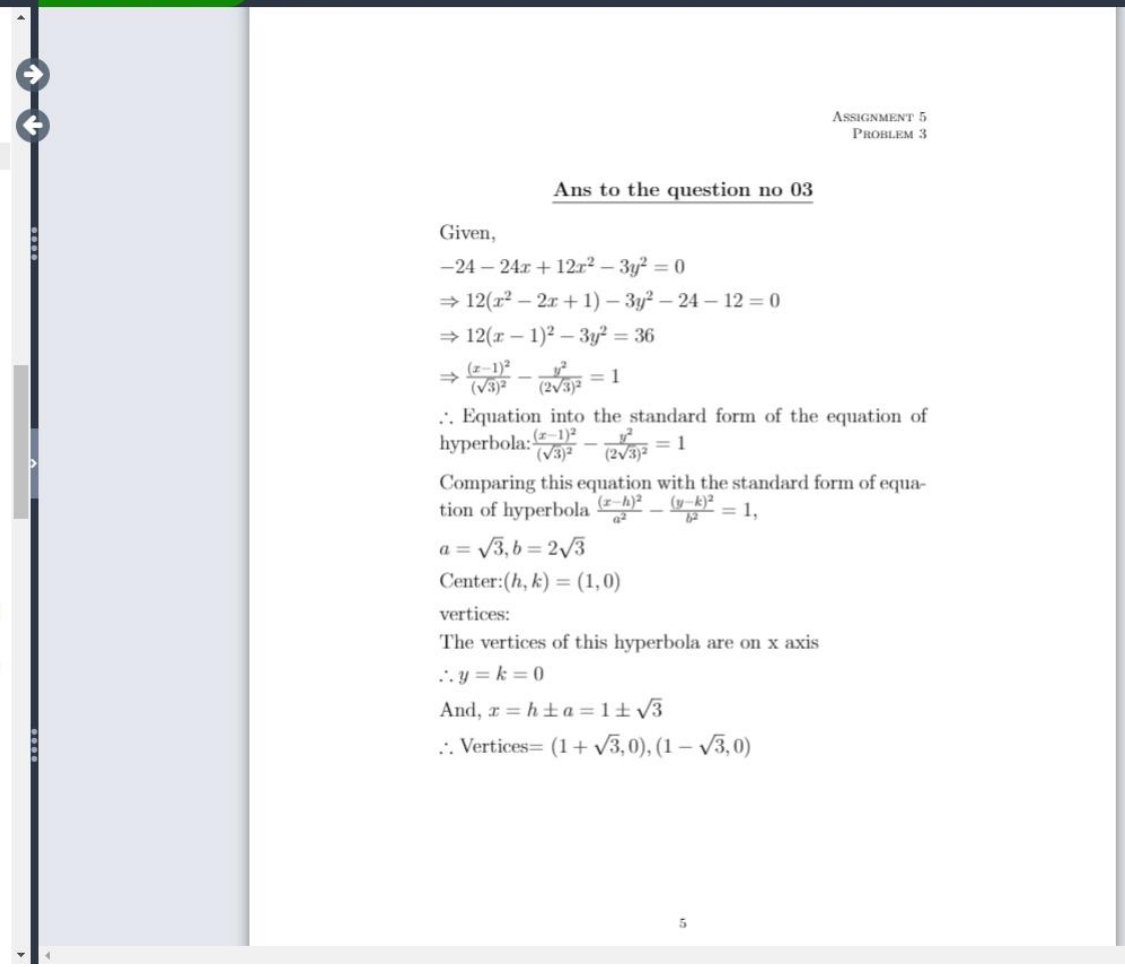

ASSIGNMENT 5
PROBLEM 3

Ans to the question no 03

Given,

$-24 - 24x + 12x^2 - 3y^2 = 0$

$\Rightarrow 12(x^2 - 2x + 1) - 3y^2 - 24 - 12 = 0$

$\Rightarrow 12(x-1)^2 - 3y^2 = 36$

$\Rightarrow \frac{(x-1)^2}{(\sqrt{3})^2} - \frac{y^2}{(2\sqrt{3})^2} = 1$

$\therefore$ Equation into the standard form of the equation of hyperbola:$\frac{(x-1)^2}{(\sqrt{3})^2} - \frac{y^2}{(2\sqrt{3})^2} = 1$

