Common Algebra Errors

<u>Terms vs. Factor errors</u>
Many properties apply only to terms or only to factors. Be clear on which is which.

(1) $(ab)^n = a^n b^n$ but $(a+b)^n \neq a^n + b^n$
powers do not “distribute over addition”

(2) $\sqrt{ab} = \sqrt{a}\sqrt{b}$ but $\sqrt{a+b} \neq \sqrt{a} + \sqrt{b}$
cannot “take root term by term”

(3) $\dfrac{3a^{-2}b}{c} = \dfrac{3b}{a^2 c}$ but $\dfrac{3a^{-2}+b}{c} \neq \dfrac{3+b}{a^2 c}$
factors ”jump fraction bar” to change sign of exponent — terms do not

(4) $\dfrac{2xy}{5x} = \dfrac{2\cancel{x}y}{5\cancel{x}} = \dfrac{2y}{5}$ but $\dfrac{2x+y}{5x} \neq \dfrac{2\cancel{x}+y}{5\cancel{x}}$
factors divide out — terms do not “cancel”

(5) 3(x+y)=3x+3y
“multiplication distributes over addition”

$10(0.2x) \neq 10(0.2) \bullet 10x$
but mult does not “distribute over mult”
instead, the associative law applies
$10(0.2x) = (10 \bullet 0.2)x = 2x$

Missing or “invisible” parenthesis

(6) $(-3)^2 = (-3)(-3) = 9$ is not the same as -3^2

$-3^2 = -(3)^2 = -(3 \bullet 3) = -9$

(7) $(5x)^{-2} = \dfrac{1}{(5x)^2} = \dfrac{1}{25x^2}$ is not the same as $5x^{-2}$

$5x^{-2} = 5 \bullet x^{-2} = 5 \bullet \dfrac{1}{x^2} = \dfrac{5}{x^2}$

(8) (x+2)(x+1) is not the same as x+2(x+1)

(9) 3x-(x+1) is not the same as 3x-x+1

Square roots and Absolute Values

(10) $\sqrt{16} = 4$ not ± 4

(11) If $x^2 = 49$ then x = $\pm\sqrt{49} = \pm 7$ not just 7.

(12) $\sqrt{x^2} = |x|$ not just x

Common Algebra Errors Worksheet

Name: ______________________________

Answer True or False. If the answer is false, tell which algebra error is made (according to the given notes) and give the correct simplification/solutions

1) $\sqrt{x^2+16}=x+4$ ______________________________

2) $(\sqrt{x}+3)^2=x+3\sqrt{x}+9$ ______________________________

3) $\frac{x^2y-x}{x^2(x+4)}=\frac{y-x}{x+4}$ ______________________________

4) $\sqrt{25}=\pm 5$ ______________________________

5) $(x+2)^3=x^3+8$ ______________________________

6) If $x^2=32$ then $x=4\sqrt{2}$ ______________________________

7) $7x^{-2}y=\frac{7y}{x^2}$ ______________________________

8) $\sqrt{(x-2)^2}=x-2$ ______________________________

9) $\frac{4y^{-2}-x}{y}=\frac{4-x}{y^3}$ ______________________________

10) $\sqrt{a^2+9b^2}=a+3b$ ______________________________