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Menu
assignment 5
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Source
Rich Text
Recompile

```

1 \documentclass{article}
2 \usepackage{graphicx}
3 \usepackage{amsmath}
4 \usepackage{amssymb}
5 \begin{document}
6   \begin{titlepage}
7     \begin{center}
8       \line(1,0){300}\\
9       [0.25 in]
10      \huge{\bfseries Shihab Muhtasim}\\
11      [0.5 cm]
12      \textsc{\Large Student ID: 21301610}\\
13      \line(1,0){400}\\
14      [2 cm]
15      \textsc{\LARGE MAT 110}\\
16      [0.5 cm]
17      \textsc{\LARGE ASSIGNMENT 05}\\
18      [0.5 cm]
19      \textsc{\LARGE SET 6}\\
20      \end{center}
21    \end{titlepage}
22    \begin{newpage}
23      \begin{flushright}
24        \textsc{Assignment 5}\\
25        \textsc{Problem 1}\\
26        [1 cm]
27      \end{flushright}
28      \begin{center}
29        \textbf{\Large \underline{Ans to the question no 01}}\\
30        [0.5 cm]
31      \end{center}
32      \Large {Given, \\[3mm]
33      $-15+12x-6y+y^2=0$\\[3mm]
34      \Rrightarrow $y^2-6y+3^2=15-12x+9$\\[3mm]
35      \Rrightarrow $(y-3)^2=-12x+24$\\[3mm]
36      \Rrightarrow $(y-3)^2=4(-3)(x-2)$\\[3mm]

```

Shihab Muhtasim

STUDENT ID: 21301610

MAT 110

ASSIGNMENT 05

SET 6

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Menu
assignment 5
Review
Share
Submit
History
Chat

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20 \end{center}
21 \end{titlepage}
22 \begin{newpage}
23 \begin{flushright}
24 \textsc{Assignment 5}\\
25 \textsc{Problem 1}\\
26 [1 cm]
27 \end{flushright}
28 \begin{center}
29 \textbf{\Large \underline{Ans to the question no 01}}\\
30 [0.5 cm]
31 \end{center}
32 \Large {Given, \\[3mm]
33 $-15+12x-6y+y^2=0$\\[3mm]
34 \rightarrow $y^2-6y+3=15-12x+9$\\[3mm]
35 \rightarrow $(y-3)^2=-12x+24$\\[3mm]
36 \rightarrow $(y-3)^2=4(-3)(x-2)$\\[3mm]
37 \therefore$ Equation into the standard form of the equation of $
parabola: $(y-3)^2=4(-3)(x-2)$\\[3mm]
38 Comparing this equation with $Y^2=4pX$ we get,\\[3mm]
39 $Y=y-3$,\\[3mm]
40 $4p=12 \rightarrow p=-3$,\\[3mm]
41 $X=2-x$\\[3mm]
42 Vertex:\\[3mm]
43 $Y=0 \rightarrow y-3=0 \rightarrow y=3$\\[3mm]
44 Again,\\[3mm]
45 $X=0 \rightarrow 2-x=0 \rightarrow x=2$\\[3mm]
46 \therefore$ Vertex$(x,y)= (2,3)$\\[5mm]
47 Focus: \\[3mm]
48 The focus of the parabola's following $Y^2=4pX$ will be on x
axis\\[3mm]
49 $\therefore Y=0 \rightarrow y-3=0 \rightarrow y=3$\\[3mm]
50 And$, $X=p \rightarrow 2-x=-3 \rightarrow x=5$\\[3mm]
51 \therefore$ Focus$=(-1,3)$\\[3mm]
52 Equation of directrix:\\[3mm]
53 $X+n=0 \rightarrow 2-x-2=0 \rightarrow x=5$\\[3mm]

```

ASSIGNMENT 5
PROBLEM 1

Ans to the question no 01

Given,

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

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

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

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

\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,

$$X = 0$$

$$\Rightarrow 2 - x = 0$$

$$\Rightarrow x = 2$$

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

Focus:

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47 FOCUS: \\\[3mm]
48 The focus of the parabola's following  $Y^2=4pX$  will be on x
axis\\[3mm]
49  $\therefore Y=0 \\\Rightarrow y-3=0 \\\Rightarrow y=3$ 
50 And,  $X=p \Rightarrow x-2=-3 \Rightarrow x=-1$ 
51  $\therefore$  Focus  $= (-1, 3)$ 
52 Equation of directrix: \\[3mm]
53  $X+p=0 \Rightarrow x-2-3=0 \Rightarrow x=5$ 
54 Equation of directrix is  $x=5$  \\[3mm]
55 \end{newpage}
56 \begin{newpage}
57 \begin{flushright}
58 \textsc{Assignment 5}\\
59 \textsc{Problem 2}\\
60 [1 cm]
61 \end{flushright}
62 \begin{center}
63 \textbf{\Large \underline{Ans to the question no 02}}\\
64 [0.5 cm]
65 \end{center}
66 \Large {Given, \\\[3mm]
67  $256+9x^2-160y+16y^2=0$  \\[3mm]
68  $\Rightarrow 9x^2+16y^2-160y+256=0$  \\[3mm]
69  $\Rightarrow 9x^2+16(y^2-10y+25)+256-25 \cdot 16=0$  \\[3mm]
70  $\Rightarrow 9x^2+16(y-5)^2+144=0$  \\[3mm]
71  $\Rightarrow \frac{9x^2}{144} + \frac{16(y-5)^2}{144} = 1$  \\[3mm]
72  $\Rightarrow \frac{x^2}{16} + \frac{(y-5)^2}{9} = 1$  \\[3mm]
73  $\therefore$  Equation into the standard form of the equation of $
ellipse:  $\frac{x^2}{16} + \frac{(y-5)^2}{9} = 1$  \\[3mm]
74 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]
75 vertex: \\[3mm]
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}

