

Math 233 Warm Up Problems

September 18, 2009

1. Lecture Problems

Find the equations of the planes tangent to the surface at the given points

(a) $z = x - y - 2$ at the point $(10, 1, 7)$.

(b) $z = x^2 + y^2$ at the point $(1, 5, 26)$.

(c) $z^2 = x^2 - y^2 + 12$ at the point $(1, 2, -3)$.

1. Lecture Problems

Find the equations of the planes tangent to the surface at the given points

- (a) $z = x - y - 2$ at the point $(10, 1, 7)$.

Solution:

$$x - y - z = 2$$

- (b) $z = x^2 + y^2$ at the point $(1, 5, 26)$.

Solution:

$$2x + 10y - z = 26$$

- (c) $z^2 = x^2 - y^2 + 12$ at the point $(1, 2, -3)$.

Solution:

$$2x - 4y + 6z = -24$$

2. For the surfaces in Problem 2, find the equation of the lines normal to the surface at the given points.
- (a) $z = x - y - 2$ at the point $(10, 1, 7)$.
 - (b) $z = x^2 + y^2$ at the point $(1, 5, 26)$.
 - (c) $z^2 = x^2 - y^2 + 12$ at the point $(1, 2, -3)$.

2. For the surfaces in Problem 2, find the equation of the lines normal to the surface at the given points.

(a) $z = x - y - 2$ at the point $(10, 1, 7)$.

Solution:

$$L(t) = (10, 1, 7) + t(1, -1, -1)$$

(b) $z = x^2 + y^2$ at the point $(1, 5, 26)$.

Solution:

$$L(t) = (1, 5, 26) + t(2, 10, -1)$$

(c) $z^2 = x^2 - y^2 + 12$ at the point $(1, 2, -3)$.

Solution:

$$L(t) = (1, 2, -3) + t(2, -4, 6)$$