

Derivatives of Basic Functions Worksheet - Answer Key

1. Find $f'(x)$ for $f(x) = 2x^3 - (-2x) + \pi$.

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

6. Find $\frac{d}{dz} (\sin(\pi) \sin(z) + \ln(5y))$.

$$\frac{1}{y}$$

2. Find $\frac{dg}{dy}$ for $g(y) = 2 \sin(y) + \tan(\pi) + 3y^2$.

$$\frac{dg}{dy} = 2 \cos(y) + 6y$$

7. Find $l'(x)$ is $l(x) = \sqrt{x} (x^2 + \frac{1}{x})$.

$$l'(x) = \frac{5}{2}x^{3/2} - \frac{1}{2}x^{-3/2}$$

3. Find $\frac{dw}{dz}$ for $w(z) = \pi^z - z^\pi$.

$$\frac{dw}{dz} = \ln(\pi)\pi^z - \pi z^{\pi-1}$$

8. Find $\frac{d}{du} (4x^{100} - 6x^7 + 9x + \ln(2))$.

$$400x^{99} - 47x^6 + 9$$

4. Find $h'(u)$ for $h(u) = \ln(u^2)$.

$$h(u) = 2 \ln(u) \implies h'(u) = \frac{2}{u}$$

9. Find $[x^2 + e^x + |x|]'$.

The function is not differentiable.

5. Find $\lim_{h \rightarrow 0} \frac{f(a+h) - f(a)}{h}$ for $f(x) = \frac{2}{x^2} - 4x^2$.

$$\frac{-4}{x^3} - 8x$$

10. Find $u'(x)$ if $u(x) = \frac{x^3 - x \cos(x)}{x}$.

$$u(x) = x^2 - \cos(x) \implies u'(x) = 2x + \sin(x)$$

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