

## Advanced Order of Operations: Examples

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| I. $2 + 5x^3 = 2 + (5(x^3)) \neq 2 + (5x)^3 = 2 + 5^3x^3$<br>Ex: $x=2$ : $2 + 5(2)^3 = 42$                   | $2 + (5 \cdot 2)^3 = 1002$                     |
| II. $\sin 3x = \sin(3x) \neq (\sin 3)x = x \sin 3$<br>Ex: $x = \frac{\pi}{2}$ ; $\sin 3(\frac{\pi}{2}) = -1$ | $(\sin 3)\frac{\pi}{2} = \frac{\pi \sin 3}{2}$ |
| III. $\ln x^3 = \ln(x^3) = 3 \ln x \neq (\ln x)^3 = (\ln x)(\ln x)(\ln x)$<br>Ex: $x=2$ : $\ln 2^3 = \ln 8$  | $(\ln 2)^3 = (\ln 2)(\ln 2)(\ln 2)$            |
| IV. $-x^2 = -(x^2) \neq (-x)^2 = x^2$  |  |
| V. $\sin \pi^2 = \sin(\pi^2) \neq (\sin \pi)^2 = \sin^2 \pi$   |  |
| VI. $\ln 2x = \ln(2x) \neq (\ln 2)x = x \ln 2 = \ln 2^x$<br>Ex $x=3$ : $\ln 2 \cdot 3 = \ln 6$               | $(\ln 2)^3 = \ln 2^3 = \ln 8$                  |
| VII. $\ln 2x + 1 = (\ln(2x)) + 1 \neq \ln(2x+1) \neq \ln 2x + \ln 1$   |  |
| VIII. $e^{7x} = e^{(7x)} = (e^7)^x \neq e^7 e^x = e^{7+x}$   |  |
| IX. $e^{2^x} = e^{(2^x)} \neq (e^2)^x = e^{2x} = e^x e^x$  |  |
| X. $f(x) = x \sin x + x^2$<br>$f(a+2) = (a+2) \sin(a+2) + (a+2)^2 \neq a+2 \sin a+2 + a^2 + 2^2$             |  |
| XI. $3x^y = 3(x^y) \neq (3x)^y = 3^y x^y$  |  |