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1 $y^2 - x^2 = 1$

$\frac{d}{dx}(y^2 - x^2) = \frac{d}{dx}(1)$

$2y\frac{dy}{dx} - 2x = 0$

$\frac{dy}{dx} = \frac{x}{y}$

3 $xy = 1$

$\frac{d}{dx}(xy) = \frac{d}{dx}(1)$

$y + x\frac{dy}{dx} = 0$

$\frac{dy}{dx} = \frac{-y}{x}$

5 $xy^2 = x-8$

$\frac{d}{dx}(xy^2) = \frac{d}{dx}(x-8)$

$y^2 + x\frac{dy^2}{dx} = \frac{d}{dx}(x) - \frac{d}{dx}(8)$

$y^2 + 2xy\frac{dy}{dx} = 1-0$

$\frac{dy}{dx} = \frac{1-y^2}{2xy}$

7 $4x^3 + 7xy^2 = 2y^3$

$\frac{d}{dx}(4x^3 + 7xy^2) = \frac{d}{dx}(2y^3)$

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$$12x^2 + 7y^2 + 7x\frac{dy^2}{dx} = 2\frac{dy^3}{dx}$$

$$12x^2 + 7y^2 + 14xy\frac{dy}{dx} = 6y^2\frac{dy}{dx}$$

$$\frac{dy}{dx} = \frac{-12x^2 - 7y^2}{14xy - 6y^2} = \frac{12x^2 + 7y^2}{6y^2 - 14xy}$$

9 $\sqrt{5xy} + 2y = y^2 + xy^3$

$$\frac{d}{dx}\left((5xy)^{1/2} + 2y\right) = \frac{d}{dx}\left(y^2 + xy^3\right)$$

$$\frac{1}{2}(5xy)^{-\frac{1}{2}} \cdot \frac{d}{dx}(5xy) + 2\frac{dy}{dx} = \frac{dy^2}{dx} + y^3 + x\frac{dy^3}{dx}$$

$$\frac{1}{2\sqrt{5xy}} \cdot \left(5 + 5x\frac{dy}{dx}\right) + 2\frac{dy}{dx} = 2y\frac{dy}{dx} + y^3 + 3xy^2\frac{dy}{dx}$$

$$\frac{5}{2\sqrt{5xy}} + \frac{5x}{2\sqrt{5xy}}\frac{dy}{dx} + 2\frac{dy}{dx} = \frac{dy}{dx}\left(2y + 3xy^2\right) + y^3$$

$$\frac{dy}{dx}\left(\frac{5x}{2\sqrt{5xy}} + 2 - 2y - 3xy^2\right) = y^3 - \frac{5}{2\sqrt{5xy}}$$

$$\frac{dy}{dx} = \frac{y^3 - \frac{5}{2\sqrt{5xy}}}{\frac{5x}{2\sqrt{5xy}} - 3xy^2 - 2y + 2}$$

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11) $xy + \sin(xy) = 1$

$\frac{d}{dx}(xy + \sin(xy)) = \frac{d}{dx}(1)$

$y + x\frac{dy}{dx} + [\cos(xy)\cdot(y + x\frac{dy}{dx})] = 0$

$y + x\frac{dy}{dx} + y\cdot\cos(xy) + x\cdot\cos(xy)\frac{dy}{dx} = 0.$

$\frac{dy}{dx}(x + x\cos(xy)) = \cancel{-y = \cos(xy)} - y - y\cos(xy)$

$\frac{dy}{dx} = \frac{-y - y\cos(xy)}{x + x\cos(xy)}$

$\frac{dy}{dx} = \frac{-y\cancel{(1+\cos(xy))}}{x\cancel{(1+\cos(xy))}}$

$\frac{dy}{dx} = \frac{-y}{x}.$

17) $x^{2/3} - y^{2/3} - 2y = 2;\ (1,-1)$

$\frac{d}{dx}(x^{2/3} - y^{2/3} - 2y) = \frac{d}{dx}(2).$

$\cancel{\frac{2}{3}x^{-\frac{1}{3}} - \frac{2}{3}y^{-\frac{1}{3}} - 2}$

$\frac{2}{3}x^{-\frac{1}{3}} - \frac{2}{3}y^{-\frac{1}{3}}\frac{dy}{dx} - 2\frac{dy}{dx} = 0.$

