

**Topic:** Chain rule with power rule

**Question:** Apply power rule and chain rule to find the derivative.

$$y = (5x^2 + 2x - 8)^5$$

**Answer choices:**

- A  $y' = (5x + 2)(5x^2 + 2x - 8)^4$
- B  $y' = (50x + 10)(5x^2 + 2x - 8)^5$
- C  $y' = (50x + 10)(5x^2 + 2x - 8)^4$
- D  $y' = (50x - 10)(5x^2 + 2x - 8)^4$



**Solution: C**

Use substitution with  $u = 5x^2 + 2x - 8$  and  $u' = 10x + 2$ , and rewrite the function with the substitution.

$$y = u^5$$

Then the derivative is

$$y' = 5u^4u'$$

Back-substitute.

$$y' = 5(5x^2 + 2x - 8)^4(10x + 2)$$

$$y' = (50x + 10)(5x^2 + 2x - 8)^4$$



**Topic:** Chain rule with power rule

**Question:** Apply power rule and chain rule to find the derivative.

$$f(x) = 8(6x^2 + 2)^4$$

**Answer choices:**

A  $f'(x) = 384x(6x^2 + 2)^3$

B  $f'(x) = 384(6x^2 + 2)^3$

C  $f'(x) = 32x(6x^2 + 2)^3$

D  $f'(x) = 32(6x^2 + 2)^3$



**Solution: A**

Use substitution with  $u = 6x^2 + 2$  and  $u' = 12x$ , and rewrite the function with the substitution.

$$f(x) = 8u^4$$

Then the derivative is

$$f'(x) = 32u^3u'$$

Back-substitute.

$$f'(x) = 32(6x^2 + 2)^3(12x)$$

$$f'(x) = 384x(6x^2 + 2)^3$$



**Topic:** Chain rule with power rule

**Question:** Apply power rule and chain rule to find the derivative.

$$f(y) = (y^3 + 1)^{25}$$

**Answer choices:**

A  $f'(y) = (3y^2)^{25}$

B  $f'(y) = 25(y^3 + 1)^{24}$

C  $f'(y) = 75y^2(y^3 + 1)^{24}$

D  $f'(y) = 25(3y^2)^{24}$



**Solution: C**

Use substitution with  $u = y^3 + 1$  and  $u' = 3y^2$ , and rewrite the function with the substitution.

$$f(y) = u^{25}$$

Then the derivative is

$$f'(y) = 25u^{24}u'$$

Back-substitute.

$$f'(y) = 25(y^3 + 1)^{24}(3y^2)$$

$$f'(y) = 75y^2(y^3 + 1)^{24}$$

