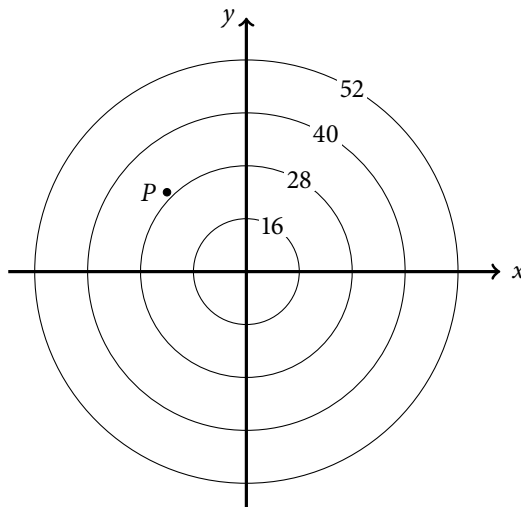


Review Quiz 3

Instructions. You have 20 minutes to complete this review quiz. You may use your calculator. You may not use any other materials. Put your answers on the separate answer form provided.

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



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. Consider the contour plot of the surface $z = f(x, y)$ in Problem 1. Which statement is true regarding f_x and f_y at point P ?
- (a) $f_x < 0$ and $f_y < 0$
 - (b) $f_x > 0$ and $f_y < 0$
 - (c) $f_x < 0$ and $f_y > 0$
 - (d) $f_x < 0$ and $f_y > 0$
 - (e) cannot determine – not enough information
3. An equation for the plane tangent to the surface $z = e^{2x+y}$ at the point $(0, 0, 1)$ is
- (a) $z = 1$
 - (b) $z = x + y + 1$
 - (c) $z = x + 2y + 1$
 - (d) $z = 2x + y + 1$
 - (e) $z = 2xe^{2x+y} + ye^{2x+y} + 1$

4. 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) $46/9$
5. If $f_x(1, 2) = f_y(1, 2) = 0$, $f_{xx}(1, 2) = 3$, $f_{yy}(1, 2) = 5$, and $f_{xy}(1, 2) = 2$, then:
- (a) f has a local minimum at $(1, 2)$
 - (b) f has a local maximum at $(1, 2)$
 - (c) f has a saddle point at $(1, 2)$
 - (d) f has neither a local extreme point nor a saddle point at $(1, 2)$
 - (e) There is not enough information to determine the behavior of f at $(1, 2)$