

# KEY

1. a.  $x=0, 12$  (FACTOR)

b.  $x = \frac{5 \pm \sqrt{385}}{8}$  (QUAD. FORM)

c.  $x = \frac{7 \pm \sqrt{38}}{2}$  (QUAD. FORM)

d.  $x = 15\sqrt{5}$  (SQUARE ROOT METHOD)

e.  $x = \frac{10 \pm 6\sqrt{10}}{10} = \frac{5 \pm 3\sqrt{10}}{5}$  (QUAD. FORM)

f.  $x=0, \frac{3 \pm \sqrt{57}}{4}$  (QUAD. FORM)

g.  $x = \frac{5}{2}, \pm i\sqrt{2}$  (GROUPING / SQ. ROOT)

h.  $x = -\frac{1}{3}, \frac{2}{5}$  (FACTOR)

2. a.  $(-11, -6)$

b.  $(2, -2)$

3. a. ALL REALS EXCEPT  $x=7$

b. ALL REALS

4. a.  $\frac{x-2}{(x-6)(x+3)} \cdot \frac{(x+3)(x+1)}{x+4} = \boxed{\frac{(x-2)(x+1)}{(x-6)(x+3)}}$

b.  $\frac{(w-4)(w+2)}{(12w+1)(w-3)} \cdot \frac{(w-3)(2w+7)}{(w-4)(w-5)} = \boxed{\frac{(w+2)(2w+7)}{(12w+1)(w-5)}}$

c.  $\frac{2x}{2x} \cdot \frac{7}{12x} + \frac{6}{8x^2} \cdot \frac{3x}{3} = \frac{14x+18}{24x^2} = \boxed{\frac{7x+9}{12x^2}}$

d.  $\frac{3x}{x-2} - \frac{5}{x+3} = \frac{3x(x+3) - 5(x-2)}{(x-2)(x+3)} = \frac{3x^2+9x-5x+10}{(x-2)(x+3)}$

$= \boxed{\frac{3x^2+4x+10}{(x-2)(x+3)}}$

$$e. \frac{2}{1} + \frac{k-3}{k+1} = \frac{2(k+1) + k-3}{k+1} = \frac{2k+2+k-3}{k+1}$$

$$= \boxed{\frac{3k-1}{k+1}}$$

$$f. \frac{x}{(x+5)(x+6)} - \frac{5}{(x+5)(x+4)} = \frac{x(x+4) - 5(x+6)}{(x+5)(x+4)}$$

$$= \frac{x^2 + 4x - 5x - 30}{(x+5)(x+4)} = \frac{x^2 - x - 30}{(x+5)(x+4)} = \frac{(x+5)(x-6)}{(x+5)(x+4)} = \boxed{\frac{x-6}{x+4}}$$

$$g. \frac{2}{x-1} - \frac{1}{-(x-1)} = \frac{2}{x-1} + \frac{1}{x-1} = \boxed{\frac{3}{x-1}}$$

5.

$$a. \left( \frac{4}{x+5} + \frac{3}{x-5} = \frac{1}{x^2-25} \right) x^2 - 25$$

$$4(x-5) + 3(x+5) = 1 \rightarrow 4x - 20 + 3x + 15 = 1$$

$$7x - 5 = 1$$

$$\boxed{x = \frac{6}{7}}$$

$$b. \left( \frac{x+7}{(x-3)(x+3)} = \frac{-x+2}{(x-3)} \right) (x-3)(x+3)$$

$$x+7 = (-x+2)(x+3)$$

$$x+7 = -x^2 - x + 6 \rightarrow x^2 + 2x + 1 = 0$$

$$(x+1)(x+1) = 0$$

$$\boxed{x = -1}$$

$$c. \left( \frac{x-4}{(x-4)(x-3)} - \frac{x+2}{x-3} = 0 \right) \cdot (x-3)$$

$$\rightarrow 1 - (x+2) = 0$$

$$1 - x - 2 = 0$$

$$\boxed{-1 = x}$$

$$d. \left( \frac{x}{(x+2)(x-1)} = \frac{2}{(x-3)(x-1)} - \frac{1}{(x-3)} \right) (x+2)(x-1)(x-1)$$

$$x(x-3) = 2(x+2) - (x+2)(x-1)$$

$$x^2 - 3x = 2x + 4 - x^2 - x + 2$$

$$x^2 - 3x = -x^2 + x + 6$$

$$2x^2 - 4x - 6 = 0$$

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

$$(x-3)(x+1) = 0$$

$$x = \cancel{3} \text{ OR } \boxed{-1}$$

↑  
EXTRANEUS

6.

a.  $18 + 6i$

b.  $-5 - 6i$

c.  $67 + 165i$

d.  $29$

e.  $\frac{1}{5} - \frac{3}{5}i$

f.  $\frac{2 + i}{5}$