Ch. 14 - Board Problems

FIND THE DERIVATIVES.

① $y = e^{2x^3}$

② $y = \cos\ln(4x^3)$

③ $y = e^{(4x^3 + 5)^2}$

④ $y = \ln\left(-\dfrac{4x^5}{x^3 - 3}\right)^5$

⑤ FIND THE INVERSE.

$f(x) = \sqrt[5]{x + 1} + 2$

⑥ FIND vertex and standard form

$y = -5(x-2)(2x+3)$

Ch.14 - Implicit Differentiation

EXPLICIT (solve for y, then differentiate)   IMPLICIT (differentiate each part, solve for $\frac{dy}{dx}$ or y')

$2x + 4y = 8$ $2x + 4y = 8$

EX. 2   DIFFERENTIATE $5y^2 = 3x + y$

EX. 3   DIFFERENTIATE WITH RESPECT TO X. $4y + \sqrt{y} = 2x - 3$

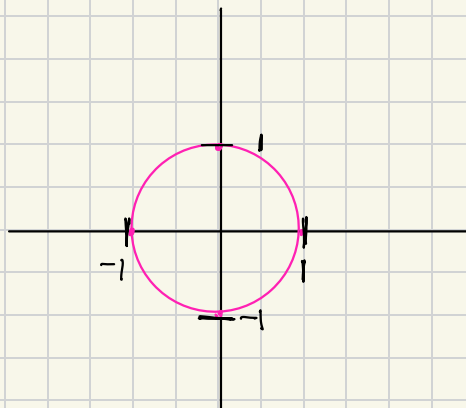EX. 4   DIFFERENTIATE IMPLICITLY. $x^2 + y^2 = 2ay$

$\sin y \cdot e^x = 2x$

$$x^2 + y^2 = 1$$

Find the tangent LINE TO THE CIRCLE

DETERMINE ON WHICH POINTS OF

$$x^2 + y^2 = 1 \quad \text{CAUSE THE SLOPE}$$

OF THE TANGENT LINE $= \underline{1}$

| EX. 8 | FIND THE LINES THAT ARE TANGENT
AND NORMAL TO

$$\ln(y) - x = -2 \qquad (2, 1)$$

Solve by implicit differentiation with respect to x.

1. $2x + 3y = 4$

2. $3xy = 2x$

3. $\ln(y) = x^2$

4. $\sin(y) = x^2 - 1$

5. $\left(y^2 - 2y\right)^3 = x$

6. $15x = 15y + 5y^3 + 3y^5$

7. $x = \sqrt{y} + \sqrt[3]{y}$

8. $x^3 + x^2y + y^3 = 3$

9. $\sin(x) + \cos(y) = y$

10. $e^x + e^y = 2y$

Find the slope of the tangent line to the curve at the point given.

11. $-3 + xy = y$ at $(2, 3)$

12. $xy^2 + \dfrac{1}{x} = 2y + x$ at $(1, 2)$

CALCU

EX. 7