

Worksheet: Power Rule of Derivatives



Q1: Differentiate the function $f(x) = -\frac{x^2}{7} - 3x - 4$.



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A $f'(x) = -\frac{2x^2}{7} - 3x - 4$

B $f'(x) = -\frac{x^3}{7} - 3x^2 - 4x$

C $f'(x) = -\frac{x}{7} - 3$

D $f'(x) = -\frac{2x^3}{7} - 3x^2 - 4x$

E $f'(x) = -\frac{2x}{7} - 3$

Q2: Given that $y = x^3 + x^2 + 8x$ and $z = x(x - 4)(x - 1)$, determine $\frac{dy}{dx} - \frac{dz}{dx}$.

A $-4x - 4$

B $12x + 4$

C $12x + 12$

D $-2x - 4$

E $-8x + 4$

Q3: Find $\frac{dy}{dx}$, given that $-6xy = 11$.

A $\frac{11 - 6yx}{x}$

B $-\frac{11y}{6x}$

C $\frac{11}{6x}$

D $\frac{11}{6x^2}$



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Q4: Given that $y = 15 - \frac{1}{x^6} + \frac{1}{3}x^{20}$, determine y' .

A $\frac{5}{x^7} + \frac{19}{3}x^{19}$

B $\frac{6}{x^7} + \frac{20}{3}x^{19}$

C $\frac{6}{x^6} + \frac{20}{3}x^{20}$

D $\frac{1}{x^7} + \frac{1}{3}x^{19}$



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Q5: Find $\frac{dy}{dx}$, given that $y = 7x^5 + \frac{1}{x^6}$.

A $35x^5 - \frac{6}{x^6}$

B $35x^6 - \frac{6}{x^7}$

C $35x^5 + \frac{6}{x^6}$

D $35x^4 - \frac{6}{x^7}$

E $7x^4 + \frac{1}{x^5}$

Q6: Find $\frac{dy}{dx}$, given that $y = 22x^4$.

A $88x^5$

B $88x^3$

C $22x^5$

D $88x^4$

Q7: Determine the first derivative of the function $y = 2x(9x^2 - 3x) + 10x$.

A $54x^4 - 12x^3 + 10x^2$

B $54x^2 - 12x + 10$

C $18x^2 - 6x + 10$

D $18x^4 - 6x^3 + 10x^2$



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Q8: Evaluate $f'(3)$, where $f(x) = 17x^2 + 52x$.

A 102

B 207

C 154

D 50

E -102

Q9: Differentiate the function $f(t) = 6.3t^5 + 5.2t^2 + 7.3$.

A $f'(t) = 31.5t^6 + 10.4t^3 + 7.3t$

B $f'(t) = 6.3t^4 + 5.2t$

C $f'(t) = 6.3t^6 + 5.2t^3 + 7.3t$

D $f'(t) = 31.5t^4 + 10.4t$

E $f'(t) = 25.2t^4 + 5.2t$

Q10: Given that $y = 3x^7e^{-6}$, determine $\frac{dy}{dx}$.

A $3x^6e^{-6}$

B $21x^6e^{-6}$

C $-\frac{18x^7}{e^6} + \frac{21x^6}{e^6}$

D $-\frac{18x^7}{e^6} + \frac{3x^6}{e^6}$

Q11: Find $\frac{dy}{dx}$ if $y = 2x^{-7}$.

A $-14x^{-8}$

B $2x^{-8}$

C $-14x^{-6}$

D $-16x^{-8}$

Q12: Given that $y = -25x$, determine $\frac{dy}{dx}$.

A -25

B $-\frac{25}{x}$

C $-\frac{25}{\sqrt{x}}$

D $-25x^2$



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Q13: Evaluate $\frac{d}{dx} \left(\sqrt{3}x^7 + \frac{x^9}{9} + 6\pi \right)$.

A $7\sqrt{3}x^6 + 8x^8$

B $7\sqrt{3}x^6 + \frac{8}{9}x^8$

C $7\sqrt{3}x^6 + x^8 + 6$

D $7\sqrt{3}x^6 + x^8$

E $\frac{\sqrt{3}}{7}x^6 + \frac{x^8}{81}$



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Q14: Find the first derivative of the function $f(x) = -2x + 10$.

A 2

B $-2x^2 + 10x$

C -2

D $-2x$

E $-2x^2$



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Q15: Find the first derivative of the function $y = x^4 - \frac{x^3}{4} - 3x + 6$.



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A $4x^3 - \frac{3x^2}{4} - 3$

B $x^3 - \frac{x^2}{4} - 3$

C $3x^3 - \frac{x^2}{2} - 3$

D $4x^5 - \frac{3x^4}{4} - 3x^2 + 6x$

Q16: Find the first derivative of the function $y = (x^2 + 8)(3x^3 - 8x + 6)$.



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A $18x^5 + 48x^2 + 12x - 64$

B $15x^4 + 48x^2 + 12x - 64$

C $12x^4 + 32x^2 + 6x - 64$

D $3x^4 + 16x^2 + 6x - 64$

Q17: Find $\frac{dy}{dx}$, given that $y = -8x^9 - 4x^5 + 3x + 5$.



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A $-72x^8 - 20x^4 + 3$

B $-72x^9 - 20x^5 + 3$

C $-72x^{10} - 20x^6$

D $-8x^8 - 4x^4 + 3$

Q18: Evaluate $\frac{d}{dx}(-3x^2 - 4x + 5)$.

A $-9x^3 - 4$

B $-3x - 4$

C $-6x - 4$

D $-9x^3 - 4x$



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Q19: Given that $f(x) = -x^2 + mx + 1$, determine m if $f'(3) = 1$.

A -7

B 1

C 5

D 7

E 3

Q20: If the function $f(x) = -3x^9 - 5$, find $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$.

A $-27x^9$

B $-27x^8$

C -27

D $-3x^9$

E $-27x^8 - 5h$



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Q21: Find $\frac{dy}{dx}$ if $y = \frac{6\sqrt{x}}{7}$.

A $-\frac{3}{7\sqrt{x}}$

B $\frac{6}{7\sqrt{x}}$

C $\frac{3}{7\sqrt{x}}$

D $\frac{3\sqrt{x}}{7}$

Q22: If $y = 5(\cos^2 2x + \sin^2 2x)$, find $\frac{dy}{dx}$.

A $20(\cos 2x + \sin 2x)$

B $40 \cos 2x \sin 2x$

C $-20(\sin 2x - \cos 2x)$

D 0



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Q23: If $y = 15 \sin^2 8x - 15 \cos^2 8x$, find $\frac{dy}{dx}$.

A $240 \sin 16x$

B $-15 \sin 16x$

C $-240 \sin 16x$

D 0

E $15 \sin 16x$



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Q24: Find $\frac{dy}{dx}$, given that $y = -\frac{43}{x^8}$.

A $-\frac{43}{x^7}$

B $-\frac{344}{x^7}$

C $-\frac{344}{x^8}$

D $\frac{344}{x^9}$



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Q25: Find $\frac{dy}{dx}$, given that $y = 3x^4 + 4x^2 + 6 - \frac{7}{x^7} - \frac{8}{x^8}$.

A $12x^3 + 8x + 6 + \frac{49}{x^6} + \frac{64}{x^7}$

B $9x^3 + 4x + \frac{56}{x^8} + \frac{72}{x^9}$

C $12x^3 + 8x + 6 + \frac{49}{x^8} + \frac{64}{x^9}$

D $3x^3 + 4x + \frac{7}{x^8} + \frac{8}{x^9}$

E $12x^3 + 8x + \frac{49}{x^8} + \frac{64}{x^9}$



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