Comparing this equation with the standard form of equation of hyperbola $\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$,

$a = \sqrt{3}, b = 2\sqrt{3}$

Center:$(h,k) = (1,0)$

vertices:

The vertices of this hyperbola are on x axis

$\therefore y = k = 0$

And, $x = h \pm a = 1 \pm \sqrt{3}$

$\therefore$ Vertices= $(1+\sqrt{3},0), (1-\sqrt{3},0)$

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```
100 Vertices:\\[3mm]
101 The vertices of this hyperbola  are on x axis\\[3mm]
102 $\therefore y=k=0$\\[3mm]
103 And, $x=h\pm a=1 \pm \sqrt{3}\\[3mm]
104 \therefore  $ Vertices= $(1+\sqrt{3},0),(1-\sqrt{3},0)$\\[3cm]
105 Eccentricity:\\[3mm]
106 $e=\sqrt{1 + \frac{b^2}{a^2} }\\[3mm]
107 =\sqrt{1+\frac{2\sqrt{3})^2}{(\sqrt{3})^2}}\\[3mm]
108 =\sqrt{5}\\[3mm]$
109 Foci:\\[3mm]
110 $(h \pm ae,k)=(1 \pm \sqrt{3} \cdot \sqrt{5},0)=(1 \pm \sqrt{15}
    ,0)\\[3mm]
111 \therefore $ Foci=$(1+\sqrt{15} ,0),(1-\sqrt{15} ,0) \\[3mm]$
112 Equation of directrices:\\[3mm]
113 $x-h=\pm \frac{a}{e}\\[3mm]
114 \Rightarrow x-1=\pm \frac{\sqrt{3}}{\sqrt{5}}\\[3mm]
115 \Rightarrow x=1 \pm \frac{\sqrt{3}}{\sqrt{5}}\\[3mm]
116 \Rightarrow x=\frac{5\pm \sqrt{15}}{5}\\[3mm]
117 \therefore$ Equation of directrices:  $ x=\frac{5 +
    \sqrt{15}}{5},x=\frac{5 + \sqrt{15}}{5}$\\[3mm]}
118 \end{newpage}
119 \begin{newpage}
120     \begin{flushright}
121     \textsc{Assignment 5}\\
122     \textsc{Problem 4}\\
123     [1 cm]
124     \end{flushright}
125 \begin{center}
126   \textbf{\Large \underline {Ans to the question no 04}}\\
127   [0.5 cm]
128 \end{center}
129 \Large {Given, \\[3mm]
130 $r=\frac{9}{6+2cos \theta}\\[3mm]
131 \Rightarrow r=\frac{\frac{9}{6}}{1+\frac{cos \theta}{3}} \\[3mm]
132 \Rightarrow r=\frac{\frac{3}{2}}{1+\frac{1}{3}cos \theta} \\[3mm]$
133 Comparing this equation with $r=\frac{ke}{1+ecos\theta},\\[3mm]$
```

Eccentricity:

$$e = \sqrt{1 + \frac{b^2}{a^2}}$$

$$= \sqrt{1 + \frac{2\sqrt{3})^2}{(\sqrt{3})^2}}$$

$$= \sqrt{5}$$

Foci:

$$(h \pm ae, k) = (1 \pm \sqrt{3} \cdot \sqrt{5}, 0) = (1 \pm \sqrt{15}, 0)$$

$$\therefore \text{Foci} = (1 + \sqrt{15}, 0), (1 - \sqrt{15}, 0)$$

Equation of directrices:

$$x - h = \pm \frac{a}{e}$$

