

1) Find the derivative of the function below.

$$f(x) = x^3 \sin(x)$$

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

2) Find $\frac{d^3}{dx^3} 5^x$.

$$y' = 5^x \ln(5); y'' = 5^x \ln(5) \ln(5); y''' = 5^x \ln(5) \ln(5) \ln(5)$$

$$\frac{d^3}{dx^3} 5^x = 5^x (\ln(5))^3$$

3) Find eighth derivative of the function below.

$$f(x) = (2x + 1)^{10}$$

$$f'(x) = 10(2x + 1)^9 \cdot 2; f''(x) = 10 \cdot 9(2x + 1)^8 \cdot 2^2; \dots$$

$$f^{(8)} = 10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot (2x + 1)^2 \cdot 2^8$$

4) On the graph given, sketch the derivative of the function provided.

