True or false: If $\lim_{n\to\infty} a_n = 0$, then $\sum a_n$ is convergent.

FALSE

This is the Maclaurin series for the function

$$f(x) = \frac{x^2}{1+x}$$

chapter 12 review, 47: $\sum_{n=0}^{\infty}(-1)^n x^{n+2}$

This is the general form of a power series.

$\sum_{n=0}^{\infty} c_n(x-a)^n$

This is the value of the sum of the series

$$1 - e + \frac{e^2}{2!} - \frac{e^3}{3!} + \frac{e^4}{4!} - \dots$$

chapter 12 review, 31: e^{-e}

This test may be used to determine the convergence of the series

$$\sum_{n=1}^{\infty} \frac{n}{n^3+1}$$

limit comparison test (maybe others?)

True or false: for any vectors $\mathbf{u}$ and $\mathbf{v}$ in $\mathbb{R}^3$, $\mathbf{u} \times \mathbf{v} = \mathbf{v} \times \mathbf{u}$.

FALSE

This is a drawing of the surface described by $x^2 + 2z^2 = 1$.

elliptic cylinder in direction of y-axis

This is a vector pointing from the point (8,2,7) to (1,9,8).

(-7, 7, 1)

This is a drawing of the surface described by $-x^2 + y^2 - z^2 = 1$.

hyperbolic paraboloid of two sheets in y direction

This is a drawing of the plane $x+y+z = 8$ in the first octant.

x,y,z intercepts all 8

If f has a local maximum at the point (a, b), then this is the value of $f_x(a, b) + f_y(a, b)$.

0

These are the coordinates of the local maximum of the function

$$f(x, y) = 3xy - x^2y - xy^2$$

chap 15 review, 53: (1,1)

If f has an absolute maximum at (a, b) and an absolute minimum at (c, d), then this word (eg. positive, negative, zero, non-positive, non-negative) describes $f(a, b) - f(c, d)$.

non-negative

This is the value of the absolute maximum of the function

$$f(x, y) = 4xy^2 - x^2y^2 - xy^3$$

on the triangle with vertices at the origin, (0,6), and (6,0).

chap 15 review, 55: (1,2)

True or false: If $f(x, y)$ has two local maxima, then f must have a local minimum.

FALSE (eg. parabolic cylinder)

This is an estimate of

$$\iint_{[0,3]\times[0,3]} f(x,y)dA$$

where f is given by the below contour map and the sample points are upper-right corners.

chap 16 review, 1: about 64.0

This is an expression for $\iint_R f(x,y)dA$ as an iterated integral, where R is the region shown:

chap 16 review, 9: $\int_0^\pi \int_2^4 f(r\cos\theta, r\sin\theta)r\ dr\ d\theta$

The volume of the solid tetrahedron with vertices (0,0,0), (0,0,1), (0,2,0), and (2,2,0).

chap 16 review, 31: 2/3

The volume of one of the wedges cut from the cylinder $x^2 + 9y^2 = a^2$ by the planes $z = 0$ and $z = mx$.

chap 16 review, 33: $2ma^3/9$

The surface area of the intersecting cylinders $y^2 + z^2 = 1$ and $x^2 + z^2 = 1$, shown below:

16.6, 24: 16

The difference between an Aggie and a carp is that one is a bottom-feeding scum sucker and the other is one of these.

fish

This is how many credit-hours an Aggie gets for screwing in a light bulb.

three

The Aggie got fired from his job as a quality control inspector at the M&M plant because he kept throwing out all of these.

W&W's

The number that an Aggie can't find on the telephone, preventing him from dialing 911 in an emergency.

11

This is what Aggies think Cheerios are.

donut seeds

dz/dt, where $z = x^2y + xy^2, x = 2 + t^4$, and $y = 1 - t^3$.

15.5, 1: $4(wxy + y^2)t^3 - 3(x^2 + 2xy)t^2$

$\partial z/\partial s$, where $z = x^2 + xy + y^2, x = s + t$, and $y = st$.

15.5, 7: $2x + y + xt + 2yt$

$\partial z/\partial u$, where $z = x^2 + xy^3, x = uv^2 + w^3$, and $y = u + ve^w$, when $u = 2, v = 1$, and $w = 0$.

