Common Algebra Mistakes

	WRONG	Right

1) $(a+b)^2$ $\neq a^2 + b^2$

$$(a+b)^2 = (a+b)(a+b)$$
$$= a^2 + 2ab + b^2$$

2) $\sqrt{a+b}$ $\neq \sqrt{a} + \sqrt{b}$

$\sqrt{a+b}$ you have to leave it

3) $\dfrac{\sqrt{a}}{b}$ $\neq \dfrac{a}{b^2}$

when you square
$$\left(\frac{\sqrt{a}}{b}\right)^2 = \frac{a}{b^2} \neq \frac{\sqrt{a}}{b}$$

i.e. usually $x^2 \neq x$

4) $\dfrac{ab+b}{b}$ $\neq \dfrac{ab+b}{b} \neq ab$

$\neq \dfrac{ab+b}{b} \neq a+b$

$\neq \dfrac{ab+b}{b} \neq \dfrac{ab+1}{b}$

$$\frac{ab+b}{b} = \frac{b(a+1)}{b}$$
$$= a+1$$

Algebra mistake examples

1) $(5+x)^2 - 25$

$$= 25 + 10x + x^2 - 25$$

$$= 10x + x^2$$

Good!

NOT $(5+x)^2 - 25$

$$\neq \underline{25 + x^2 - 25}$$

$$= x^2$$

BAD!

2) $\sqrt{25 + x^2} - 5$

$$= \frac{\sqrt{25+x^2} - 5}{1} \cdot \frac{\sqrt{25+x^2} + 5}{\sqrt{25+x^2} + 5}$$

$$= \frac{25 + x^2 - 25}{\sqrt{25+x^2} + 5}$$

$$= \frac{x^2}{\sqrt{25+x^2} + 5}$$

you could just leave
it as it was too;
it depends on what
you're trying to do

NOT $\sqrt{25+x^2} - 5$

$$\neq \underline{\sqrt{25} + \sqrt{x^2}} - 5$$

$$= 5 + x - 5$$

$$= x$$

BAD

3) $\dfrac{\sqrt{25}}{6} = \dfrac{5}{6}$ NOT $\dfrac{\sqrt{25}}{6} \neq \left(\dfrac{\sqrt{25}}{6}\right)^2 = \dfrac{25}{36}$

Good

not equal

$2 \neq 2^2 = 4$

4) $\dfrac{5x + 5}{10}$

$= \dfrac{5(x+1)}{10}$

$= \dfrac{(x+1)}{2}$

Good

NOT $\dfrac{5x + 5}{10} \neq \dfrac{5x}{2}$

or $\dfrac{5x + 5}{10^2} \neq \dfrac{x+5}{2}$

or $\dfrac{5x + 5}{10} \neq \dfrac{5x + 1}{2}$

If you're confused about these examples try plugging in $x = 1$:

1) $(5+1)^2 - 25$

$= 6^2 - 25$

$= 36 - 25$

$= 11$

$(5+1)^2 - 25$

$= 25 + 10(1) + 1^2 - 25$

$= 10(1) + 1 = 11$

Good

$(5+1)^2 - 25$

$\neq 25 + 1 - 25$

$= 1$

Bad