

[← MA2009, section GRUPO4, Fall 2019](#)

Tarea 2: Superficies cuádricas (Homework)

 **INSTRUCTOR**
Luz Maria Gonzalez
 Tecnológico de Monterrey, Mexico

Current Score											Due Date	Past Due
QUESTION	1	2	3	4	5	6	7	8	9	10	<div>AGO. 31 11:59 P. M.</div> <div><div><div><div></div><div></div></div><div>Request Extension</div></div></div>	
POINTS	10/10	10/10	10/10	10/10	10/10	10/10	10/10	10/10	10/10	10/10		
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
<div>TOTAL</div> <div><div>100/100</div><div>100.0%</div></div>												

Assignment Submission & Scoring

Assignment Submission

For this assignment, you submit answers by question parts. The number of submissions remaining for each question part only changes if you submit or change the answer.

Assignment Scoring

Your last submission is used for your score.

The due date for this assignment has passed.

Your work can be viewed below, but no changes can be made.

Important! Before you view the answer key, decide whether or not you plan to request an extension. Your Instructor may not grant you an extension if you have viewed the answer key. Automatic extensions are not granted if you have viewed the answer key.

[+ Request Extension](#)
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(a) What does the equation $y = x^2$ represent as a curve in \mathbb{R}^2 ?

- ☐ line
- ☐ hyperbola
- ☐ circle
- ☒ parabola
- ☐ ellipse



(b) What does it represent as a surface in \mathbb{R}^3 ?

- ☐ hyperboloid
- ☐ elliptic paraboloid
- ☐ ellipsoid
- ☒ parabolic cylinder
- ☐ cone



(c) What does the equation $z = y^2$ represent?

- ☐ elliptic paraboloid
- ☐ hyperboloid
- ☐ cone
- ☒ parabolic cylinder
- ☐ ellipsoid



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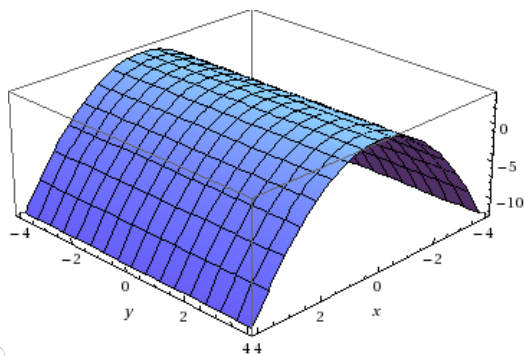
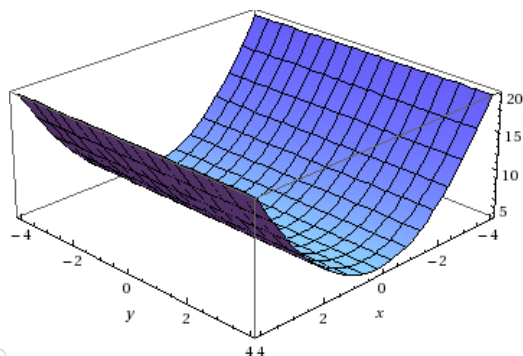
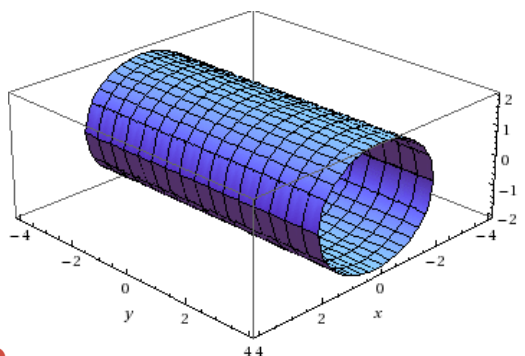
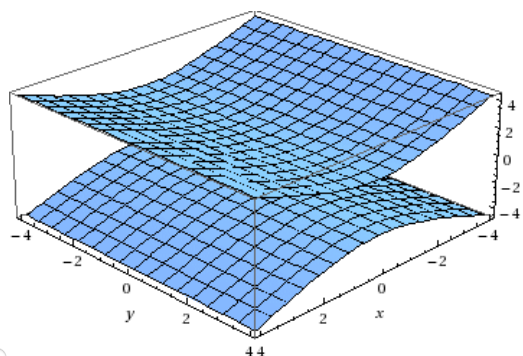
Describe the surface.

$$x^2 + z^2 = 4$$

- ☐ sphere
- ☐ ellipsoid
- ☐ hyperboloid
- ☒ circular cylinder
- ☐ elliptic cylinder
- ☐ hyperbolic cylinder
- ☐ parabolic cylinder
- ☐ elliptic paraboloid



Sketch the surface.