15.5, 21: 85

$\partial z/\partial x$, where $x^2 + y^2 + z^2 = 3xyz$.

15.5, 31: $\frac{3yz-2x}{2z-3xy}$

The voltage V in a simple electrical circuit is slowly decreasing as the battery wears out. The resistance R is slowly increasing as the resistor heats up. Use Ohm's Law ($V = IR$) to find this, the change in current I, at the moment when $R = 400\Omega, I = 0.08A, dV/dt = -0.01V/s$, and $dR/dt = 0.03\Omega/s$.

15.5, 40: -0.000031 A/s

The direction $\mathbf{u}$ that maximizes the value of the directional derivative $D_{\mathbf{u}}f(x, y, z)$.

$\nabla f(x, y, z)$

The kind of vector that $\mathbf{u}$ is in the equation

$$D_{\mathbf{u}}f(x, y, z) = \nabla f(x, y, z) \cdot \mathbf{u}$$

unit vector

The direction in which the electric potential V changes most rapidly at $(3, 4, 5)$, where$V(x, y, z) = 5x^2 - 3xy + xyz$.

15.6, 33b: (38,6,12)

The direction you would go (uphill or downhill) if you were climbing south on a hill whose shape is given by $z = 1000 - 0.01x^2 - 0.02y^2$, where the positive x-axis points east and the positive y-axis points north, and you start at the point $(50, 80, 847)$.

15.6, 34a: uphill

A point on the hyperboloid $x^2 - y^2 + 2z^2 = 1$ where the normal line is parallel to the line that joins the points (3, -1, 0) and (5,3,6).

15.6, 53: $(\sqrt{6}/3, -2\sqrt{6}/3, \sqrt{6}/2), (-\sqrt{6}/3, 2\sqrt{6}/3, -\sqrt{6}/2)$

An expression (as a triple integral) for the volume of the wedge in the first octant that is cut from the cylinder $y^2 + z^2 = 1$ by the planes $y = x$ and $x = 1$.

16.7, 21a: $\int_0^1 \int_0^x \int_0^{\sqrt{1-y^2}} dzdydx$ (or something equivalent)

The iterated integral with respect to $dxdzdy$ for the integral $\iiint_E f(x, y, z)dV$, where E is bounded by $z = 0$, $z = y$, and $x^2 = 1 - y$.

16.7, 29: $\int_0^1 \int_0^y \int_{-\sqrt{1-y}}^{\sqrt{1-y}}$

The volume of the solid tetrahedron with vertices (0,0,0), (0,0,1), (0,2,0), and (2,2,0).

2/3 (see same problem in double integrals)

The average value of the function $f(x, y, z) = xyz$ over the cube with side length 5 that lies in the first octant with one vertex at the origin and edges parallel to the coordinate axes.

16.7, 47: 125/8

The iterated integral with respect to $dxdydz$ where the original integral is

$$\int_0^1 \int_y^1 \int_0^y f(x, y, z)dzdxdy$$

16.7, 33: $\int_0^1 \int_z^1 \int_y^1 f(x, y, z)dxdydz$

There is no theory of this; instead, there is just a list of animals Chuck Norris allows to live.

evolution

It took 10 days and this many women to give birth to Chuck Norris.

four women

This is the chief export of Chuck Norris.

pain

This is the number of times that Chuck Norris has counted to infinity.

two times

Chuck Norris does not sleep. Instead, he does this.

he waits

This person was impaled by a bicycle handlebar and had surgery to repair "index finger deep" muscle damage.

sarah

This person breaks her vegan diet every time we have Tiff's Treats.

gina

This person currently has his hair dyed blue.

jer-el

This person feeds almonds to squirrels on the way to class.

meagan

This person can solve a Rubik's cube in less than five minutes!!! (sic)

gerald

This person has a huge crush on JRD.

natalia

brian

This person went to the beach everyday for a year and couldn't get a tan.

ruben

This person can wiggle her right ear, but not her left.

megan

This person has a sugar packet collection.

leila

This person can do the wave with his eyebrows.

An argument showing that $\cosh x \geq 1 + \frac{1}{2}x^2$ for all x.