U2H8 Find $\frac{dy}{dx}$.

1. $y = -2e^x$

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

3. $\ln(y+1) = 4x$

4. $y = xe^2 - e^x$

5. $y = e^{\sqrt{x}}$

6. $y = \frac{x^{-4}}{4} - \frac{x^{-3}}{3} + \frac{x^{-2}}{2} - x^{-1} + 3$

7. $y = 3^{-\sin x}$

8. $y = (4\pi^x)(-\frac{1}{3}x^{0.5})$

9. $y = 16^x - 2x + 9$

10. $y = \frac{2x+5}{3x-2}$

11. $y = (1-x)(1+x^2)^{-1}$

12. $y = \frac{(x+1)(x+2)}{(x-1)(x-2)}$

13. Which of the following numbers is the slope of the line tangent to the curve $y = x^2 + 5x$ at $x = 3$?
a. 24 b. -5/2 c. 11 d. 8

14. Which of the following numbers is the slope of the line $3x - 2y = -12$?
a. 6 b. 3 c. 3/2 d. 2/3

15. Find an equation for the line tangent to the curve at the given point. $y = \frac{x^3+1}{2x}$, $x = 1$

16. Find an equation for the line normal to the curve at the given point. $y = \frac{x^4+2}{x^2}$, $x = -1$

U2H8 Find $\frac{dy}{dx}$.

1. $y = 2e^x$

$y' = 2e^x$

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

$e^{-2x} = y-3$

$y = e^{-2x} + 3$

$y' = e^{-2x} \cdot -2$

3. $\ln(y+1) = 4x$

$y+1 = e^{4x}$

$y = e^{4x} - 1$

$y' = 4e^{4x}$

4. $y = xe^2 - e^x$

$y' = x(0) + e^2(1) - e^x$

$y' = e^2 - e^x$

5. $y = e^{\sqrt{x}}$

$y' = e^{\sqrt{x}} \cdot \ln e \cdot \frac{1}{2} x^{-1/2}$

$y' = \frac{e^{\sqrt{x}}}{2\sqrt{x}}$

6. $y = \frac{x^{-4}}{4} - \frac{x^{-3}}{3} + \frac{x^{-2}}{2} - x^{-1} + 3$

$y' = -x^{-5} + x^{-4} - x^{-3} + x^{-2}$

7. $y = 3^{-\sin x}$

$y' = 3^{-\sin x} \cdot \ln 3 \cdot -\cos x$

8. $y = (4\pi^x)(-\frac{1}{3}x^{0.5})$

$y' = (4\pi^x)(-\frac{.5}{3}x^{-.5}) + (-\frac{1}{3}x^{.5})(4(\pi^x \cdot \ln\pi))$

$y' = (4\pi^x)(-\frac{1}{6}x^{-1/2}) + (-\frac{1}{3}x^{1/2})[4(\pi^x \cdot \ln\pi)]$

9. $y = 16^x - 2x + 9$

$y' = (16^x \cdot \ln 16) - 2$

10. $y = \frac{2x+5}{3x-2}$

$y' = \frac{(3x-2)(2) - (2x+5)(3)}{(3x-2)^2}$

11. $y = (1-x)(1+x^2)^{-1} = \frac{(1-x)}{(1+x^2)}$

$y' = \frac{(1+x^2)(-1) - (1-x)(2x)}{(1+x^2)^2}$

12. $y = \frac{(x+1)(x+2)}{(x-1)(x-2)} = \frac{x^2+3x+2}{x^2-3x+2}$

$y' = \frac{(x-1)(x-2)[(x+1)+(x+2)] - (x+1)(x+2)[(x-1)+(x-2)]}{[(x-1)(x-2)]^2}$

$y' = \frac{(x^2-3x+2)(2x+3) - (x^2+3x+2)(2x-3)}{(x^2-3x+2)^2}$

13. Which of the following numbers is the slope of the line tangent to the curve $y = x^2 + 5x$ at $x = 3$?

a. 24 b. -5/2 c. 11 d. 8

$y' = 2x + 5$

$y'(3) = 2(3) + 5 = 6 + 5 = 11$

14. Which of the following numbers is the slope of the line $3x - 2y + 12$?

a. 6 b. 3 c. 3/2 d. 2/3

change to: $y = 6 + \frac{3x}{2}$

slope of this line is 3/2

15. Find an equation for the line tangent to the curve at the given point. $y = \frac{x^3+1}{2x}$, $x = 1$

pt = (1, 1) m = ?

$m = y' = \frac{(2x)(3x^2) - (x^3+1)(2)}{(2x)^2}$

$m = y'(1) = \frac{(2\cdot1)(3\cdot1^2+1) - (1^3+1)(2)}{(2\cdot1)^2}$

$m = y'(1) = 1/2$

$y - 1 = 1/2(x-1)$

16. Find an equation for the line normal to the curve at the given point. $y = \frac{x^4+2}{x^2}$, $x = -1$

pt (-1, 3) m = ?

$m = y' = \frac{(x^2)(4x^3) - (x^4+2)(2x)}{(x^2)^2}$

$m = y'(-1) = \frac{(1\cdot-4) - (3)(-2)}{1} = 2$

$m_{tan} = 2$

$m_{norm} = -\frac{1}{2}$

$y - 3 = -\frac{1}{2}(x+1)$