

The product of two positive numbers is 588. Minimize the sum of the first and three times the second.

- (a) Both numbers are  $14\sqrt{3}$ .  
(b) 42 and 14  
(c) 28 and 21  
(d) None of these

Find two positive integers whose product is a maximum if the sum of those numbers is 56.

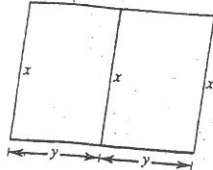
- (a) 52 and 4 (b) 32 and 24 (c) 29 and 27 (d) 28 and 28 (e) None of these

A rancher has 300 feet of fencing to enclose a pasture bordered on one side by a river. The river side of the pasture needs no fence. Find the dimensions of the pasture that will produce a pasture with a maximum area.

75' x 100' 150'

A person has 400 feet of fencing to enclose two adjacent rectangular regions of the same size. What dimensions should each region be so that the enclosed area will be a maximum?

100' x 50'



An open box is to be made from a rectangular piece of material by cutting equal squares from each corner and turning up the sides. Find the dimensions of the box of maximum volume if the material has dimensions 6 inches by 6 inches.

4" x 4" x 1"

Find the point on the graph of  $y = \sqrt{x+1}$  closest to the point (3, 0).

- (a) (0, 1)  
(b)  $(\frac{5}{2}, \sqrt{\frac{7}{2}})$   
(c) (3, 2)  
(d)  $(2, \sqrt{3})$   
(e) None of these

Calculate 3 iterations of Newton's Method to approximate the real zero of  $f(x) = -x^3 + x + 1$ . Use  $x_1 = 1.0000$  as the initial guess and round to 4 decimal places after each iteration.

- (a) 1.5432 (b) 1.1056 (c) 1.3252  
(d) 1.3198 (e) None of these

Calculate 3 iterations of Newton's Method to approximate the real zero of  $f(x) = x^3 - 2x - 2$ . Use  $x_1 = 1.5000$  as the initial guess and round to 4 decimal places after each iteration.

- (a) 1.7693 (b) 1.9867 (c) 2.0003  
(d) 1.8196 (e) None of these

Calculate 3 iterations of Newton's Method to approximate the real zero of  $f(x) = x^3 - x + 1$ . Use  $x_1 = 1.5000$  as the initial guess and round to 4 decimal places after each iteration.

-1.325

The side of a cube is measured to be 3.0 inches. If the measurement is correct to within 0.01 inch, use differentials to estimate the propagated error in the volume of the cube.

- (a)  $\pm 0.000001 \text{ in.}^3$  (b)  $\pm 0.06 \text{ in.}^3$  (c)  $\pm 0.027 \text{ in.}^3$   
(d)  $\pm 0.27 \text{ in.}^3$  (e) None of these

Use differentials to approximate  $\sqrt{4.9}$ .

(a) 2.225

(b) 2.250

(c) 2.214

(d) 2.450

(e) None of these

The measurement of the edge of a piece of square floor tile is found to be 12 inches with a possible error of 0.02 inches.

a. Use differentials to approximate the maximum possible error in the area of the tile.

$.48 \text{ in}^2$

b. Use the answer from part a to estimate the relative error.

$\frac{1}{300}$

c. Use the answer from part b to estimate the percentage error.

$.33\%$

The measurement of the circumference of a circle is found to be 54 centimeters. Approximate the percentage error in computing the area of the circle if the possible error in measuring the circumference is 0.6 centimeters. Round your answer to three decimal places.

$2.22\%$