7) a) $(3x^2 - 2x + 9) - (3x - 1)(x + 4) =$

$3x^2 - 2x + 9 - (3x^2 + 12x - x - 4) =$

$3x^2 - 2x + 9 - 3x^2 - 12x + x + 4 =$

$13x + 13 = 13(x + 1)$

b) $a(a - b + 1) + \dfrac{4a - 6b + 2}{2} =$

$a^2 - ab + a + 2a - 3b + 1 =$

$a^2 + 3a - 3b - ab + 1$

c) $(x - 4)^2 + 2(x + 3)^2 - (x - 5)^2 =$

$= x^2 - 8x + 16 + 2(x^2 + 6x + 9) - (x^2 - 10x + 25) =$

$= x^2 - 8x + 16 + 2x^2 + 12x + 18 - x^2 + 10x - 25 =$

$2x^2 + 14x + 9$

d) $(x + 6)(x - 2) + (x + 4)(x - 4) =$

$= x^2 - 2x + 6x - 12 + x^2 - 4x + 4x - 16 =$

$= 2x^2 + 4x - 28$

e) $\dfrac{6(x - 1)(x + 2)}{(2x - 5) - 2(x - 1)} = \dfrac{6(x^2 + 2x - x - 2)}{2x - 5 - 2x + 2} =$

$= \dfrac{6(x^2 + 2x - x - 2)}{-3} = -2(x^2 + 2x - x - 2) =$

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

8) a) $(a + 5)^2 = a^2 + 10a + 25$

b) $(2x + 4)^2 = 4x^2 + 16x + 16$

c) $\left(y - \frac{1}{3}\right)^2 = y^2 - \frac{2}{3}y + \frac{1}{9}$

(26) a) $45x^3 - 5xy^2 = 5x(9x^2 - y^2) =$
$= 5x((3x)^2 - y^2) = 5x(3x - y)(3x + y)$

b) $a^4 - b^4 = (a^2)^2 - (b^2)^2 = (a^2 - b^2)(a^2 + b^2)$
$= (a+b)(a-b)(a^2+b^2)$

c) $xy - 5x + 4y - 20 = x(y-5) + 4(y-5) =$
$= (y-5)(x+4)$

d) $x^2 + 2xy + y^2 + 5x + 5y = (x+y)^2 + 5(x+y)$
$= (x+y)[(x+y)+5] = (x+y)(x+y+5)$

(27) a) $\dfrac{6x^2 - 9x}{15x} = \dfrac{3x(2x-3)}{15x} = \dfrac{2x-3}{5}$

b) $\dfrac{x^2 - 25}{x^2 + 10x + 25} = \dfrac{(x+5)(x-5)}{(x+5)^2} = \dfrac{x-5}{x+5}$

c) $\dfrac{20x^3yz^2}{35xy^2z^2} = \dfrac{4x^2}{7y}$

d) $\dfrac{x^2 + 2xy + y^2}{x^2 + xy - 3x - 3y} = \dfrac{(x+y)^2}{x(x+y) - 3(x+y)} =$

$= \dfrac{(x+y)^2}{(x+y)(x-3)} = \dfrac{x+y}{x-3}$

e) $\dfrac{5x - 10}{x^2 - 2x} = \dfrac{5(x-2)}{x(x-2)} = \dfrac{5}{x}$

(27) f) $\frac{x+6}{x^3-36x} = \frac{x+6}{x(x^2-36)} = \frac{x+6}{x(x-6)(x+6)} =$

$= \frac{1}{x(x-6)}$

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

$\frac{3x-2(x-5)}{12} = \frac{3+2(x-5)}{3}$

$\frac{3x-2x+10}{12} = \frac{3+2x-10}{3}$

$3x-2x+10 = \frac{3+2x-10}{3} \cdot 12$ (4)

$x+10 = (2x-7).4$

$x+10 = 8x-28$

$x-8x = -28-10$

$-7x = -38$

$x = \frac{-38}{-7} \Rightarrow x = \frac{38}{7}$

b) $10-(8x-2) = 5x+2(-4x+1)$

$10-8x+2 = 5x-8x+2$

$-8x-5x+8x = 2-x-10$

$-5x = -10$

$x = \frac{-10}{-5} \Rightarrow x = 2$

c) $\frac{3x-2}{5} - x = \frac{1}{2} \Rightarrow \frac{3x-2-5x}{5} = \frac{1}{2}$

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

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(28) c) cont. $-2x = \frac{9}{2} \Rightarrow x = -\frac{9}{4}$

d) $0,8x - 2 = 0,222\ldots - \frac{2}{5}x$

$\frac{8}{10}x - 2 = \frac{2}{9} - \frac{2}{5}x \Rightarrow \frac{8}{10}x + \frac{2}{5}x = \frac{2}{9} + 2$

$\frac{8x + 4x}{10} = \frac{2 + 18}{9} = \frac{12x}{10} = \frac{20}{9}$

$12x = \frac{200}{9} \Rightarrow x = \frac{\cancel{200}^{\cancel{100}^{50}}}{\cancel{12} \times 9_{\cancel{6}_{3}}} \Rightarrow x = \frac{50}{27}$

(29) a) $\begin{cases} 3x - y = 14 \\ 5x + 2y = 16 \end{cases}$ (x2) $\hookrightarrow$ $\begin{cases} 6x - 2y = 28 \\ 5x + 2y = 16 \end{cases}$

$11x = 44 \Rightarrow x = \frac{44}{11}$

$x = 4$

$3x - y = 14$
$3.4 - y = 14$
$12 - y = 14$
$-y = 14 - 12$
$-y = 2 \Rightarrow y = -2$

$S = \{(4, -2)\}$