

Differentiate composite functions using the chain rule

1Find the composite function of $p(d(x))$?

given:

$$d(x) = -2x^2 - 2x + 3$$

$$p(x) = 2 \cdot x^2$$

$$p(d(x)) = ?$$

A $p(d(x)) = -2(2 \cdot x^2)^2 - 2(2 \cdot x^2) + 3$

B $p(d(x)) = 2 \cdot (-2x^2 - 2x + 3)^2$

2Find the derivative $f'(x)$ using the natural exponential rule and the chain rule.

$$\frac{d}{dx} e^u = e^u \cdot \frac{du}{dx}$$

$$[12pt] f(x) = 5e^x$$

A $f'(x) = 5e^x$

B $f'(x) = 5e^x \cdot (x)$

C $f'(x) = 5(x)e^{x-1}$

3Find the derivative $f'(x)$ using the chain rule.

$$\text{if } y = f(g(x)), y' = f'(g(x)) \cdot g'(x)$$

$$[12pt] f(x) = (-x - 7)^2$$

A $f'(x) = -2(-x - 7)^2$

B $f'(x) = -(-x - 7)$

C $f'(x) = -2(-x - 7)$

D $f'(x) = 2(-x - 7)$

4Find the derivative $f'(x)$ using the chain rule.

$$\text{if } y = f(g(x)), y' = f'(g(x)) \cdot g'(x)$$

$$[12pt] f(x) = (2x - 2)^{-\frac{1}{3}}$$

A $f'(x) = -\frac{1}{3}(2x - 2)^{-\frac{4}{3}}$

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

C $f'(x) = -\frac{2}{3}(2x - 2)^{-\frac{1}{3}}$

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

5Find the derivative $f'(x)$ using the chain, natural exponential, and general exponential rules.

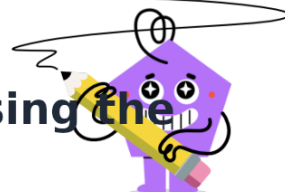
$$f(x) = (4e^x + 2 \cdot 5^x)^4$$

A $f'(x) = 4(4e^x + 2 \cdot 5^x)^3 \cdot (4e^x + 2 \cdot 5^x \ln 5)$

B $f'(x) = 4(4e^x + 2 \cdot 5^x)^4 \cdot (4e^x + 2 \cdot 5^x \ln 5)$

C $f'(x) = 4(4e^x + 2 \cdot 5^x)^3$

D $f'(x) = (4e^x + 2 \cdot 5^x)^3 \cdot (4e^x + 2 \cdot 5^x \ln 5)$



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Find the derivative $f'(x)$ using the general exponential rule and the chain rule.

$$f(x) = 2 \cdot 5^{x^2}$$

A

$$f'(x) = 2 \cdot 5^{x^2} \ln 5 \cdot (x^2)$$

B

$$f'(x) = 2 \cdot 5^{x^2} \cdot 2x$$

C

$$f'(x) = 2 \cdot 5^{x^2} \ln 5 \cdot 2x$$

D

$$f'(x) = 2 \cdot 5^{x^2} \ln 5$$

7

Find the derivative $f'(x)$ using the trigonometric rules and the chain rule.

$$f(x) = \cos\left(\frac{1}{x^3}\right)$$

A

$$f'(x) = -\sin\left(\frac{1}{x^3}\right) \cdot \left(\frac{1}{x^3}\right)$$

B

$$f'(x) = -\sin\left(\frac{1}{x^3}\right)$$

C

$$f'(x) = \cos\left(\frac{1}{x^3}\right) \cdot \left(-\frac{3}{x^4}\right)$$

D

$$f'(x) = -\sin\left(\frac{1}{x^3}\right) \cdot \left(-\frac{3}{x^4}\right)$$

8

Find the derivative $f'(x)$ using the trigonometric rules and the chain rule.

$$f(x) = 4 \cos(3x^2 - 2x)$$

A

$$f'(x) = 4 \cos(3x^2 - 2x) \cdot (6x - 2)$$

B

$$f'(x) = -4 \sin(3x^2 - 2x) \cdot (6x - 2)$$

C

$$f'(x) = -4 \sin(3x^2 - 2x)$$

D

$$f'(x) = -4 \sin(3x^2 - 2x) \cdot (3x^2 - 2x)$$

9

Find the derivative $f'(x)$ using the chain rule.

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

A

$$f'(x) = -2(2x^2 + 2)^{-3}(4x)$$

B

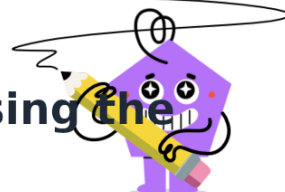
$$f'(x) = (2x^2 + 2)^{-3}(4x)$$

C

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

D

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



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10Find the derivative $f'(x)$ using the chain rule.

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

A

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

B

$$f'(x) = 3(3x - 2)^{\frac{1}{3}}$$

C

$$f'(x) = 4(3x - 2)^{\frac{1}{3}}$$

D

$$f'(x) = \frac{4}{3}(3x - 2)^{\frac{1}{3}}$$

11Find the derivative $f'(x)$ using the chain rule.

$$f(x) = (-3x^2 - 5)^{-\frac{3}{2}}$$

A

$$f'(x) = -\frac{3}{2}(-3x^2 - 5)^{-\frac{5}{2}}(-6x)$$

B

$$f'(x) = (-3x^2 - 5)^{-\frac{5}{2}}(-6x)$$

C

$$f'(x) = -\frac{3}{2}(-3x^2 - 5)^{-\frac{3}{2}}(-6x)$$

D

$$f'(x) = -\frac{3}{2}(-3x^2 - 5)^{-\frac{5}{2}}$$

12Find the derivative $f'(x)$ using the chain rule.