☐

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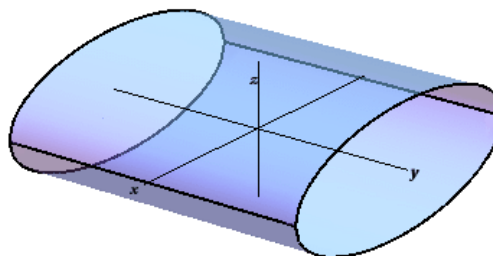
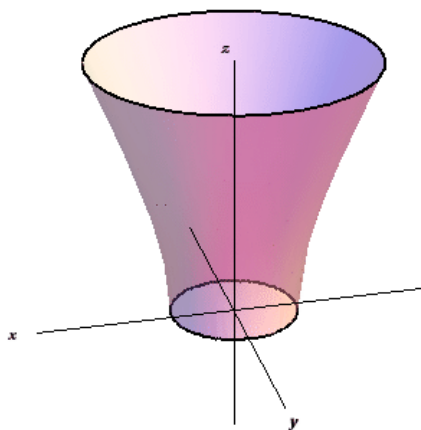
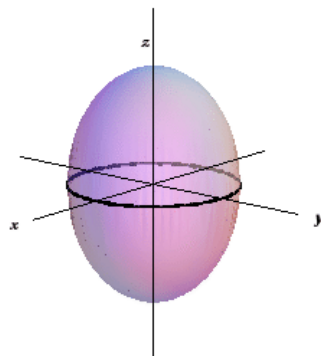
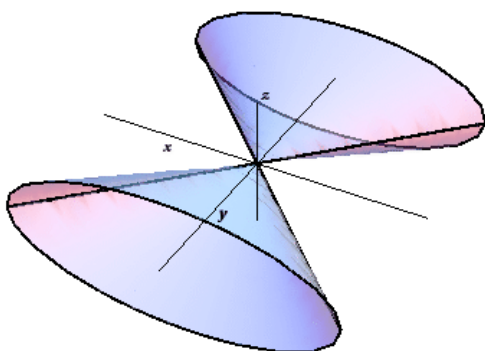

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Use traces to sketch the surface.

$$6x^2 - y^2 + z^2 = 0$$



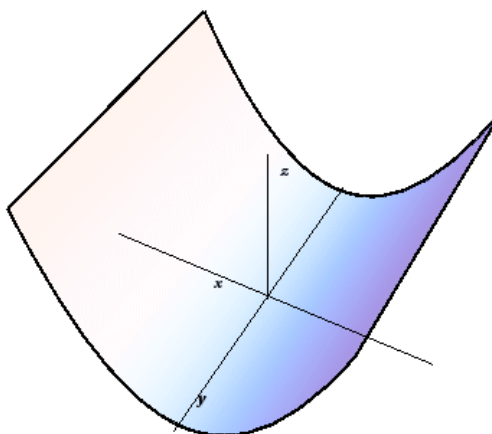
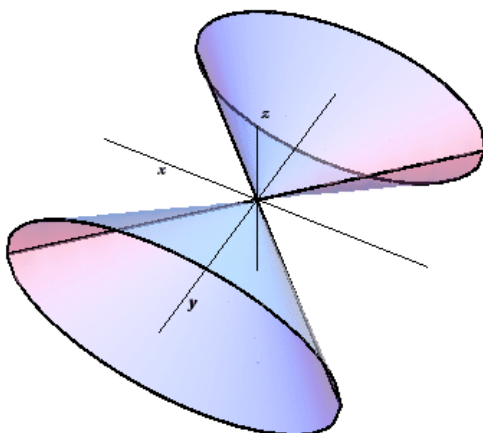
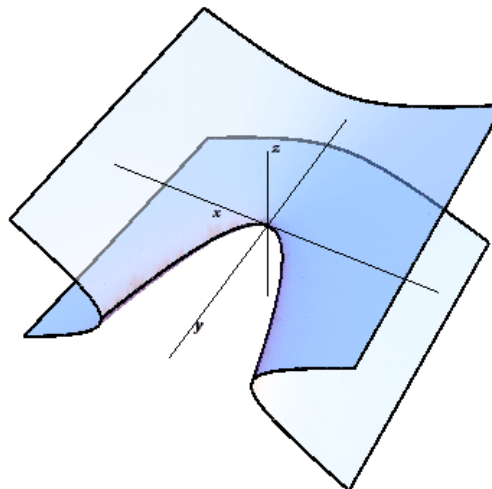
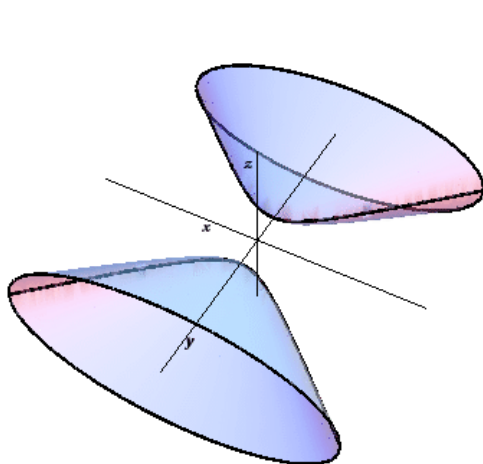
Identify the surface.