$\frac{dy}{dx}\left(\frac{-2}{3\sqrt[3]{y}} - 2\right) = -\frac{2}{3\sqrt[3]{x}}$

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$$\frac{dy}{dx} = \frac{-\frac{2}{3\sqrt[3]{x}}}{-\frac{2}{3\sqrt[3]{y}} - 2}$$

Untuk $(1, -1)$:

$$\frac{dy}{dx} = \frac{\frac{2}{3\sqrt[3]{1}}}{\frac{2}{3\sqrt[3]{-1}} + 2}$$

$$\frac{dy}{dx} = \frac{2/3}{\frac{-2+6}{3}}$$

$$\frac{dy}{dx} = \frac{\cancel{2}/\cancel{3}}{\cancel{4}2/\cancel{3}} = \frac{1}{2}$$

25 $y = \frac{1}{(x^3+2x)^{2/3}}$

$$\frac{dy}{dx} = \frac{d}{dx}(x^3+2x)^{-\frac{2}{3}}$$

$$\frac{dy}{dx} = -\frac{2}{3}(x^3+2x)^{-5/3} \cdot \frac{d}{dx}(x^3+2x)$$

$$\frac{dy}{dx} = -\frac{2}{3}(x^3+2x)^{-5/3} \cdot (3x^2+2)$$

$$\frac{dy}{dx} = \frac{-2(3x^2+2)}{(x^3+2x)^{5/3}}$$

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27 $y = \sqrt{x^2 + \sin x}$

$\frac{dy}{dx} = \frac{d}{dx}\left(x^2 + \sin x\right)^{\frac{1}{2}}$

$\frac{dy}{dx} = \frac{1}{2}\left(x^2 + \sin x\right)^{-\frac{1}{2}} \cdot \frac{d}{dx}\left(x^2 + \sin x\right)$

$\frac{dy}{dx} = \frac{1}{2}\left(x^2 + \sin x\right)^{-\frac{1}{2}}\left(2x + \cos x\right)$

$\frac{dy}{dx} = \frac{(2x + \cos x)}{2\sqrt{x^2 + \sin x}}$

29 $y = \frac{1}{\sqrt[3]{x^2 \cdot \sin x}}$

$\frac{dy}{dx} = \frac{d}{dx}\left(x^2 \cdot \sin x\right)^{-\frac{1}{3}}$

$\frac{dy}{dx} = -\frac{1}{3}\left(x^2 \cdot \sin x\right)^{-\frac{4}{3}} \cdot \frac{d}{dx}\left(x^2 \cdot \sin x\right).$

$\frac{d}{dx}(x^2 \cdot \sin x) = 2x \cdot \sin x + x^2 \cdot \cos x$

$\rightarrow \frac{dy}{dx} = -\frac{1}{3}\left(x^2 \cdot \sin x\right)^{-4/3} \cdot \left(2x \sin x + x^2 \cdot \cos x\right).$

$\frac{dy}{dx} = \frac{-(2x \sin x + x^2 \cdot \cos x)}{3\left(x^2 \cdot \sin x\right)^{4/3}}$

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31) $y = \sqrt[4]{1+\cos(x^2+2x)}$

$$\frac{dy}{dx} = \frac{d}{dx}\left(1+\cos(x^2+2x)\right)^{\frac{1}{4}}$$

$$\frac{dy}{dx} = \frac{1}{4}\left(1+\cos(x^2+2x)\right)^{\frac{-3}{4}} \cdot \frac{d}{dx}\left(1+\cos(x^2+2x)\right)$$

$$\frac{dy}{dx} = \frac{\left[-(2x+2)\cdot \sin(x^2+2x)\right]}{4\cdot\left(1+\cos(x^2+2x)\right)^{3/4}}$$

$$\frac{dy}{dx} = \frac{-\cancel{2}(x+1)\cdot \sin(x^2+2x)}{2\cancel{4}\left(1+\cos(x^2+2x)\right)^{3/4}}$$

$$\frac{dy}{dx} = \frac{-(x+1)\cdot \sin(x^2+2x)}{2\left(1+\cos(x^2+2x)\right)^{3/4}}$$

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