

Differentiation Rules - Key

In problems 1-24, find the derivative of the function

1. $f'(x) = 0$	2. $f'(x) = 12x^3$
3. $f'(x) = 35x^4 - 2$	4. $f'(x) = \frac{10}{3}x$
5. $f'(x) = 8$	6. $f'(x) = 4x^3 - 4x$
7. $f'(x) = \frac{-3}{x^4} + 4$ <i>or</i> $f'(x) = \frac{4x^4 - 3}{x^4}$	8. $f'(x) = 14x + 3$
9. $f'(x) = \frac{-1}{x^2} + 3$ <i>or</i> $f'(x) = \frac{3x^2 - 1}{x^2}$	10. $f'(x) = \frac{3}{5x^5}$
11. $f'(x) = \frac{1}{4x^{\frac{3}{4}}} + 1$ <i>or</i> $f'(x) = \frac{4x^{\frac{3}{4}} + 1}{4x^{\frac{3}{4}}}$	12. $f'(x) = \frac{-10}{x^3} + \frac{1}{x^2}$ <i>or</i> $f'(x) = \frac{x - 10}{x^3}$
13. $f'(x) = \frac{-24}{x^7}$	14. $f'(x) = \frac{-4}{9x^7}$
15. $f'(x) = 32x$	16. $f'(x) = \frac{3}{2\sqrt{x}}$
17. $f'(x) = \frac{\sqrt[3]{7}}{3x^3}$	18. $f'(x) = \frac{-1}{12x^{\frac{7}{6}}}$
	20.

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<p>19.</p> $f'(x) = 3x^2 + \frac{21}{x^4} - \frac{4}{x^3}$ <p><i>or</i></p> $f'(x) = \frac{3x^6 - 4x + 21}{x^4}$	$f'(x) = 3x^2 - 2x + \frac{3}{x^2}$ <p><i>or</i></p> $f'(x) = \frac{3x^4 - 2x^3 + 3}{x^2}$
<p>21.</p> $f'(x) = \frac{3}{8x^{\frac{5}{8}}} - 2$ <p><i>or</i></p> $f'(x) = \frac{-16x^{\frac{5}{8}} + 3}{8x^{\frac{5}{8}}}$	<p>22. $f'(x) = 2x - 2$</p>
<p>23.</p> $f'(x) = \frac{-3}{x^4} + \frac{16}{x^5} - \frac{10}{x^6}$ <p><i>or</i></p> $f'(x) = \frac{-3x^2 + 16x - 10}{x^6}$	<p>24.</p> $f'(x) = 3x^2 - 6x - \frac{2}{x^2}$ <p><i>or</i></p> $f'(x) = \frac{3x^4 - 6x^3 - 2}{x^2}$

In problems 25-28, find the slope of the graph at the given point

25. $m = -1$	26. $m = 26$
27. $m = \frac{1}{12}$	28. $m = \frac{-1}{4}$

In problems 29-31, find the equation of the tangent line at the given point

29. $y = 9x - 2$	30. $y = \frac{1}{20}x - \frac{3}{5}$
31. $y = -4x$	

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In problems 32-33, find the point(s) at which the graph has a horizontal tangent line

32. (2,38), (6,6)	33. (5,-19)
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