

Differentiate the following:

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|---|---|---|
| 1 $f(x) = (x + 4)^2$ | 2 $f(x) = (2x + 3)^2$ | 3 $f(x) = (3x - 4)^2$ |
| 4 $f(x) = (5x - 2)^4$ | 5 $f(x) = (5 - x)^3$ | 6 $f(x) = (7 - 2x)^4$ |
| 7 $y = (9 - 4x)^5$ | 8 $y = 4(2x + 3)^6$ | 9 $y = (3x + 8)^{\frac{1}{2}}$ |
| 10 $y = (2x - 9)^{\frac{3}{5}}$ | 11 $y = \sqrt[3]{6x - 5}$ | 12 $y = \frac{1}{\sqrt{3x - 2}}$ |
| 13 $f(x) = \frac{4}{5x - 4}$ | 14 $f(x) = \frac{7}{3 - 8x}$ | 15 $P = \frac{3}{(4 - 3k)^2}$ |
| 16 $N = \frac{5}{\sqrt{(8 - 5p)^3}}$ | 17 $y = \sin 4x$ | 18 $y = \cos 3x$ |
| 19 $y = -\sin \frac{1}{2}x$ | 20 $y = \tan 6x$ | 21 $y = \sec 9x$ |
| 22 $y = 6x + \cot 3x$ | 23 $y = \csc 2x + (3x + 2)^4$ | |
| 24 $y = \sin 5x - \frac{4}{\sqrt{(3x + 4)^5}}$ | 25 $y = \sin^3 x$ | 26 $y = \tan^2(4x)$ |
| 27 $y = 3x^4 - \cos^3 x$ | 28 $y = \frac{2}{(3x - 4)^5} - \sec^2(2x)$ | |
| 29 $y = \cos\left(3x - \frac{\pi}{4}\right)$ | 30 $y = \tan(\sqrt{x + 1})$ | |

1 $f'(x) = 2(x + 4)$ **2** $f'(x) = 4(2x + 3)$ **3** $f'(x) = 6(3x - 4)$ **4** $f'(x) = 20(5x - 4)^3$ **5** $f'(x) = -3(5 - x)^2$ **6** $f'(x) = -8(7 - 2x)^3$
7 $\frac{dy}{dx} = -20(9 - 4x)^4$ **8** $\frac{dy}{dx} = 48(2x + 3)^5$ **9** $\frac{dy}{dx} = \frac{3}{2}(3x + 8)^{-\frac{1}{2}}$ **10** $\frac{dy}{dx} = \frac{10}{3}(2x - 9)^{\frac{2}{3}}$ **11** $\frac{dy}{dx} = 2(6x - 5)^{-\frac{2}{3}}$
12 $\frac{dy}{dx} = -\frac{3}{2}(3x - 2)^{-\frac{2}{3}}$ **13** $f'(x) = -20(5x - 4)^{-2}$ **14** $f'(x) = 56(3 - 8x)^{-2}$ **15** $\frac{dP}{dk} = 18(4 - 3k)^{-3}$ **16** $\frac{dN}{dp} = \frac{75}{2}(8 - 5p)^{-\frac{5}{2}}$
17 $\frac{dy}{dx} = 4 \cos 4x$ **18** $\frac{dy}{dx} = -3 \sin 3x$ **19** $\frac{dy}{dx} = -\frac{1}{2} \cos \frac{1}{2}x$ **20** $\frac{dy}{dx} = 6 \sec^2 6x$ **21** $\frac{dy}{dx} = 9 \sec 9x \tan 9x$ **22** $\frac{dy}{dx} = 6 - 3 \operatorname{cosec}^2 3x$
23 $\frac{dy}{dx} = -2 \operatorname{cosec} 2x \cot 2x + 12(3x + 2)^3$ **24** $\frac{dy}{dx} = 5 \cos 5x + 30(3x + 4)^{-\frac{2}{3}}$ **25** $\frac{dy}{dx} = 3 \sin^2 x \cos x$ **26** $\frac{dy}{dx} = 8 \tan 4x \sec^2 4x$
27 $\frac{dy}{dx} = 12x^3 + 3 \cos^2 x \sin x$ **28** $\frac{dy}{dx} = -30(3x - 4)^{-6} - 2 \sec^2 2x \tan 2x$ **29** $\frac{dy}{dx} = -3 \sin\left(3x - \frac{\pi}{4}\right)$ **30** $\frac{dy}{dx} = (x + 1)^{-\frac{1}{2}} \sec^2(\sqrt{x + 1})$