Name: Solution

Directions: Show all work. No credit for answers without work.

1. [**4 parts, 2 points each**] Simplify the following expressions.

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

$= (a+b)(a+b)$

$= a^2 + ba + ab + b^2$

$= \boxed{a^2 + 2ab + b^2}$

(b) $\frac{a}{b} + \frac{c}{d}$

$= \frac{a}{b} \cdot \frac{d}{d} + \frac{c}{d} \cdot \frac{b}{b}$

$= \boxed{\frac{ad+cb}{bd}}$

(c) $(\sqrt{x})^{-4}$ $= \left(x^{\frac{1}{2}}\right)^{-4}$

$= x^{\frac{-4}{2}}$

$= x^{-2}$

$= \boxed{\frac{1}{x^2}}$

(d) $\frac{1}{1+\frac{1}{x}}$

$= \frac{1}{1+\frac{1}{x}}$ $= \frac{1}{\frac{x}{x}+\frac{1}{x}}$ $= \frac{1}{\frac{x+1}{x}}$

$= \boxed{\frac{x}{x+1}}$

2. [**2 points**] Solve the equation $(x+2)^2 = x+14$ for x. Find all solutions.

$(x+2)^2 = x+14$

$x^2 + 4x + 4 = x + 14$

$x^2 + 3x - 10 = 0$

$(x+5)(x-2) = 0$

$x = -5$ or $x = 2$

Check:

$x=-5$: $(-5+2)^2 = (-5)+14$

$9 = 9$ ✓

$x=2$: $(2+2)^2 = 2+14$

$16 = 16$ ✓

Solns: $\boxed{x=-5,\ x=2}$