```

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 $x = 5$

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53 
$$x+p=0 \Rightarrow x-2-3=0 \Rightarrow x=5$$

54 Equation of directrix is  $x=5$ 
55 \end{newpage}
56 \begin{newpage}
57 \begin{flushright}
58 \textsc{Assignment 5}
59 \textsc{Problem 2}
60 [1 cm]
61 \end{flushright}
62 \begin{center}
63 \textbf{\Large \underline{Ans to the question no 02}}
64 [0.5 cm]
65 \end{center}
66 \Large {Given, }
67 
$$256+9x^2-160y+16y^2=0$$

68 
$$\Rightarrow 9x^2+16y^2-160y+256=0$$

69 
$$\Rightarrow 9x^2+16(y^2-10y+25)+256-25 \cdot 16=0$$

70 
$$\Rightarrow 9x^2+16(y-5)^2+144=0$$

71 
$$\Rightarrow \frac{9x^2}{144}+\frac{16(y-5)^2}{144}=1$$

72 
$$\Rightarrow \frac{x^2}{4^2}+\frac{(y-5)^2}{3^2}=1$$

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

$$\frac{(x-h)^2}{a^2}+\frac{(y-k)^2}{b^2}=1$$

75 vertex:
76  $(h,k)=(0,5)$ 
77  $a=4, b=3$ 
78 sketch of the ellipse:
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]

```

ASSIGNMENT 5
PROBLEM 2

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 : $\frac{x^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$

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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APA Citation
Reading list

Menu
assignment 5
Review
Share
Submit
History
Chat

Source
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```

62 \begin{center}
63 \textbf{\Large \underline {Ans to the question no 02}}\\
64 [0.5 cm]
65 \end{center}
66 \Large {Given, \[3mm]}
67 $256+9x^2-160y+16y^2=0\[3mm]
68 \Rightarrow 9x^2+16y^2-160y+256=0 \[3mm]
69 \Rightarrow 9x^2+16(y^2-10y+25)+256-25\cdot 16=0 \[3mm]
70 \Rightarrow 9x^2+16(y-5)^2+144=0 \[3mm]
71 \Rightarrow \frac{9x^2}{144}+\frac{16(y-5)^2}{144}=1 \[3mm]
72 \Rightarrow \frac{x^2}{16}+\frac{(y-5)^2}{9}=1 \[3mm]
73 \therefore$ Equation into the standard form of the equation of $
ellipse: $\frac{x^2}{4^2}+\frac{(y-5)^2}{3^2}=1$\[3mm]
74 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]$
75 vertex:\[3mm]
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}{3}-\frac{y^2}{12}=1

```

sketch of the ellipse:

