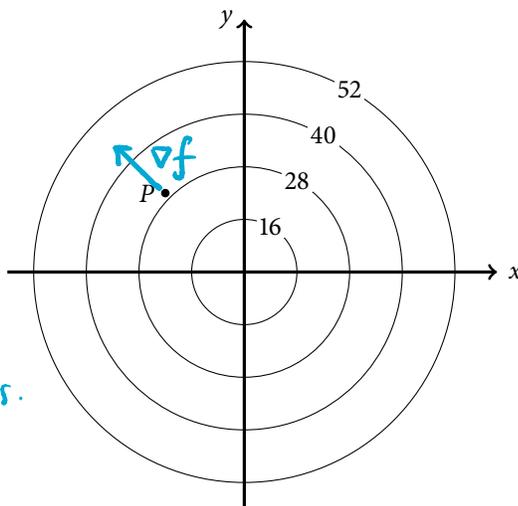


Review Quiz 2

Instructions. You have 10 minutes to complete this review quiz. You may use your calculator. You may not use any other materials. Submit your answers using the provided Google Form.

1. Consider the following contour plot of the surface $z = f(x, y)$:

Recall: ∇f is perpendicular to the level curves of f , pointing in the direction of increasing f values.



The gradient for this surface at point P is in the direction of:

- (a) $-\vec{i} - \vec{j}$
- (b) $\vec{i} + \vec{j}$
- (c) $\vec{i} - \vec{j}$
- (d) \vec{j}
- (e) $-\vec{i} + \vec{j}$

2. Let $f(x, y, z) = x^2y + yz$. The directional derivative of f at the point $(3, -2, 4)$ in the direction of the unit vector $\langle 2/3, 2/3, -1/3 \rangle$ is:

- (a) -26
- (b) $-2/3$
- (c) 0
- (d) $4/3$
- (e) $46/9$

$$\begin{aligned} \nabla f(x, y, z) &= \langle 2xy, x^2+z, y \rangle & \vec{u} &= \left\langle \frac{2}{3}, \frac{2}{3}, -\frac{1}{3} \right\rangle \\ \Rightarrow \nabla f(3, -2, 4) &= \langle -12, 13, -2 \rangle \\ \Rightarrow D_{\vec{u}} f(3, -2, 4) &= \nabla f(3, -2, 4) \cdot \vec{u} \\ &= \langle -12, 13, -2 \rangle \cdot \left\langle \frac{2}{3}, \frac{2}{3}, -\frac{1}{3} \right\rangle \\ &= \frac{4}{3} \end{aligned}$$

3. Which of the following breakfast foods do you enjoy the most?

- (a) Bagel with cream cheese
- (b) Scrambled eggs
- (c) Bacon
- (d) Cereal
- (e) None of the above

4. Which of the following superpowers would you like to have the most?

- (a) Mind reading
- (b) Invisibility
- (c) Teleportation
- (d) Flying
- (e) I already have a superpower

5. Army or Navy?

- (a) Navy
- (b) Navy
- (c) Navy
- (d) Navy
- (e) None of the above