$$f(x) = (2x^2 - 5)^4$$

A

$$f'(x) = 4(2x^2 - 5)^4(4x)$$

B

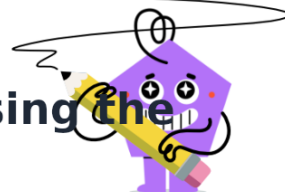
$$f'(x) = 4(2x^2 - 5)^3(4x)$$

C

$$f'(x) = (2x^2 - 5)^3(4x)$$

D

$$f'(x) = 4(2x^2 - 5)^3$$



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13Find the derivative $f'(x)$ using the chain, general exponential, and trigonometric rules.

$$\text{if } y = f(g(x)), \quad y' = f'(g(x)) \cdot g'(x)$$

$$[12pt] f(x) = (2 \cdot 8^x + 4 \sin(x))^{\frac{1}{3}}$$

A

$$f'(x) = (2 \cdot 8^x + 4 \sin(x))^{-\frac{2}{3}} \cdot (2 \cdot 8^x \ln 8 + 4 \cos(x))$$

B

$$f'(x) = \frac{1}{3} (2 \cdot 8^x + 4 \sin(x))^{\frac{1}{3}} \cdot (2 \cdot 8^x \ln 8 + 4 \cos(x))$$

C

$$f'(x) = \frac{1}{3} (2 \cdot 8^x + 4 \sin(x))^{-\frac{2}{3}}$$

D

$$f'(x) = \frac{1}{3} (2 \cdot 8^x + 4 \sin(x))^{-\frac{2}{3}} \cdot (2 \cdot 8^x \ln 8 + 4 \cos(x))$$

14Find the derivative $f'(x)$ using the chain, general exponential, and trigonometric rules.

$$f(x) = \frac{1}{(2^x + 4 \sin(x))^2}$$

A

$$f'(x) = (2^x + 4 \sin(x))^{-3} \cdot (2^x \ln 2 + 4 \cos(x))$$

B

$$f'(x) = -2(2^x + 4 \sin(x))^{-2} \cdot (2^x \ln 2 + 4 \cos(x))$$

C

$$f'(x) = -2(2^x + 4 \sin(x))^{-3}$$

D

$$f'(x) = -2(2^x + 4 \sin(x))^{-3} \cdot (2^x \ln 2 + 4 \cos(x))$$

15Find the derivative $f'(x)$ using the general exponential rule and the chain rule.

$$f(x) = 3 \cdot 5^{2x^4 - 2x^2}$$

A

$$f'(x) = 3 \cdot 5^{2x^4 - 2x^2} \ln 5$$

B

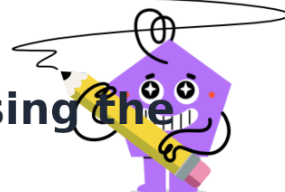
$$f'(x) = 3 \cdot 5^{2x^4 - 2x^2} \ln 5 \cdot (8x^3 - 4x)$$

C

$$f'(x) = 3 \cdot 5^{2x^4 - 2x^2} \ln 5 \cdot (2x^4 - 2x^2)$$

D

$$f'(x) = 3 \cdot 5^{2x^4 - 2x^2} \cdot (8x^3 - 4x)$$



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Find the derivative $f'(x)$ using the natural exponential rule and the chain rule.

$$\frac{d}{dx} e^u = e^u \cdot \frac{du}{dx}$$

$$[12pt] f(x) = e^{2x^3 - x}$$

A

$$f'(x) = (2x^3 - x)e^{2x^3 - x - 1}$$

B

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

C

$$f'(x) = e^{2x^3 - x} \cdot (6x^2 - 1)$$

D

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

17

Find the derivative $f'(x)$ using the chain, natural exponential, and trigonometric rules.

$$\text{if } y = f(g(x)), \quad y' = f'(g(x)) \cdot g'(x)$$

$$[12pt] f(x) = (5e^x + 3\sin(x))^3$$

A

$$f'(x) = 3(5e^x + 3\sin(x))^3 \cdot (5e^x + 3\cos(x))$$

B

$$f'(x) = (5e^x + 3\sin(x))^2 \cdot (5e^x + 3\cos(x))$$

C

$$f'(x) = 3(5e^x + 3\sin(x))^2$$

D

$$f'(x) = 3(5e^x + 3\sin(x))^2 \cdot (5e^x + 3\cos(x))$$

18

Find the derivative $f'(x)$ using the trigonometric rules and the chain rule.

$$\frac{d}{dx} \cos(u) = -\sin(u) \cdot \frac{du}{dx}$$

$$[12pt] f(x) = 4\cos(2\sqrt{x})$$

A

$$f'(x) = -4\sin(2\sqrt{x}) \cdot (2\sqrt{x})$$

B

$$f'(x) = 4\cos(2\sqrt{x}) \cdot \frac{1}{\sqrt{x}}$$

C

$$f'(x) = -4\sin(2\sqrt{x}) \cdot \frac{1}{\sqrt{x}}$$

D

$$f'(x) = -4\sin(2\sqrt{x})$$

19

Find the derivative $f'(x)$ using the chain rule.

$$f(x) = \frac{1}{\sqrt[3]{(x^2 - 4)}}$$

A

$$f'(x) = -\frac{1}{3}(x^2 - 4)^{-\frac{4}{3}}(2x)$$

B

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

C

$$f'(x) = -\frac{1}{3}(x^2 - 4)^{-\frac{1}{3}}(2x)$$

D

$$f'(x) = -\frac{1}{3}(x^2 - 4)^{-\frac{4}{3}}$$