

WARM UP

DAY AFTER 3.1

Find $\frac{dy}{dx}$

$$1) y = 5x^4 + \frac{1}{4}x^3 - \frac{x^2}{7} + \pi^3 + \frac{5}{x^2}$$

$$2) y = x^e$$

$$3) y = \frac{1}{3}x^4 - \frac{2}{5}x^3 + 7x^{-2} + e$$

$$4) y = \frac{2}{3}x^5 - \frac{1}{7}x^4 + 8x^{-1} + \pi^4$$

5) Write the equation of the line tangent to the graph of $y = \sqrt{2} \cos x$ @ $x = \frac{\pi}{4}$

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DAY AFTER 3.1

Find $\frac{dy}{dx}$

$$1) y = 5x^4 + \frac{1}{4}x^3 - \frac{x^2}{7} + \pi^3 + \frac{5}{x^2}$$

$$y = 5x^4 + \frac{1}{4}x^3 - \frac{1}{7}x^2 + \pi^3 + 5x^{-2}$$

$$y' = 20x^3 + \frac{3}{4}x^2 - \frac{2}{7}x - 10x^{-3}$$

$$3) y = \frac{1}{3}x^4 - \frac{2}{5}x^3 + 7x^{-2} + e$$

$$y' = \frac{4}{3}x^3 - \frac{6}{5}x^2 - 14x^{-3}$$

$$2) y = x^e$$

$$y' = ex^{e-1}$$

$$y = e^x$$
$$y' = e^x$$

$$4) y = \frac{2}{3}x^5 - \frac{1}{7}x^4 + 8x^{-1} + \pi^4$$

$$y' = \frac{10}{3}x^4 - \frac{4}{7}x^3 - 8x^{-2}$$

5) Write the equation of the line tangent to the graph of $y = \sqrt{2} \cos x$ @ $x = \frac{\pi}{4}$

pt.
 $(\frac{\pi}{4},)$

$$\begin{aligned} & \sqrt{2} \cos\left(\frac{\pi}{4}\right) \\ &= \sqrt{2} \cdot \frac{1}{\sqrt{2}} \\ &= 1 \end{aligned}$$

$$\left(\frac{\pi}{4}, 1\right)$$

Slope

$$y' = -\sqrt{2} \sin x$$

$$y'\left(\frac{\pi}{4}\right) = -\sqrt{2} \sin\left(\frac{\pi}{4}\right)$$

$$y'\left(\frac{\pi}{4}\right) = -\sqrt{2} \left(\frac{1}{\sqrt{2}}\right)$$

$$y'\left(\frac{\pi}{4}\right) = -1$$

$$y - 1 = -1 \left(x - \frac{\pi}{4}\right)$$

$$\begin{aligned} y &= \cos x \\ y' &= -\sin x \end{aligned}$$