- ☒ elliptic cone
- ☐ elliptic paraboloid
- ☐ parabolic cylinder
- ☐ hyperboloid of two sheets
- ☐ hyperbolic paraboloid
- ☐ elliptic cylinder
- ☐ hyperboloid of one sheet
- ☐ ellipsoid



Use traces to sketch the surface.

$$-x^2 + 8y^2 - z^2 = 8$$



Identify the surface.

- ☐ hyperbolic paraboloid
- ☐ hyperboloid of one sheet
- ☐ elliptic cylinder
- ☐ ellipsoid
- ☐ elliptic cone
- ☐ parabolic cylinder
- ☐ elliptic paraboloid
- ☒ hyperboloid of two sheets



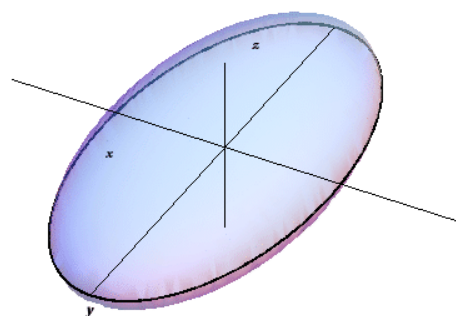
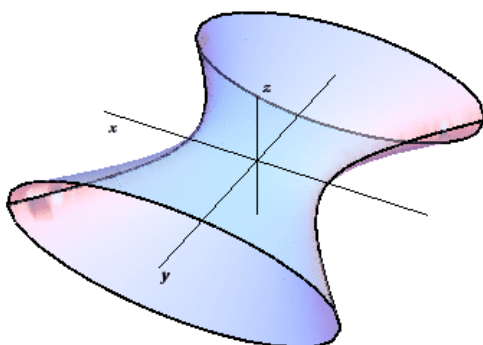
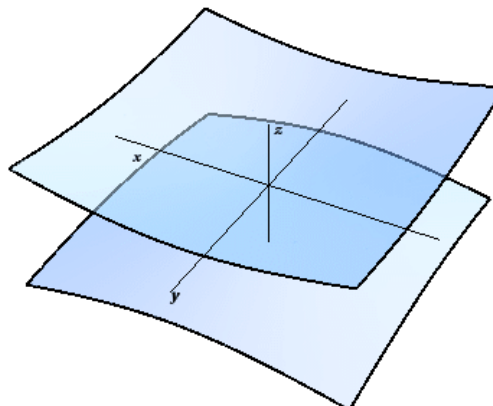
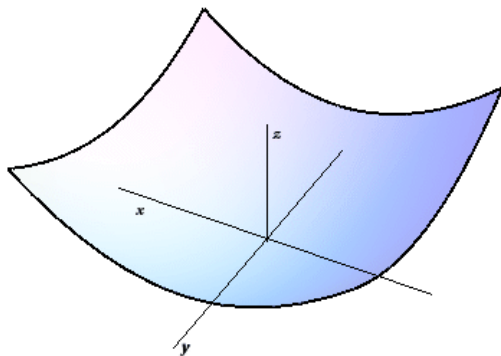
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Use traces to sketch the surface.

$$3x^2 - 12y^2 + z^2 = 12$$



Identify the surface.

- ☐ hyperbolic paraboloid
- ☐ elliptic cylinder
- ☐ ellipsoid
- ☐ hyperboloid of two sheets
- ☐ elliptic paraboloid
- ☐ elliptic cone
- ☒ hyperboloid of one sheet
- ☐ parabolic cylinder

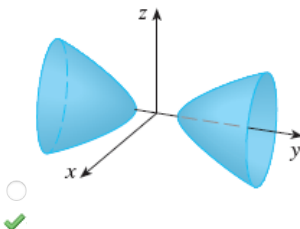
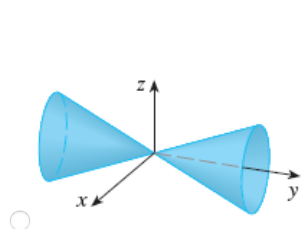
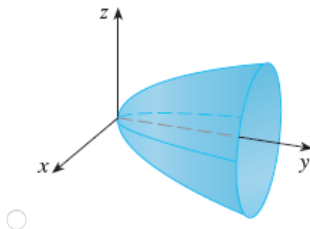
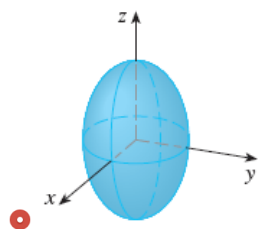


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Match the equation with its graph.

