

1. $\lim_{(x,y) \rightarrow (0,0)} \frac{x^2y}{x^2+y^2}$

☐ π

☐ 1

☒ 0

☐ 2

2. Find the limit $\lim_{\Delta y \rightarrow 0} \frac{f(x, y+\Delta y) - f(x, y)}{\Delta y}$ for the function $f(x, y) = 8x^2 - 5y$.

☒ -5

☐ 0

☐ $8x$

☐ $16x$

3. Suppose the temperature at any point (x, y) in a steel plate is $T = 500 - 0.6x^2 - 1.5y^2$, where x and y are measured in meters. At the point $(7, 6)$, find the rate of change of the temperature with respect to the distance moved along the plate in the direction of the x -axis. Round the answer to one decimal place.

☐ $-5.8^\circ/\text{m}$

☐ $41.6^\circ/\text{m}$

☒ $-8.4^\circ/\text{m}$

☐ $3.6^\circ/\text{m}$

4. For $f(x, y) = 37x^3 - 18xy + y^3$, find all values of x and y such that $f_x = 0$ and $f_y = 0$ simultaneously.

☒ $(0, 0), \left(\frac{6}{37^{\frac{2}{3}}}, \frac{6}{37^{\frac{1}{3}}}\right)$

☐ $(0, 0), \left(-\frac{6}{37^{\frac{1}{3}}}, -\frac{6}{37^{\frac{1}{3}}}\right)$

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5. Evaluate $\lim_{(x,y) \rightarrow (0,0)} \frac{2 \sin(x^2+y^2)}{x^2+y^2}$.

☐ $\frac{\sqrt{2}}{2}$

☒ 2

☐ $\frac{1}{2}$

☐ $\frac{\sqrt{3}}{2}$

6. Describe the domain of the function $f(x,y) = \ln(1 - x - y)$.

☐ $\{(x,y): y \leq x - 1\}$

☐ $\{(x,y): x \geq 0, y \geq 0\}$

☐ $\{(x,y): y \geq 0\}$

☒ $\{(x,y): y < -x + 1\}$

7. For $f(x,y,z) = z \sin(8x + y)$, evaluate f_z at the point $\left(0, \frac{3\pi}{2}, -8\right)$.

☐ $f_z\left(0, \frac{3\pi}{2}, -8\right) = 8$

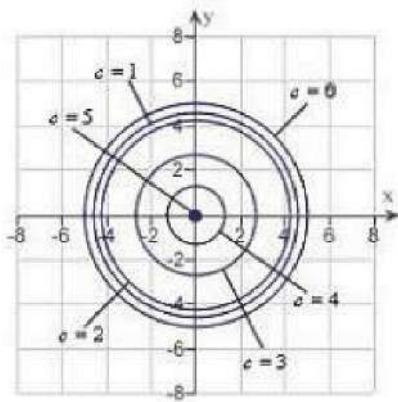
☒ $f_z\left(0, \frac{3\pi}{2}, -8\right) = -1$

☐ $f_z\left(0, \frac{3\pi}{2}, -8\right) = 9$

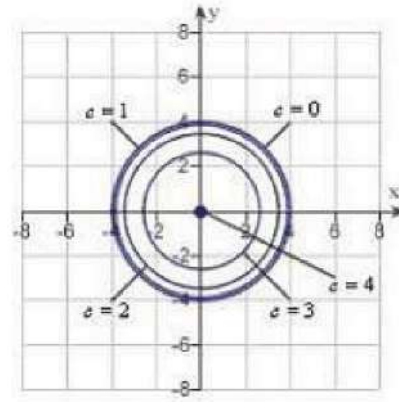
☐ $f_z\left(0, \frac{3\pi}{2}, -8\right) = 1$

8. Sketch the level curves for the function $z = \sqrt{16 - x^2 - y^2}$ for the given c -values. $c = 0, 1, 2, 3, 4, 5$

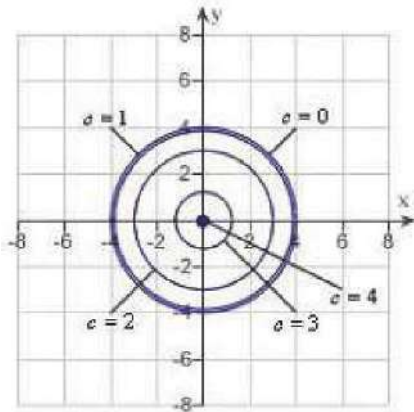
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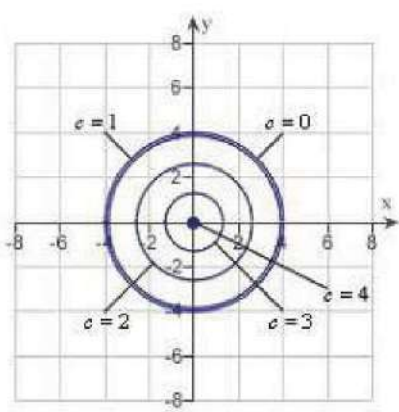
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☐



☐



9. Determine the continuity of the composite function $f \circ g$ where $f(t) = \frac{1}{\sqrt{t}}$ and $g(x, y) = 7x - 13y$.

☐ Continuous for all $y = \frac{7}{13}x$.

☒ Continuous for all $y \neq \frac{7}{13}x$.

☐ Continuous everywhere.

☐ Continuous except at $(0, \frac{7}{13})$.

10. A rectangular box with an open top has a length of x feet, a width of y feet and a height of z feet. It costs Tk. 4.20 per square foot to build the base and Tk. 0.65 per square foot to build the sides. Write the cost, C , of constructing the box as a function of x , y and z .

- ☐ $C = 4.20yz + 1.30(xy + xz)$
- ☐ $C = 4.20xz + xy + 1.95yz$
- ☒ $C = 4.20xy + 1.30(yz + xz)$
- ☐ $C = 4.20xy + 1.95(xz + yz)$