

Examples from Sections A3, A4, A5

As part of our quick algebra review, here are examples for class Wednesday Jan 21.

Problem 1. [page A31, #30] Simplify, collect terms ...

$$(2x^2 + 1) - (x^2 - 2x - 1) = \dots \quad \begin{array}{l} 2x^2 + 1 - x^2 + 2x + 1 \\ x^2 + 2x + 2 \end{array}$$

Problem 2. [page A31, #38]

$$y^2(4y^2 + 2y - 3) = \dots \quad \begin{array}{l} 4y^4 + 2y^3 - 3y^2 \\ \cancel{4y^4} + \cancel{2y^3} - y^2 \end{array}$$

Problem 3. [page A31, #49]

$$(3x - 5)(2x + 1) = \dots \quad \begin{array}{l} 3x \cdot 2x + 3x - 5(2x) - 5 \\ 6x^2 - 7x - 5 \end{array}$$

Problem 4. [page A31, #74]

$(a+b)^2 = a^2 + 2ab + b^2$

$$\left(\frac{2}{3}t + 5\right)^2 = \dots \quad \begin{array}{l} \left(\frac{2}{3}t + 5\right)\left(\frac{2}{3}t + 5\right) = \\ \frac{4}{9}t^2 + \frac{10}{3}t + \frac{10}{3}t + 25 \\ \hline \frac{4}{9}t^2 + \frac{20}{3}t + 25 \end{array}$$

Problem 5. [page A31, # 104]

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

$$x^2 - 49 = (x-7)(x+7)$$

Problem 6. [page A31, # 114]

Factor

$$x^2 + 10x + 25 = (x+5)(x+5)$$

Problem 7. [page A31, # 168 with a number changed]

Factor

$$2y^3 - 7y^2 - 10y = y(2y^2 - 7y - 10)$$

Problem 8. [page A31, # 138]

Factor

$$x^2 - 13x + 42$$

$$(x-6)(x-7)$$

Problem 9. [page A43, # 6]

Find the domain of the following rational expression.

$$\frac{x+1}{2x+1}$$

$$2x+1 \neq 0$$

$$2x \neq -1$$

$$x \neq -\frac{1}{2}$$

"All real numbers except $-\frac{1}{2}$."

Problem 10. [page A43, # 14]

Simplify

$$xy - y = y(x-1)$$

$$\frac{2x^2 \cdot y}{(x-1)y} = \frac{2x^2 y}{xy - y}$$

$$y \neq 0$$

$$\frac{2x^2}{x-1}$$

Problem 11. [page A43, #22]

Simplify (and find the domain):

$$\frac{x^2 + 8x - 20}{x^2 + 11x + 10}$$

$$\frac{(x-2)(x+10)}{(x+10)(x+1)}$$

$(x \neq -2, -10)$

Problem 12. [page A43, # 36]

Do the indicated arithmetic (and simplify the resulting expression).

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

$$\frac{x+13}{x^3(3-x)} \cdot \frac{x(x-3)}{5} = \frac{(x+13)(x)(x-3)}{x^3(3-x)5}$$

$$= \frac{x(x+13)}{5x^2}$$

Problem 13. [page A43, # 46]

Do the indicated arithmetic (and simplify the resulting expression).

Common denominator

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

$$= \frac{3-5x+5}{x-1} = \frac{8-5x}{x-1}$$

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$$\frac{5}{3} - \frac{4}{3} = \frac{1}{3}$$

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

