

Cumulative Practice 2.

1a)

$$(x+2)(2x^2+4x+1)$$

$$= x(2x^2) + x(4x) + x(1) + 2(2x^2) + 2(4x) + 2(1)$$

$$= 2x^3 + 4x^2 + x + 4x^2 + 8x + 2$$

$$= 2x^3 + \underline{4x^2 + 4x^2} + \underline{x + 8x} + 8x + 2$$

$$= 2x^3 + 8x^2 + 17x + 2 \#$$

1b)

$$(3x^2+5x-4)(2x-1)$$

$$= (2x-1)(3x^2+5x-4)$$

$$= 2x(3x^2) + 2x(5x) + 2x(-4) - 1(3x^2) - 1(5x) - 1(-4)$$

$$= 6x^3 + 10x^2 - 8x - 3x^2 - 5x + 4$$

$$= 6x^3 + 10x^2 - 3x^2 - 8x - 5x + 4$$

$$= 6x^3 + 7x^2 - 13x + 4 \#$$

3a)

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

$$= (x^2-2x-8)(x+5)$$

$$= (x-5)(x^2-2x-8)$$

$$= x(x^2) + x(-2x) + x(-8) - 5(x^2) - 5(2x) - 5(-8)$$

$$= x^3 - 2x^2 - 8x - 5x^2 + 10x + 40$$

$$= x^3 - 2x^2 - 5x^2 - 8x + 10x + 40$$

$$= x^3 - 7x^2 + 2x + 40 \#$$

$$(x+2)(x-4)$$

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

$$= x^2 - 4x + 2x - 8$$

$$= x^2 - 2x - 8$$

3b)

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

$$= (2x^2+17x+21)(2-x)$$

$$= (2-x)(2x^2+17x+21)$$

$$= 2(2x^2) + 2(17x) + 2(21) - x(2x^2) - x(17x) - x(21)$$

$$= 4x^2 + 34x + 42 - 2x^3 - 17x^2 - 21x$$

$$= -2x^3 + 4x^2 - 17x^2 + 34x - 21x + 42$$

$$= -2x^3 - 13x^2 + 13x + 42 \quad \#$$

No.

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

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

$$= 2x^2 + 14x + 3x + 21$$

$$= 2x^2 + 17x + 21$$

3c)

$$(5-x)(x-1)^2$$

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

$$= (-x^2+6x-5)(x-1)$$

$$= (x-1)(-x^2+6x-5)$$

$$= x(-x^2) + x(6x) + x(-5) - 1(-x^2) - 1(6x) - 1(-5)$$

$$= -x^3 + 6x^2 - 5x + x^2 - 6x + 5$$

$$= -x^3 + 6x^2 + x^2 - 5x - 6x + 5$$

$$= -x^3 + 7x^2 - 11x + 5 \quad \#$$

$$7^2 = 7 \times 7$$

$$(x-1)^2 = (x-1)(x-1)$$

$$(5-x)(x-1)$$

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

$$= 5x - 5 - x^2 + x$$

$$= -x^2 + 6x - 5$$

3d)

$$(4x-3)^3$$

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

$$= (16x^2-24x+9)(4x-3)$$

$$= (4x-3)(16x^2-24x+9)$$

$$= 4x(16x^2) + 4x(-24x) + 4x(9) - 3(16x^2) - 3(-24x) - 3(9)$$

$$= 64x^3 - 96x^2 + 36x - 48x^2 + 72x - 27$$

$$= 64x^3 - 48x^2 - 96x^2 + 36x + 72x - 27$$

$$= 64x^3 - 144x^2 + 108x - 27 \quad \#$$

$$4^3 = 4 \times 4 \times 4$$

$$(4x-3)^3 = (4x-3)(4x-3)(4x-3)$$

$$(4x-3)(4x-3)$$

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

$$= 16x^2 - 12x - 12x + 9$$

$$= 16x^2 - 24x + 9$$

5a) $\frac{7m-14}{10} - \left(\frac{2m+1}{10}\right)$

$$= \frac{7m-14-(2m+1)}{10}$$

$$= \frac{7m-14-2m-1}{10}$$

$$= \frac{5m-15}{10} \#$$

5b) $5b - \left(\frac{12b+3a}{3}\right)$

$$= \frac{5b}{1} - \left(\frac{12b+3a}{3}\right)$$

$$= \frac{3(5b) - (12b+3a)}{3}$$

$$= \frac{15b - 12b - 3a}{3}$$

$$= \frac{3b - 3a}{3}$$

$$= \frac{3(b-a)}{3}$$

$$= b-a \#$$

5c) $\frac{4}{x+2} + \left(\frac{3}{x}\right)$

$$= \frac{4(x) + 3(x+2)}{x(x+2)}$$

$$= \frac{4x + 3x + 6}{x(x+2)}$$

$$= \frac{7x+6}{x(x+2)} \#$$

5d) $\frac{4}{3x-2} - \left(\frac{2}{2x+3}\right)$

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

$$= \frac{8x+12-6x+4}{(3x-2)(2x+3)}$$

$$= \frac{2x+16}{(3x-2)(2x+3)} \#$$

5e) $\frac{3}{8p+24} - \left(\frac{2p}{4p^2-36}\right)$

(take out common factor)

$$= \frac{3}{8(p+3)} - \left(\frac{2p}{4(p^2-9)}\right)$$

$$= \frac{3}{8(p+3)} - \frac{2p}{4(p+3)(p-3)}$$

$$= \frac{3(p-3) - 2p(2)}{8(p+3)(p-3)}$$

$$= \frac{3p-9-4p}{8(p+3)(p-3)} = \frac{-p-9}{8(p+3)(p-3)} \#$$

take out common factors
 $a^2 - b^2 = (a+b)(a-b)$

5f) $\frac{5}{x^2+4x+3} + \frac{2}{3x+3}$

cross method

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

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

$$= \frac{15 + 2x + 6}{3(x+1)(x+3)}$$

$$= \frac{21 + 2x}{3(x+1)(x+3)} \#$$

combine terms

7a) $y = \frac{1}{3}(x-6)$

$y = \frac{x-6}{3}$

$3y = x-6$
 $x-6 = 3y$
 $x = 3y + 6$ #

7b)

$S = \frac{a}{1-r}$

$S(1-r) = a$

$S - Sr = a$

$-Sr = a - S$

$r = \frac{a-S}{-S}$ #

7c)

$P = \frac{rs}{r+s}$

$P(r+s) = rs$

$Pr + Ps = rs$

$Pr - rs = -Ps$

$r(P-s) = -Ps$

$r = \frac{-Ps}{(P-s)}$ #

7d)

$3 + ax = h - 3bx$

$ax + 3bx = h - 3$

$x(a+3b) = h-3$

$x = \frac{h-3}{a+3b}$ #

7e)

$\frac{4s}{3-r} = \frac{1}{2}$

$4s(2) = 1(3-r)$

$8s = 3-r$

$3-r = 8s$

$-r = 8s-3$

$r = 8s-3$

$-r$ #

9)

$S = \frac{2dt}{d+t}$

$S(d+t) = 2dt$

$sd + st = 2dt$

$st - 2dt = -sd$

$t(s-2d) = -sd$

$t = \frac{-sd}{s-2d}$ #

$t = \frac{-sd}{s-2d}$

$t = \frac{-(15)(45)}{15-2(45)}$

$t = \frac{-675}{15-90}$

$t = \frac{-675}{-75}$

$t = 9$ #

$(- \div -) = +$