

MATH 1260
Test 2 Sample Questions

Answers

(1) (a) 0

(b) DNE

(c) DNE

(d) DNE

(e) 0

(f) DNE

(g) DNE

(h) DNE

(i) DNE

(j) 0

(2) $f(x, y, z) = (2x - 3y + z, 2x - 3y + z)$.

(4) $\vec{v} = \langle a, a \rangle$, $\vec{v} = \langle a, -a \rangle$, or $\vec{v} = \langle 0, 0 \rangle$.

(6) Either $a = 1$ and $\vec{v} = \langle a, a \rangle$ or $a = 2$ and $\vec{v} = \langle 0, a \rangle$.

(7) (a) $f_x = 4xy^3 - 3e^y + \ln(x) + 1 - \cos(xy) \cdot y$ and $f_y = 6x^2y^2 - 3xe^y - \cos(xy) \cdot x$.

(b) $\nabla f(1, 0) = \langle f_x(1, 0), f_y(1, 0) \rangle = \langle -2, -4 \rangle$.

(8) $g_x = \cos(y) \sin(2y)$.

$g_y = (x + z^2)(-\sin(y) \sin(2y) + 2 \cos(y) \cos(2y))$.

$g_z = 2z \cos(y) \sin(2y)$.

(10) $z = 2(x - 1) + \frac{7}{2}(y - 1) + 3$.

(11)

$$\begin{pmatrix} 1 & 0 & \frac{1}{2} \\ 2 & -2 & -2 \end{pmatrix}.$$

(12)

$$\begin{pmatrix} 0 & -3 & -3 \\ 108 & 0 & 0 \end{pmatrix}.$$

(13) $z_u = uf_x + vf_y$ and $z_v = uf_y - vf_x$.

(15) (a) $(0, 0)$, which is a saddle.

(b) The global maximum is 4 at the points $(2, 2)$ or $(-2, -2)$, and the global minimum is -4 at the points $(2, -2)$ or $(-2, 2)$.

(16) (a) $(-1/4, 0)$, which is a minimum.

(b) The global maximum is 8 at $(2, 0)$, and the global minimum is $-17/8$ at $(-1/4, 0)$.

(17) The maximum is $16/5$ at $(2/5, 4)$ and the minimum is -112 at $(-2, 4)$.

(18) The dimensions are 1 by 1 by $3/2$.

(19) The dimensions are 2 by 2 by 4.

(20) The maximum volume is 4000 ft^3 . The dimensions are 20 by 20 by 10.