Simplifying Rational Expressions

Step 1: Factor the numerator and denominator completely.
Step 2: Cancel common factors.

1. Simplify each expression.

a) $\frac{18}{16x+32} = \frac{\cancel{18}^{\,9}}{8\cancel{16}(x+2)} = \boxed{\frac{9}{8(x+2)}}$

$\frac{16x}{16} + \frac{32}{16}$ GCF = 16

$16(x+2)$

b) $\frac{x^2-25}{x^2+5x-50} = \frac{(x+5)\cancel{(x-5)}}{(x+10)\cancel{(x-5)}} = \boxed{\frac{x+5}{x+10}}$

$x^2 - 25$

$x \quad x \qquad 5 \quad 5$

$(x+5)(x-5)$

$x^2+5x-50$

$(x+10)(x-5)$

c) $\frac{4a+4b}{8a^2-8b^2} = \frac{\cancel{4}^{1}\cancel{(a+b)}}{\cancel{8}_{2}\cancel{(a+b)}(a-b)} = \boxed{\frac{1}{2(a-b)}}$

$\frac{4a}{4} + \frac{4b}{4}$ GCF = 4

$4(a+b)$

$\frac{8a^2}{8} - \frac{8b^2}{8}$ GCF = 8

$8(a^2 - b^2)$

a a b b

$8(a+b)(a-b)$

d) $\frac{4-x^2}{x^2-3x+2} = \frac{(2+x)\cancel{(2-x)}^{-1}}{\cancel{(x-2)}(x-1)} = \boxed{\frac{-1(2+x)}{x-1}}$

$4 - x^2$

2 2 x x

$x^2 - 3x + 2$

$(x-2)(x-1)$

$(2+x)(2-x)$

e) $\frac{3x^2+x}{3x+1} = \frac{x\cancel{(3x+1)}}{\cancel{3x+1}} = \boxed{x}$

$\frac{3x^2}{x} + \frac{x}{x}$ GCF = x

$x(3x+1)$

f) $\frac{x^2-y^2}{(x+y)^2} = \frac{\cancel{(x+y)}(x-y)}{\cancel{(x+y)}(x+y)} = \boxed{\frac{x-y}{x+y}}$

$x^2 - y^2$

$x \quad x \quad y \quad y$

$(x+y)(x-y)$

g) $\frac{x^2+x-56}{x^2+20x+96} = \frac{(x-7)\cancel{(x+8)}}{(x+12)\cancel{(x+8)}} = \boxed{\frac{x-7}{x+12}}$

$x^2 + x - 56$

$(x-7)(x+8)$

$x^2 + 20x + 96$

$(x+12)(x+8)$