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Menu
assignment 5
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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 \text{Equation into the standard form of the equation of} \\
\text{hyperbola: } \frac{(x-1)^2}{(\sqrt{3})^2}-\frac{y^2}{(2\sqrt{3})^2}=1\\[3mm]
97 \text{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 \text{Center: } (h,k)=(1,0) \\[3mm]
100 \text{vertices:} \\[3mm]
101 \text{The vertices of this hyperbola are on x axis} \\[3mm]
102 \therefore y=k=0 \\[3mm]
103 \text{And, } x=h \pm a = 1 \pm \sqrt{3} \\[3mm]
104 \therefore \text{Vertices= } (1+\sqrt{3},0), (1-\sqrt{3},0) \\[3mm]
105 \text{Eccentricity:} \\[3mm]
106 e=\sqrt{1+\frac{b^2}{a^2}} \\[3mm]
107 =\sqrt{1+\frac{12}{3}}=\sqrt{5}

```

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

5

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Menu
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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 $=\\sqrt{1+\\frac{2\\sqrt{3}}{1}}$ \\[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} \\[3mm]
122 \\textsc{Problem 4} \\[3mm]
123 [1 cm]
124 \\end{flushright}
125 \\begin{center}
126 \\textbf{\\Large \\underline{Ans to the question no 04}} \\[3mm]
127 [0.5 cm]
128 \\end{center}
129 \\Large {Given, \\[3mm]
130 $r=\\frac{9}{6+2\\cos \\theta}$ \\[3mm]
131 $\\Rightarrow r=\\frac{9}{6+2\\cos \\theta}$ \\[3mm]
132 $\\Rightarrow r=\\frac{9}{2(3+\\cos \\theta)}$ \\[3mm]
133 Comparing this equation with $r=\\frac{ke}{1+e\\cos \\theta}$, \\[3mm]

```

Eccentricity:

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

$$= \sqrt{1 + \frac{2\sqrt{3}}{1}}$$

$$= \sqrt{5}$$

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: $x = \frac{5 + \sqrt{15}}{5}, x = \frac{5 - \sqrt{15}}{5}$

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Menu
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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, }
130 $r=\frac{9}{6+2\cos \theta}$
131 \Rightarrow r=\frac{\frac{9}{6}}{1+\frac{\cos \theta}{3}}
132 \Rightarrow r=\frac{\frac{3}{2}}{1+\frac{1}{3}\cos \theta}$
133 Comparing this equation with $r=\frac{ke}{1+e\cos \theta}$,
134 (a)Eccentricity: $e=\frac{1}{3}$
135 (b) As we know, for ellipse the eccentricity value is $0<e<1$,
136 Here, $0<e=\frac{1}{3}<1$
137 \therefore $ The conic is an ellipse
138 (c)Equation of directrix:
139 Here, $k=\frac{3}{2}$
140 \Rightarrow k=\frac{3}{2} \cdot \frac{3}{1} = \frac{9}{2}$
141 Since we have a positive value the directrix will be,
142 $x=k$
143 \Rightarrow $
144 \therefore (c)Equation of directrix: $x=\frac{9}{2}$
145 (d)Sketch of the conic:
146 \includegraphics[width=15cm]{sketch question 4.PNG}
147 \end{newpage}
148 \begin{newpage}
149 \begin{flushright}
150 \textsc{Assignment 5}\\
151 \textsc{Problem 5}\\
152 [1 cm]

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ASSIGNMENT 5
PROBLEM 4

Ans to the question no 04

Given,

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

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

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

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

(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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143 \Rightarrow x=\frac{9}{2} \\[3mm]
144 \therefore(c)Equation of directrix:$ x=\frac{9}{2} \\[1cm]$
145 (d)Sketch of the conic:\\[3mm]}
146 \includegraphics[width=15cm]{sketch question 4.PNG}
147 \end{newpage}
148 \begin{newpage}
149 \begin{flushright}
150 \textsc{Assignment 5}\\
151 \textsc{Problem 5}\\
152 [1 cm]
153 \end{flushright}
154 \begin{center}
155 \textbf{\Large \underline{Ans to the question no 05}}\\
156 [0.5 cm]
157 \end{center}
158 \Large {Given, \\[3mm]
159 The cylindrical coordinates$ (r,\theta,z)=(\pi,
\frac{\pi}{2},-2) \\[3mm]
160 We know in terms of rectangular coordinates,\\[3mm]
161 $x=r\cos\theta \\[3mm]
162 $y=r\sin\theta \\[3mm]
163 $z=z \\[3mm]
164 Here,\\[3mm]
165 $x=\pi \cos\frac{\pi}{2} \\[3mm]
166 \Rightarrow x=\pi \cdot 0=0 \\[3mm]
167 Again,\\[3mm]
168 $y=\pi \sin\frac{\pi}{2} \\[3mm]
169 \Rightarrow y=\pi \cdot 1 \\[3mm]
170 \Rightarrow y=\pi =3.1416 \\[3mm]
171 And, $z=-2 \\[5mm]
172 \therefore$ Rectangular coordinates $(x,y,z)=(0,3.1416,-2) \\[3mm]
173 \end{newpage}
174 \begin{newpage}
175 \begin{flushright}
176 \textsc{Assignment 5}

