① $\frac{3x-1}{x^2-6x-40}$

Domain of Fraction

PSD

$x^2-6x-40=0$

$(x-10)(x+4)=0$

$x-10=0 \quad x+4=0$

$x \neq 10 \quad x \neq -4$

$(-\infty,-4) \cup (-4,10) \cup (10,\infty)$

② $\frac{x^2+3x-5}{5x^2-12x+7}$

$5x^2-12x+7=0$ KEY #

$(5x-7)(x-1)=0$

$5x-7=0 \quad x-1=0$

$5x=7 \quad x \neq 1$

$x \neq \frac{7}{5}$

$(-\infty,1) \cup (1,\frac{7}{5}) \cup (\frac{7}{5},\infty)$

③ $\frac{x-3}{x^2+9}$

$x^2+9=0$

$(-\infty,\infty)$

④ $\frac{a^2-10a+16}{a-2}$ PSD

$\frac{(a-2)(a-8)}{a-2}$

$\frac{(a-2)(a-8)}{a-2}$

$a-8$

Simplifying Rational Expressions

STEP 1: Factor top
Factor bottom

STEP 2: Cancel if possible

⑤ $\frac{w^2-5w-50}{w^2-2w-35}$ PSD PSD

$\frac{(w-10)(w+5)}{(w-7)(w+5)}$

$\frac{w-10}{w-7}$

⑥ $\frac{9-k^2}{k^2+11k+24}$ Wrong order PSD

$\frac{-k^2+9}{(k+3)(k+8)}$ GCF

$\frac{-1(k^2-9)}{(k+3)(k+8)}$ Diff of Squares

$\frac{-1(k+3)(k-3)}{(k+3)(k+8)}$

$\frac{-1(k-3)}{k+8}$

⑦ $\frac{v^3-7v^2-3v+21}{v^2-14v+49}$ Grouping PSD

$\frac{(v-7)(v^2-3)}{(v+7)(v-7)}$

$\frac{v^2-3}{v+7}$