MA 213 Worksheet #6

Section 12.6 - 13.1
1/29/19

1 *12.6.1* (a) What does the equation $y = x^2$ represent as a curve in $\mathbb{R}^2$.
(b) What does it represent as a surface in $\mathbb{R}^3$
(c) What does the equation $z = y^2$ represent?

2 *12.6.7* Describe and sketch the surface $xy = 1$.

3 *12.6.11* Use traces to sketch and identify the surface $x = y^2 + 4z^2$.

4 Reduce the equation to one of the standard forms, classify the surface, and sketch it.
12.6.35 $x^2 + y^2 - 2x - 6y - z + 10 = 0$
12.6.37 $x^2 - y^2 + z^2 - 4x - 2z = 0$.

5 *12.6.43* Sketch the region bounded by the surfaces $z = \sqrt{x^2 + y^2}$ and $x^2 + y^2 = 1$ for $1 \leq z \leq 2$.

6 *13.1.7* Sketch the curve $\mathbf{r}(t) = \langle \sin t, t \rangle$. Indicate with an arrow the direction in which t increases.

7 *13.1.17* Find a vector equation and parametric equations for the line segment that joins $P(2, 0, 0)$ to $Q(6, 2, -2)$.

8 *13.1.49* Suppose the trajectories of two particles are given by the vector functions

$$\mathbf{r}_1(t) = \langle t^2, 7t - 12, t^2 \rangle \qquad \mathbf{r}_2(t) = \langle 4t - 3, t^2, 5t - 6 \rangle$$

for $t \geq 0$. Do the particles collide?

9 *12.6.21-28* (**On back**)

21–28 Match the equation with its graph (labeled I–VIII). Give reasons for your choice.

21. $x^2 + 4y^2 + 9z^2 = 1$

22. $9x^2 + 4y^2 + z^2 = 1$

23. $x^2 - y^2 + z^2 = 1$

24. $-x^2 + y^2 - z^2 = 1$

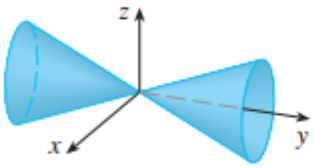
25. $y = 2x^2 + z^2$

26. $y^2 = x^2 + 2z^2$

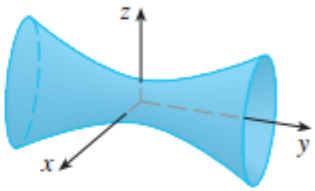
27. $x^2 + 2z^2 = 1$

28. $y = x^2 - z^2$

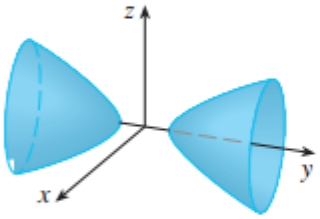
I



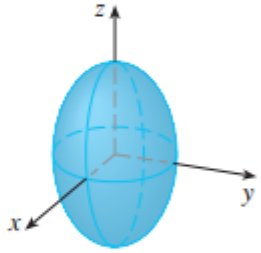
II



III



IV



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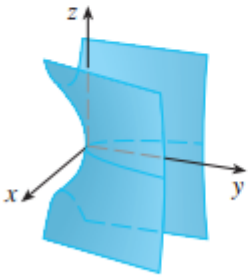
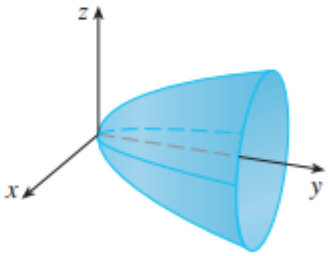
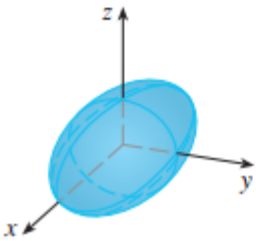


VI



VII



VIII