$$\Rightarrow x - 1 = \pm \frac{\sqrt{3}}{\sqrt{5}}$$

$$\Rightarrow x = 1 \pm \frac{\sqrt{3}}{\sqrt{5}}$$

$$\Rightarrow x = \frac{5 \pm \sqrt{15}}{5}$$

$$\therefore \text{Equation of directrices: } x = \frac{5+\sqrt{15}}{5}, x = \frac{5+\sqrt{15}}{5}$$

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\sqrt{15}}{5},x=\frac{5 + \sqrt{15}}{5}$\\[3mm]}
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    \textsc{Problem 4}\\
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\begin{center}
  \textbf{\Large \underline {Ans to the question no 04}}\\
  [0.5 cm]
\end{center}
\Large {Given, \\[3mm]
$r=\frac{9}{6+2cos \theta}\\[3mm]
\Rightarrow r=\frac{\frac{9}{6}}{1+\frac{cos \theta}{3}} \\[3mm]
\Rightarrow r=\frac{\frac{3}{2}}{1+\frac{1}{3}cos \theta} \\[3mm]$
Comparing this equation with $r=\frac{ke}{1+ecos\theta},\\[3mm]$
(a)Eccentricity: $e=\frac{1}{3}$\\[3mm]
(b) As we know, for ellipse the eccentricity value is $0<e<1,\\[3mm]
Here, 0<e=\frac{1}{3}<1 \\[3mm]
\therefore $ The conic is an ellipse\\[3mm]
(c)Equation of directrix:\\[3mm]
Here,\\[3mm]$ ke=\frac{3}{2}\\[3mm]
\Rightarrow k=\frac{3}{2}\cdot\frac{3}{1}=\frac{9}{2}\\[3mm]$
Since we have a positive value the directrix will be,\\[3mm]
$ x=k\\[3mm]
\Rightarrow x=\frac{9}{2}\\[3mm]
\therefore$(c)Equation of directrix:$ x=\frac{9}{2}\\[1cm]$
(d)Sketch of the conic:\\[3mm]}
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    \textsc{Assignment 5}\\
    \textsc{Problem 5}\\
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Ans to the question no 04

Given,

$r = \frac{9}{6+2cos\theta}$

$\Rightarrow r = \frac{\frac{9}{6}}{1+\frac{cos\theta}{3}}$

$\Rightarrow r = \frac{\frac{3}{2}}{1+\frac{1}{3}cos\theta}$

Comparing this equation with $r = \frac{ke}{1+ecos\theta}$,

(a)Eccentricity: $e = \frac{1}{3}$

(b) As we know, for ellipse the eccentricity value is $0 < e < 1$,

$Here, 0 < e = \frac{1}{3} < 1$

$\therefore$ The conic is an ellipse

(c)Equation of directrix:

Here,

$ke = \frac{3}{2}$

$\Rightarrow k = \frac{3}{2} \cdot \frac{3}{1} = \frac{9}{2}$

Since we have a positive value the directrix will be,

$x = k$

$\Rightarrow x = \frac{9}{2}$

$\therefore$(c)Equation of directrix:$x = \frac{9}{2}$

