COMMON ERRORS IN ALGEBRA

General Error	Specific Example of General Error (left side $\neq$ right side)
$\frac{\cancel{a}+bx}{\cancel{a}} \neq 1+bx$ The correct solution is: $\frac{a+bx}{a} = \frac{a}{a} + \frac{bx}{a} = \boxed{1 + \frac{bx}{a}}$ *Note: think of the correct solution as* $\frac{1}{a}(a+bx) = \frac{1}{a}(a) + \frac{1}{a}(bx)$. *This is the Distributive Property of Mult. over Addition.*	*Let: a=2, b=3, and x=4* $\frac{2+3(4)}{2} \neq 1+3(4)$ $\frac{2+12}{2} \neq 1+12$ $\frac{14}{2} \neq 13$ $7 \neq 13$
$\frac{a}{x+y} \neq \frac{a}{x} + \frac{a}{y}$ It is incorrect to separate the demoninator into two different fractions. *Note: work with x+y as (x+y).*	*Let: a=4, x=1, and y=2* $\frac{4}{1+2} \neq \frac{4}{1} + \frac{4}{2}$ $\frac{4}{3} \neq 4+2$ $\frac{4}{3} \neq 6$
$(x^a)^b \neq x^{a+b}$ *Note: this is a common error. Don't confuse this with the valid rule:* $x^a \cdot x^b = x^{a+b}$. The equation should be: $(x^a)^b = \boxed{x^{ab}}$	*Let: x=2, a=2, and b=3* $(2^2)^3 \neq 2^5$ $(4)^3 \neq 32$ $64 \neq 32$
$a - b(x-1) \neq a - bx - b$ Remember to use the distributive property here. The equation should be: $a - b(x-1) = \boxed{a - bx + b}$ *Note: think of* $a - b(x-1)$ *as* $a - b(x) - b(-1)$.	*Let: a=8, b=2, and x=3* $8 - 2(3-1) \neq 8 - 2(3) - 2$ $8 - 2(2) \neq 8 - 6 - 2$ $8 - 4 \neq 2 - 2$ $4 \neq 0$

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GENERAL ERROR	SPECIFIC EXAMPLE OF GENERAL ERROR (LEFT SIDE ≠ RIGHT SIDE)
$\mathbf{\dfrac{\left(\frac{x}{a}\right)}{b} \neq \dfrac{bx}{a}}$ To divide fractions, multiply both numerator and denominator by the reciprocal of the denominator. $\dfrac{\left(\frac{x}{a}\right)}{b} = \dfrac{\left(\frac{x}{a}\right)\bullet\frac{1}{b}}{\left(\frac{b}{1}\right)\bullet\frac{1}{b}} = \left(\frac{x}{a}\right)\bullet\left(\frac{1}{b}\right) = \boxed{\frac{x}{ab}}$	*Let: x=18, a=3, and b=2* $\dfrac{\left(\frac{18}{3}\right)}{2} \neq \dfrac{2(18)}{3}$ $\frac{6}{2} \neq \frac{36}{3}$ $3 \neq 12$
$\mathbf{x^{-a} + x^{-b} \neq \dfrac{1}{x^a + x^b}}$ Since $x^{-a} = \frac{1}{x^a}$ and $x^{-b} = \frac{1}{x^b}$, we want to rewrite each separately. The equation should be: $x^{-a} + x^{-b} = \boxed{\frac{1}{x^a} + \frac{1}{x^b}}$	*Let: x=2, a=2, and b=3* $2^{-2} + 2^{-3} \neq \dfrac{1}{2^2 + 2^3}$ $\frac{1}{2^2} + \frac{1}{2^3} \neq \frac{1}{4 + 8}$ $\frac{1}{4} + \frac{1}{8} \neq \frac{1}{12}$ $\frac{2}{8} + \frac{1}{8} \neq \frac{1}{12}$ $\frac{3}{8} \neq \frac{1}{12}$
$\mathbf{\sqrt{x^2 + a^2} \neq x + a}$ *Note: don't let this get confused with* $\sqrt{(x + a)^2} = \sqrt{(x + a)(x + a)} = x + a$	*Let: x=3 and a=4* $\sqrt{3^2 + 4^2} \neq 3 + 4$ $\sqrt{9 + 16} \neq 7$ $\sqrt{25} \neq 7$ $5 \neq 7$
$\mathbf{\sqrt{-x^2 + a^2} \neq -\sqrt{x^2 - a^2}}$ *Note: It is not valid to factor -1 out of square roots, but it is valid to factor out* $\sqrt{-1}$ *:* $\sqrt{-x^2 + a^2} = \sqrt{(-1)(x^2 - a^2)} = \sqrt{-1}\sqrt{x^2 - a^2}$ *(* $\sqrt{-1}$ *= i, which is an imaginary number.)*	*Let: x=5 and a=3* $\sqrt{-5^2 + 3^2} \neq -\sqrt{5^2 - 3^2}$ $\sqrt{-25 + 9} \neq -\sqrt{25 - 9}$ $\sqrt{-16} \neq -\sqrt{16}$ [not a real number] $\neq -4$

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