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



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Consider the equation below.

$$4x^2 + y^2 + 4z^2 - 4y - 24z + 36 = 0$$

Reduce the equation to one of the standard forms.

$$x^2 + (y-2)^2 + (z-3)^2 = 1$$

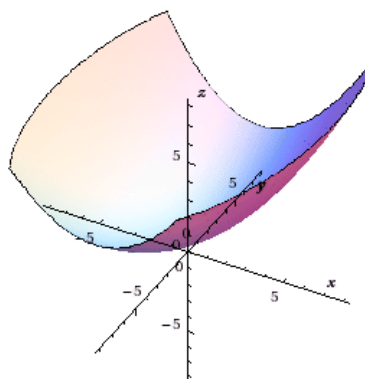
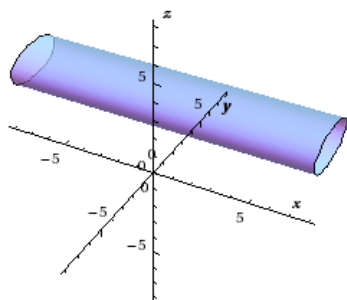


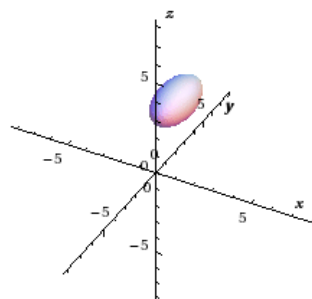
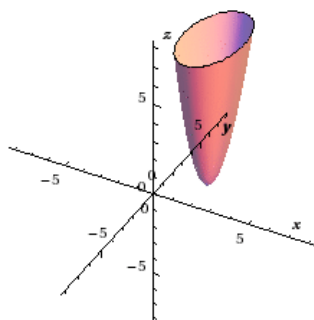
Classify the surface.

- ☐ hyperboloid of two sheets
- ☒ ellipsoid
- ☐ elliptic cylinder
- ☐ circular cone
- ☐ hyperbolic paraboloid
- ☐ hyperboloid of one sheet
- ☐ elliptic paraboloid
- ☐ parabolic cylinder



Sketch the surface.





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8. 10/10 points Previous Answers SCalc8 12.6.512.XP.

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Find an equation for the surface obtained by rotating the parabola $y = x^2$ about the y -axis.

$y = x^2 + z^2$



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9. 10/10 points Previous Answers SCalc8 12.6.513.XP.

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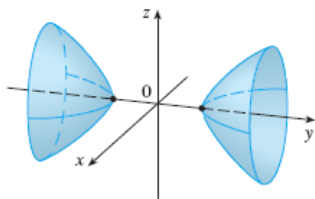
Find an equation for the surface obtained by rotating the line $x = 7y$ about the x -axis.

$x^2 = 49y^2 + 49z^2$



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EXAMPLE 7 Identify and sketch the surface $100x^2 - y^2 + 5z^2 + 100 = 0$.

SOLUTION Dividing by -100 , we first put the equation into standard form:

$$-x^2 + \frac{y^2}{100} - \frac{z^2}{20} = 1.$$

Comparing this equation with equations of quadratic surfaces, we see that it represents a hyperboloid of two sheets, the only difference being that in this case the axis of the hyperboloid is the y -axis. The traces in the xy and yz -planes are the hyperbolas

$$-x^2 + \frac{y^2}{100} = 1 \quad z = 0$$

and

$$\frac{y^2}{100} - \frac{z^2}{20} = 1 \quad x = 0.$$

The surface has no trace in the xz -plane, but traces in the vertical planes $y = k$ for $|k| > 10$ are the ellipses

$$x^2 + \frac{z^2}{20} = \frac{k^2}{100}$$

$$-1 \leq y = k$$

which can be written as

$$\frac{x^2}{\frac{k^2}{100}} + \frac{z^2}{20\left(\frac{k^2}{100}\right)} = 1 \quad y = k.$$

Thus the traces are used to make the sketch in the figure.

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