

# WHAT DID THE NINJA TURTLES SAY WHEN HANDED THE EXPRESSION $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ ?

For each function evaluate  $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ .

|  |   |  |
|--|---|--|
| $\lim_{h \rightarrow 0} \frac{1) \ f(x) = 3x + 2}{[3(x+h) + 2] - (3x + 2)}$                          | $\lim_{h \rightarrow 0} \frac{2) \ f(x) = 4x - 3}{[4(x+h) - 3] - (4x - 3)}$           | $\lim_{h \rightarrow 0} \frac{3) \ f(x) = x^2}{(x+h)^2 - x^2}$ |
| $\lim_{h \rightarrow 0} \frac{4) \ f(x) = x^2 - 5}{[(x+h)^2 - 5] - (x^2 - 5)}$                       | $\lim_{h \rightarrow 0} \frac{5) \ f(x) = 3x^2 + x}{[3(x+h)^2 + (x+h)] - (3x^2 + x)}$ | $\lim_{h \rightarrow 0} \frac{6) \ f(x) = x^3}{(x+h)^3 - x^3}$ |
| $\lim_{h \rightarrow 0} \frac{7) \ f(x) = 4x^2 + 2x - 7}{[4(x+h)^2 + 2(x+h) - 7] - (4x^2 + 2x - 7)}$ | $\lim_{h \rightarrow 0} \frac{8) \ f(x) = x^4 + 1}{[(x+h)^4 + 1] - (x^4 + 1)}$        |  |

Limits.

|                     |                     |                   |                     |                 |
|---------------------|---------------------|-------------------|---------------------|-----------------|
| A. $f'(x) = 6x + 1$ | C. $f'(x) = 4x + 2$ | D. $f'(x) = 4x^3$ | E. $f'(x) = 2x$     | F. $f'(x) = 3x$ |
| I. $f'(x) = 3$      | K. $f'(x) = 4x$     | R. $f'(x) = 3x^2$ | T. $f'(x) = 8x + 2$ | V. $f'(x) = 4$  |

|   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |   |   |   |
| 8 | 3 | 6 | 1 | 2 | 5 | 7 | 1 | 2 | 4 |

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