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```
\Rightarrow x=\frac{9}{2}\\[3mm]
\therefore$(c)Equation of directrix:$ x=\frac{9}{2}\\[1cm]$
(d)Sketch of the conic:\\[3mm]}
\includegraphics[width=15cm]{sketch question 4.PNG}
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    \textsc{Problem 5}\\
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\begin{center}
  \textbf{\Large \underline {Ans to the question no 05}}\\
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\end{center}
\Large {Given, \\[3mm]
The cylindrical coordinates$ (r,\theta,z)=(\pi,
\frac{\pi}{2},-2)$\\[3mm]
We know in terms of rectangular coordinates,\\[3mm]
$x=rcos\theta\\[3mm]
y=rsin\theta\\[3mm]
z=z\\[3mm]$
Here,\\[3mm]
$x=\pi cos\frac{\pi}{2}\\[3mm]
\Rightarrow x=\pi \cdot 0=0\\[3mm]$
Again,\\[3mm]
$y=\pi sin\frac{\pi}{2}\\[3mm]
\Rightarrow y=\pi \cdot 1\\[3mm]
\Rightarrow y=\pi =3.1416\\[3mm]$
And, $z=-2\\[5mm]
\therefore$ Rectangular coordinates $(x,y,z)=(0,3.1416,-2)\\[3mm]$}
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    \textsc{Assignment 5}\\
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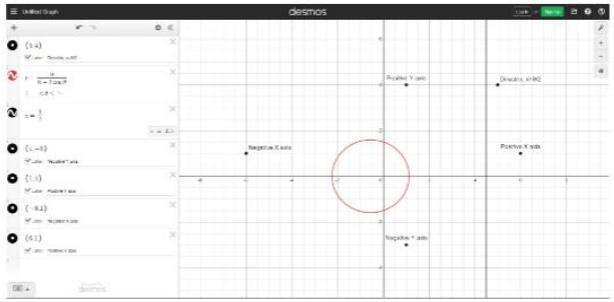
(d)Sketch of the conic:



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\begin{center}
  \textbf{\Large \underline {Ans to the question no 05}}\\
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\end{center}
\Large {Given, \\[3mm]
The cylindrical coordinates$ (r,\theta,z)=(\pi,
\frac{\pi}{2},-2)$\\[3mm]
We know in terms of rectangular coordinates,\\[3mm]
$x=rcos\theta\\[3mm]
y=rsin\theta\\[3mm]
z=z\\[3mm]$
Here,\\[3mm]
$x=\pi cos\frac{\pi}{2}\\[3mm]
\Rightarrow x=\pi \cdot 0=0\\[3mm]$
Again,\\[3mm]
$y=\pi sin\frac{\pi}{2}\\[3mm]
\Rightarrow y=\pi \cdot 1\\[3mm]
\Rightarrow y=\pi =3.1416\\[3mm]$
And, $z=-2\\[5mm]
\therefore$ Rectangular coordinates $(x,y,z)=(0,3.1416,-2)\\[3mm]$}
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    \textsc{Problem 6}\\
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ASSIGNMENT 5
PROBLEM 5

Ans to the question no 05

Given,

The cylindrical coordinates$(r, \theta, z) = (\pi, \frac{\pi}{2}, -2)$

We know in terms of rectangular coordinates,

$x = rcos\theta$

$y = rsin\theta$

$z = z$

Here,