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(d)Sketch of the conic:

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Menu
assignment 5
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146 \includegraphics[width=15cm]{sketch question 4.PNG}
147 \end{newpage}
148 \begin{newpage}
149 \begin{flushright}
150 \textsc{Assignment 5}\\
151 \textsc{Problem 5}\\
152 [1 cm]
153 \end{flushright}
154 \begin{center}
155 \textbf{\Large \underline{Ans to the question no 05}}\\
156 [0.5 cm]
157 \end{center}
158 \Large {Given, \\[3mm]
159 The cylindrical coordinates$ (r,\theta,z)=(\pi,
\frac{\pi}{2},-2)$\\[3mm]
160 We know in terms of rectangular coordinates,\\[3mm]
161 $x=r\cos\theta$\\[3mm]
162 $y=r\sin\theta$\\[3mm]
163 $z=z$\\[3mm]$
164 Here,\\[3mm]
165 $x=\pi\cos\frac{\pi}{2}$\\[3mm]
166 \Rightarrow x=\pi\cdot0=0\\[3mm]$
167 Again,\\[3mm]
168 $y=\pi\sin\frac{\pi}{2}$\\[3mm]
169 \Rightarrow y=\pi\cdot1\\[3mm]
170 \Rightarrow y=\pi=3.1416\\[3mm]$
171 And, $z=-2$\\[5mm]
172 \therefore$ Rectangular coordinates $(x,y,z)=(0,3.1416,-2)$\\[3mm]$}
173 \end{newpage}
174 \begin{newpage}
175 \begin{flushright}
176 \textsc{Assignment 5}\\
177 \textsc{Problem 6}\\
178 [1 cm]
179 \end{flushright}

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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,

$$x = r \cos \theta$$

$$y = r \sin \theta$$

$$z = z$$

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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Reading list

Menu
assignment 5
Review
Share
Submit
History
Chat

Source
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170 \rightarrow y=\pi =3.1416\\[3mm]$
171 And, $z=-2\\[5mm]$
172 \therefore$ Rectangular coordinates $(x,y,z)=(0,3.1416,-2)\\[3mm]$
173 \end{newpage}
174 \begin{newpage}
175 \begin{flushright}
176 \textsc{Assignment 5}\\
177 \textsc{Problem 6}\\
178 [1 cm]
179 \end{flushright}
180 \begin{center}
181 \textbf{\Large \underline{Ans to the question no 06}}\\
182 [0.5 cm]
183 \end{center}
184 \Large {Given, \\[3mm]}
185 The spherical coordinates $(2,\theta,\phi)=(\frac{5\pi}{6},\frac{\pi}{2},\pi)$,
186 We know in terms of rectangular coordinates,\\[3mm]
187 $x=e\cdot\sin\phi\cos\theta\\[3mm]$
188 $y=e\cdot\sin\phi\sin\theta\\[3mm]$
189 $z=e\cdot\cos\phi\\[3mm]$
190 Here,\\[3mm]
191 $x=\frac{5\pi}{6}\sin\pi\cos\frac{\pi}{2}\\[3mm]$
192 \rightarrow x=\frac{5\pi}{6}\cdot 0\cdot 0=0\\[3mm]$
193 Again,\\[3mm]
194 $y=\frac{5\pi}{6}\sin\pi\sin\frac{\pi}{2}\\[3mm]$
195 \rightarrow y=\frac{5\pi}{6}\cdot 0\cdot 1=0\\[3mm]$
196 And, $z=\frac{5\pi}{6}\cos\pi\\[3mm]$
197 \rightarrow z=-\frac{5\pi}{6}\\[3mm]$
198 \rightarrow z=-\frac{5\cdot 3.1416}{6}\\[3mm]$
199 \rightarrow z=-2.618\\[3mm]$
200 \therefore$ Rectangular coordinates $(x,y,z)=(0,0,-2.618)\\[3mm]$
201 \end{newpage}
202 \end{document}

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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,

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

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

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 $(x, y, z) = (0, 0, -2.618)$