

1. Write an equation for the plane tangent to the surface $F(x,y,z) = 0$ at the point (a,b,c) .

Choose the correct answer below.

- ☒ **A.** $F_x(a,b,c)(x - a) + F_y(a,b,c)(y - b) + F_z(a,b,c)(z - c) = 0$
- ☐ **B.** $z = F_x(a,b)(x - a) + F_y(a,b)(y - b)$
- ☐ **C.** $z = F_x(a,b)(x - a) + F_y(a,b)(y - b) + F(a,b)$
- ☐ **D.** $F_x(a,b,c)(x - a) + F_y(a,b,c)(y - b) + F_z(a,b,c)(z - c) = F(a,b,c)$

2. Find an equation of the plane tangent to the following surface at the given point.

$5xy + 2yz + xz - 32 = 0$; $(2,2,2)$

The equation of the tangent plane at $(2,2,2)$ is $6x + 7y + 3z - 32 = 0$.

3. Find an equation of the plane tangent to the following surface at the given point.

$z = 6 - 3x^2 - 3y^2$; $(3,2, -33)$

$z =$ $-18x - 12y + 45$

4. Find an equation of the plane tangent to the following surface at the given points.

$z = e^{xy}$; $(9,0,1)$ and $(0,2,1)$

The tangent plane at $(9,0,1)$ is $z =$ $9y + 1$.

The tangent plane at $(0,2,1)$ is $z =$ $2x + 1$.

5. Write the approximate change formula for a function $z = f(x,y)$ at the point (a,b) in terms of differentials.

Choose the correct answer below.

- ☒ **A.** $dz = f_x(a,b) dx + f_y(a,b) dy$
- ☐ **B.** $\Delta z = f_x(a,b)(x - a) + f_y(a,b)(y - b) + f(a,b)$
- ☐ **C.** $\Delta z = f_x(a,b) dx + f_y(a,b) dy - f(a,b)$
- ☐ **D.** $dz = f_x(a,b) dx + f_y(a,b) dy + f(a,b)$

6. Find the equation of the tangent plane to the given surface at the indicated point.

$x^2 + y^2 - z^2 + 29 = 0$; $(6,4,9)$

Choose the correct equation for the tangent plane.

- ☐ **A.** $12(x - 6) + 8(y - 4) - 18(z - 9) = -29$
- ☐ **B.** $36(x - 6) + 16(y - 4) - 81(z - 9) = 0$
- ☒ **C.** $12(x - 6) + 8(y - 4) - 18(z - 9) = 0$
- ☐ **D.** $36(x - 6) + 16(y - 4) - 81(z - 9) = -29$
- ☐ **E.** None of these equations are the correct equation for the tangent plane.

7. Find an equation of the plane tangent to the following surface at the given point.

$$yz e^{xz} + 2 = 0; \quad (0, -2, 1)$$

An equation of the tangent plane at $(0, -2, 1)$ is $-2x + y - 2z + 4 = 0$.