$x = \pi cos\frac{\pi}{2}$

$\Rightarrow x = \pi \cdot 0 = 0$

Again,

$y = \pi sin\frac{\pi}{2}$

$\Rightarrow y = \pi \cdot 1$

$\Rightarrow y = \pi = 3.1416$

And, $z = -2$

$\therefore$ Rectangular coordinates $(x, y, z) = (0, 3.1416, -2)$

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```
\Rightarrow y=\pi =3.1416\\[3mm]$
And, $z=-2\\[5mm]
\therefore$ Rectangular coordinates $(x,y,z)=(0,3.1416,-2)\\[3mm]$}
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    \textsc{Assignment 5}\\
    \textsc{Problem 6}\\
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\begin{center}
  \textbf{\Large \underline {Ans to the question no 06}}\\
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\Large {Given, \\[3mm]
The spherical coordinates$ (2,\theta,\phi)=(\frac{5\pi}{6},
\frac{\pi}{2},\pi)$\\[3mm]
We know in terms of rectangular coordinates,\\[3mm]
$x=e\cdot sin\phi cos\theta\\[3mm]
y=e\cdot sin\phi sin\theta\\[3mm]
z=e \cdot cos\phi\\[3mm]$
Here,\\[3mm]
$x=\frac{5\pi}{6} sin\pi cos\frac{\pi}{2}\\[3mm]
\Rightarrow x=\frac{5\pi}{6} \cdot 0\cdot 0=0\\[3mm]$
Again,\\[3mm]
$y=\frac{5\pi}{6}sin\pi sin\frac{\pi}{2}\\[3mm]
\Rightarrow y=\frac{5\pi} \cdot 0 \cdot 1=0\\[3mm]
And, z=\frac{5\pi}{6} cos\pi\\[3mm]
\Rightarrow z=-\frac{5\pi}{6}\\[3mm]
\Rightarrow z=-\frac{5\cdot 3.1416}{6}\\[3mm]
\Rightarrow z=-2.618\\[3mm]\\[3mm]
\therefore$ Rectangular coordinates $(x,y,z)=(0,0,-2.618)\\[3mm]$}
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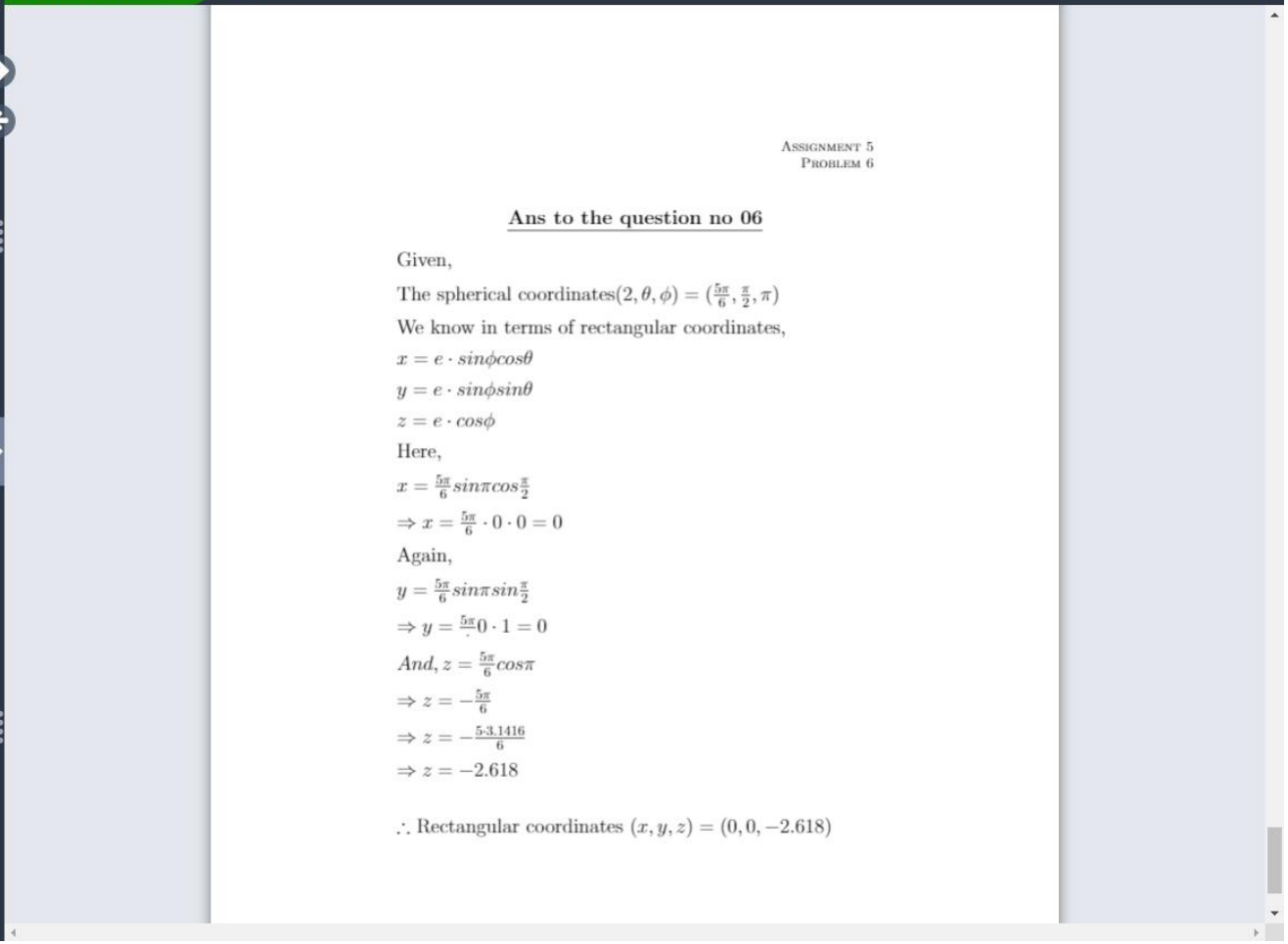

Assignment 5
Problem 6

Ans to the question no 06

Given,

The spherical coordinates$(2, \theta, \phi) = (\frac{5\pi}{6}, \frac{\pi}{2}, \pi)$

We know in terms of rectangular coordinates,

$x = e \cdot sin\phi cos\theta$

$y = e \cdot sin\phi sin\theta$

$z = e \cdot cos\phi$

Here,

$x = \frac{5\pi}{6} sin\pi cos\frac{\pi}{2}$

$\Rightarrow x = \frac{5\pi}{6} \cdot 0 \cdot 0 = 0$

Again,

$y = \frac{5\pi}{6} sin\pi sin\frac{\pi}{2}$

$\Rightarrow y = \frac{5\pi}{6} 0 \cdot 1 = 0$

$And, z = \frac{5\pi}{6} cos\pi$

$\Rightarrow z = -\frac{5\pi}{6}$

$\Rightarrow z = -\frac{5 \cdot 3.1416}{6}$

$\Rightarrow z = -2.618$

$\therefore$ Rectangular coordinates $(x, y, z) = (0, 0, -2.618)$