

1. Find two numbers whose difference is 100 and whose product is a minimum.
2. Find the point on the line  $y = 4x + 7$  that is closest to the origin.
3. Find the area of the largest rectangle that can be inscribed in a right triangle with legs of lengths 3 cm and 4 cm, if two sides of the rectangle lie along the legs.
4. A farmer wants to fence an area of 1.5 million square feet in a rectangular field and then divide it in half with a fence parallel to one of the sides of the rectangle. How can he do this so as to minimize the cost of the fence?
5. Use Newton's method with the specified initial approximation to find the root of the given equation accurate to four decimal places:  $y = x^3 + x + 1$  ;  $x_1 = -1$
6. Use Newton's method with the specified initial approximation to find the root of the given equation accurate to four decimal places:  $y = x^4 - 20$  ;  $x_1 = 2$
7. Find the differential of the function:  $y = x^4 + 5x$
8. Find the differential of the function:  $y = \frac{x+1}{x-1}$
9. Find the differential  $dy$  for the given values of  $x$  and  $dx$ :  $y = x^2 + 2x$  ;  $x = 3$  ;  $dx = \frac{1}{2}$
10. Find the differential  $dy$  for the given values of  $x$  and  $dx$ :  $y = (x^2 + 5)^3$  ;  $x = 1$  ;  
 $dx = .05$
11. Compute  $\Delta y$  and  $dy$  for the given values of  $x$  and  $dx = \Delta x$  :  $y = x^2$  ;  $x = 1$  ;  $dx = .5$
12. Compute  $\Delta y$  and  $dy$  for the given values of  $x$  and  $dx = \Delta x$  :  $y = 6 - x^2$  ;  $x = -2$  ;  
 $dx = .4$

Mr. Bohn - Calculus  
Chapter 3B Review Worksheet

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1. The two numbers are 50 and -50

Primary equation:  $P = xy$

Secondary Equation:  $x - y = 100$

2. The point is  $\left(\frac{-28}{17}, \frac{7}{17}\right)$

Primary equation:  $d = \sqrt{(x-0)^2 + (y-0)^2}$

Secondary Equation:  $y = 4x + 7$

3. Area = 3

Primary equation:  $A = xy$

Secondary Equation:  $\frac{3}{4} = \frac{3-y}{x}$

4. The field should be 1000 ft x 1500 feet, with an additional divider of 1000 ft.

Primary equation:  $P = 3x + 4y$

Secondary Equation:  $1,500,000 = 2xy$

5. Use  $x_{n+1} = x_n - \frac{x_n^3 + x_n + 1}{3x_n^2 + 1}$ .

$x_1 = -1, x_2 = -.75, x_3 = -.68605, x_4 = -.68234, x_5 = -.68233, x_6 = -.68233, x \approx -.6823$

6. Use  $x_{n+1} = x_n - \frac{x_n^4 - 20}{4x_n^3}$ .

$x_1 = 2, x_2 = 2.125, x_3 = 2.11482, x_4 = 2.11474, x_5 = 2.11474, x \approx 2.1147$

7.  $dy = (4x^3 + 5)dx$

8.  $dy = \frac{-2}{(x-1)^2} dx$

9.  $dy = 4$

10.  $dy = 10.8$

11.  $\Delta y = 1.25$  and  $dy = 1$

12.  $\Delta y = 1.44$  and  $dy = 1.6$

Answers

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