In Exercises 41-48, find dy/dx

44. 5x 4/5 + 10y 6/5 = 15

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54. a. By differentiating x 2 – y2 =1 implicitly, show that dy/dx = x/y

 b. Then show that d2y/dx2 = - 1/y3.

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Numerical Values of Derivatives

56. Suppose that the function f(x) and its first derivative have the following values at

x = 0 and x = 1

|  |  |  |
| --- | --- | --- |
| x | f(x) | f’(x) |
| 0 | 9 | -2 |
| 1 | -3 | 1/5 |

Find the first derivatives of the following combinations at the given value of x

a. $\sqrt{x} $f(x), x = 1

b. $\sqrt{f(x)}$ , x = 0

c. f$(\sqrt{x} )$ , x =1

d. f(1 – 5 tan x), x = 0

e. f(x) , x = 0

 2+cosx

f. 10sin$\left(\genfrac{}{}{0pt}{}{πx}{2}\right)$f2(x), x = 1

62. If x1/3 + y1/3 = 4, find d2y/dx2 at the point (8,8)

68. For what value or values of the constant m, if any is

 f(x) = $\left\{\begin{array}{c}sin2x, x \leq 0\\mx, x>0\end{array}\right.$

a. continuous at x = 0?

b. differentiable at x = 0?

Give reasons for your answers