Topic: Power rule for negative powers

Question: Differentiate the function.

$$f(x) = x^{-2}$$

Answer choices:

A $\quad f'(x) = -3x^{-2}$

B $\quad f'(x) = -2x^{-3}$

C $\quad f'(x) = -2x^{-2}$

D $\quad f'(x) = -2x^{-1}$

Solution: B

Apply power rule to differentiate the function.

$$f'(x) = -2x^{-2-1}$$

$$f'(x) = -2x^{-3}$$

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Question: Differentiate the function.

$$f(x) = 3x^{-5} - 4$$

Answer choices:

A $f'(x) = -12x^{-6}$

B $f'(x) = -15x^{-4}$

C $f'(x) = -5x^{-6}$

D $f'(x) = -15x^{-6}$

Solution: D

Apply power rule to differentiate the equation, one term at a time.

$$f'(x) = 3(-5)x^{-5-1} - 0$$

$$f'(x) = -15x^{-6}$$

Topic: Power rule for negative powers

Question: Differentiate the function.

$$f(x) = \frac{4}{x^2} - \frac{6}{x} + 2$$

Answer choices:

A $\quad f'(x) = -8x^{-3} + 6x^{-2}$

B $\quad f'(x) = -8x^{-4} + 6x^{-3}$

C $\quad f'(x) = -2x^{-3} + x^{-2}$

D $\quad f'(x) = -8x^{-2} + 6x^{-1}$

Solution: A

First, rewrite the fractions by changing the signs of the exponents.

$$f(x) = 4x^{-2} - 6x^{-1} + 2$$

Apply power rule to differentiate the equation, one term at a time.

$$f'(x) = 4(-2)x^{-2-1} - 6(-1)x^{-1-1} + 0$$

$$f'(x) = -8x^{-3} + 6x^{-2}$$