

Commonly Missed Algebra Facts

1. $\sqrt{x^2 + a^2} \neq x + a$, $\sqrt{x^2 - a^2} \neq x - a$

Put in nonzero numbers for x and a and you will see this fact.

Graph $Y1 = \sqrt{x^2 + a^2}$, $Y2 = x + a$ for any nonzero a . They are not the same.

You should always remember the graph of $y = \sqrt{a^2 - x^2}$ is a semicircle, but $y = a - x$ is a line.

In general, exponents do not distribute over sums and differences. For another example

$\sqrt[3]{x^3 + 8} \neq x + 2$. That is $(x^3 + 8)^{1/3} \neq x + 2$.

2. Always use parentheses when multiplying by a sum or difference.

$a(x + 1) = ax + a$.

If you lazily write $a x + 1$, this is not an equal expression.

Students sometimes misread their own work! Do this even if a is a minus sign, in which case $a = -1$. Write $5 - (x + 1) = 5 - x - 1$

3. Dividing by sums: This really belongs in part 1.

$\frac{1}{x + a} \neq \frac{1}{x} + \frac{1}{a}$ That is $(x + a)^{-1} \neq x^{-1} + a^{-1}$ Try it with nonzero numbers.

4. Cancellation in division: You can't cancel until you factor it out of the numerator and the denominator.

You cannot cancel the x in either of the expressions $\frac{x + 2}{x + 4}$, $\frac{x}{x + 2}$.

However you can cancel x from $\frac{x^2 + 2x}{x^2 + 4x} = \frac{x(x + 2)}{x(x + 4)} = \frac{x + 2}{x + 4}$ if $x \neq 0$.