#2

$$\frac{2x}{5} = -4 + \frac{x-1}{x+2}$$

domain Restrictions

$x \neq -2$

$2x(x+2) = -4(5)(x+2) + (5)(x-1)$

$2x^2 + 4x = -20x - 40 + 5x - 5$

$2x^2 + 4x = -15x - 45$

$+15x \quad +45$

$2x^2 + 19x + 45 = 0$

90

$2x^2 + 10x + 9x + 45 = 0$

$2x(x+5) + 9(x+5) = 0$

$2x + 9 = 0 \qquad x + 5 = 0$

$-9 \quad -9 \qquad -5 \quad -5$

$\frac{2x}{2} = \frac{-9}{2}$

$x = -5$

$x = \frac{-9}{2}$

(5)

(1) $\frac{x^2+4x}{x^2+2x-8} + \frac{3}{x-2} = \frac{x(x+4)}{(x+4)(x-2)} + \frac{3(x+4)}{(x-2)(x+4)}$

$= \frac{x^2+4x+3x+12}{(x+4)(x-2)}$ ✓

$= \frac{x^2+7x+12}{(x+4)(x-2)} = \frac{(x+4)(x+3)}{(x+4)(x-2)} = \frac{(x+3)}{(x-2)}$

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(2) $\frac{x^2+x}{x^2+2x-15} - \frac{3}{x-3} = \frac{x(x+1)}{(x+5)(x-3)} - \frac{3(x+5)}{x-3(x+5)}$

$= \frac{x^2+x-3x-15}{(x+5)(x-3)} = \frac{x^2-2x-15}{(x+5)(x-3)} = \frac{(x-5)(x+3)}{(x+5)(x-3)}$ x

Nothing cancels

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(3) $\frac{x^2+11x+30}{x^2+10x+21} \cdot \frac{x+3}{x+6} = \frac{(x+5)(x+6)}{(x+7)(x+3)} \cdot \frac{(x+3)}{(x+6)} = \frac{x+5}{x+7}$ ✓

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(4) $\frac{x^2-10x+25}{x^2+3x-28} \div \frac{x-4}{x+7} = \frac{(x-5)(x-5)}{(x+7)(x-4)} \cdot \frac{(x+7)}{(x-4)} = \frac{(x-5)(x-5)}{(x-4)(x-4)}$ x

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(5) $\frac{x^2-2x-24}{x^2+4x-5} \cdot \frac{x^2+3x-10}{x^2+x-12} \cdot \frac{x^2-4x+3}{x^2-8x+12}$

$\frac{(x-6)(x+4)}{(x+5)(x-1)} \cdot \frac{(x+5)(x-2)}{(x+4)(x-3)} \cdot \frac{(x-3)(x-1)}{(x-6)(x-2)} = 1$ x

(8) $\dfrac{2x^2+11x-23}{x+7} = \dfrac{2x}{1(x+7)} + \dfrac{a}{1}\cdot\dfrac{(x+7)}{(x+7)} - \dfrac{2}{x+7}$

$2x^2+11x-23 = 2x(x+7) + a(x+7) - 2$

$2x^2+11x-23 = 2x^2+14x+ax+7a-2$

$-2x^2 \quad -14x \quad +2 \quad -2x^2 \quad -14x \quad +2$

$-3x-21 = ax+7a$

$-3x-21 = a(x+7)$

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

$\boxed{-3 = a}$

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(9) $(x-2)^2+(y+3)^2=4$

$x-y=3$

$\hookrightarrow x=3+y$

	$y+3$
y	y^2 $3y$
3	$3y$ 9

	$y+1$
x	y^2 y
1	y 1

$(3+y-2)^2+(y+3)^2=4$

$(y+1)^2+(y+3)^2=4$

$(y^2+2y+1)+(y^2+6y+9)=4$

$2y^2+8y+10=4$

$-4 \quad -4$

$\dfrac{2y^2}{2}+\dfrac{8y}{2}+\dfrac{6}{2}=\dfrac{0}{2}$

$y^2+4y+3=0$

$(y+3)(y+1)=0$

$y=-3$	$y=-1$

$x-y=3$

$x-(-3)=3$

$x+3=3$

$-3 \quad -3$

$x=0$

$\boxed{(0,-3)}$

$x-y=3$

$x-(-1)=3$

$x+1=3$

$-1 \quad -1$

$x=2$

$\boxed{(2,-1)}$

(11) $12(-3)^3 + 3(-3)^4 + 7(-3)^2 - 1 = -19$ NO

#1: Remainder Theorem

#2: Divide

#3: check on Calculator → in table or Graph

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(12)

$x = 3(y - z)$

$y = 5(z - x)$

$x + y = z + 4$

$-4 \quad -4$

$x + y - 4 = z$

substitute in each to eliminate z

$x = 3(y - (x + y - 4))$

$y = 5((x + y - 4) - x)$

$x = 3y - 3x - 3y + 12$

$x = -3x + 12$

$+3x \quad +3x$

$\frac{4x}{4} = \frac{12}{4}$

$x = 3$

$y = 5(x + y - 4 - x)$

$y = 5y - 20$

$-5y \quad -5y$

$\frac{-4y}{-4} = \frac{-20}{-4}$

$y = 5$

sub back into

$x + y = z + 4$

$(3) + (5) = z + 4$

$8 = z + 4$

$-4 \quad -4$

$4 = z$

(15)

(a) $3x^2 + 8x + 24x + 64$

$x(3x + 8) + 8(3x + 8)$

$(x + 8)(3x + 8)$

(c) $4x^2 - 68x + 288$

$4(x^2 - 17x + 72)$ 72 | −8 | −9

$4(x^2 - 8x - 9x + 72)$

$4(x(x - 8) - 9(x - 8))$

$4(x - 8)(x - 9)$