

Please write out the full pledge and sign below.

1. Match each of the functions below with its graph.

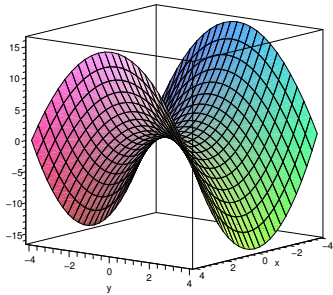
a. $f(x, y) = x^2 + y^2 + 10$

b. $g(x, y) = x^2 + y$

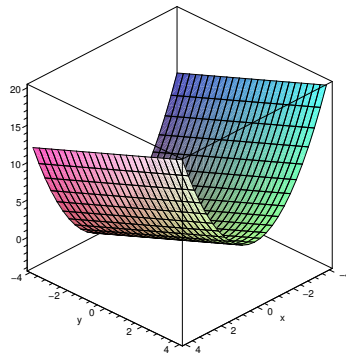
c. $h(x, y) = x^2 + 10$

d. $k(x, y) = x^2 + (y - 10)^2$

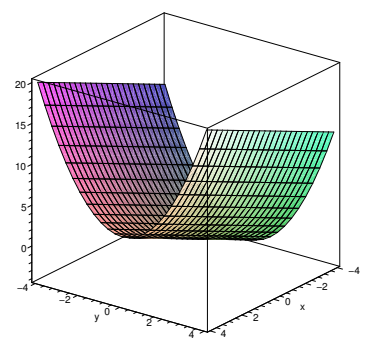
I.



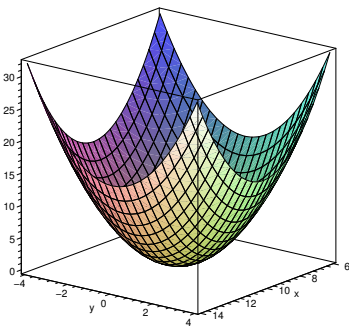
II.



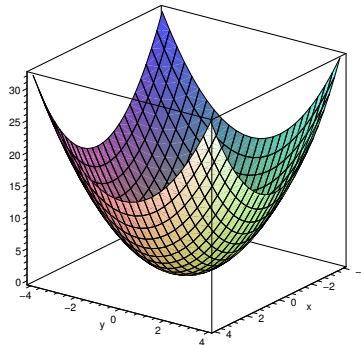
III.



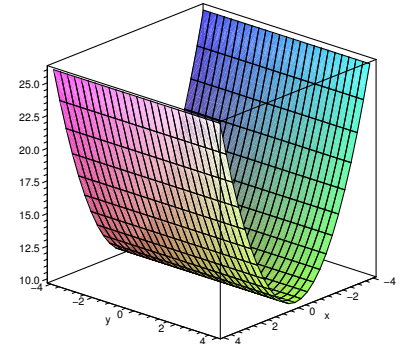
IV.



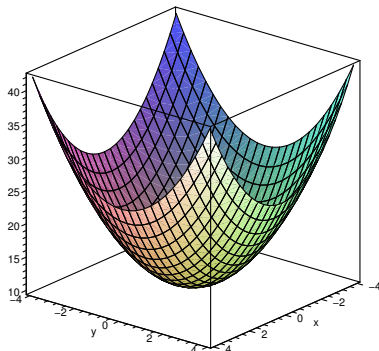
V.



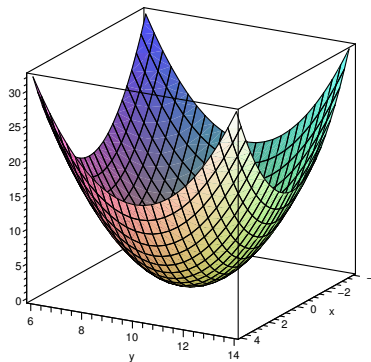
VI.



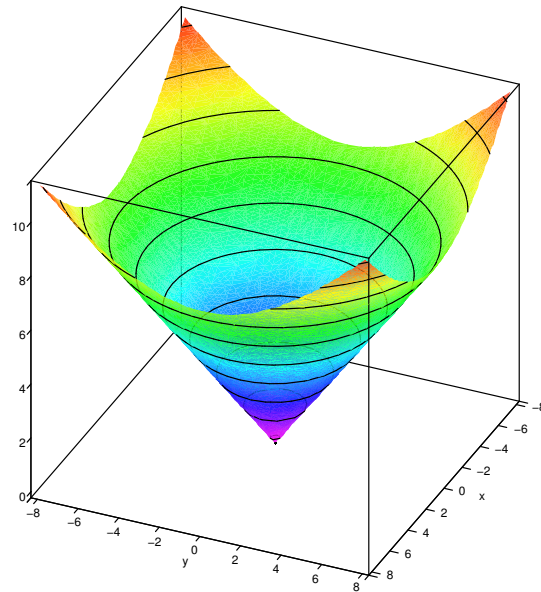
VII.



VIII.

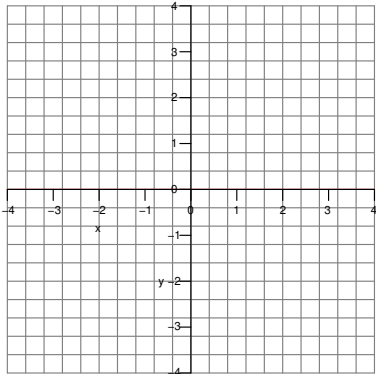


2. Make a contour diagram for the surface drawn below. Include at least 4 level curves. Label the axes and each level curve.



3. Let $f(x, y, z) = \frac{x^2}{2} + y^2 + z^2$.
- Find the equations for 3 level surfaces.
 - Describe the level surfaces you found.

4. Let $\vec{v} = 2\vec{i} - \vec{j}$, and $\vec{w} = \vec{i} + 3\vec{j}$.
- a. Sketch \vec{v} , \vec{w} , $\vec{w} - \vec{v}$ and $\vec{v} + \vec{w}$.



5. Let $\vec{v}_1 = 2\vec{i} - \vec{j} + \vec{k}$, and $\vec{v}_2 = \vec{i} + 3\vec{j} - 3\vec{k}$.
- a. Compute $\vec{v} \cdot \vec{w}$.

b. Compute $\vec{v} \times \vec{w}$.

c. Compute $\vec{v} \times (\vec{v} + \vec{w})$.

d. Find the angle θ between \vec{v} and \vec{w} .

e. Compute the area of the parallelogram determined by \vec{v} and \vec{w} .

f. Find a vector which is orthogonal to \vec{v} .

6. Let $\vec{u} = \vec{i} + \vec{j} + \vec{k}$. Find a vector orthogonal to \vec{u} .

7. Let $\vec{n} = \vec{i} + 3\vec{j} - \vec{k}$.

a. Find the equation of a plane orthogonal to \vec{n} that contains the point $(-1,2,4)$.

b. Find the equation of a plane which is parallel to the plane that you found in part a.

8. Let $f(x, y) = 2xy - y^2$. Use $\Delta x = .02$ and $\Delta y = .1$ to approximate each of the following.

a. $f_x(1, 1)$

b. $f_y(1, 1)$