

Key

MATH 108 QUIZ #2 (TAKE-HOME)

You may use your book and notes to work on this, but do not work with another student or with a tutor or other mentor.

1. Do the operation indicated on the rational expressions. Give the answer in reduced form if possible.

LCD $x^2 - 4$

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

$$\frac{5}{x-2} \cdot \frac{x+2}{x+2} + \frac{x}{2-x} \cdot \frac{(-1)}{(-1)} \cdot \frac{x+2}{x+2} - \frac{1}{x^2-4} = \frac{5x+10 - x^2 - 2x - 1}{(x+2)(x-2)}$$

$$\frac{y+1}{y^3+1} \div \frac{y^4-1}{y^2+1} = \frac{y+1}{y^3+1} \cdot \frac{y^2+1}{y^4-1}$$

$$= \frac{\cancel{y+1}}{(y+1)(y^2-y+1)} \cdot \frac{\cancel{y^2+1}}{(y^2-1)(\cancel{y^2+1})} = \frac{1}{(y^2-y+1)(y^2-1)}$$

2. Solve the equations for the variable. Show all your work.

$x^4 = 625 \rightarrow$ Take the 4th root of both sides

$$\sqrt[4]{x^4} = \sqrt[4]{625}$$

$$x^2 = \pm 25$$

$$x = \pm 5$$

$$(x+2)(x+3) = 12$$

$$(x+2)(x+3) - 12 = 0$$

$$x^2 + 3x + 2x + 6 - 12 = 0$$

$$(\sqrt{2h-5} - (1-\sqrt{h-3}))^2 = (1-\sqrt{h-3})(1-\sqrt{h-3})$$

$$2h-5 = 1 - 2\sqrt{h-3} + (h-3)$$

$$2h-5-1-h+3 = -2\sqrt{h-3}$$

$$x^2 + 5x - 6 = 0$$

$$(x+6)(x-1) = 0$$

$$x = -6, 1$$

$$(h-3)^2 = (2\sqrt{h-3})^2$$

$$(h-3)^2 = 4(h-3) = 4h-12$$

$$h^2 - 6h + 9 = 4h - 12 = 0$$

$$h^2 - 10h + 21 = 0$$

$$(h-7)(h-3) = 0$$

$$h = 7, 3$$

3. Using long division, show whether $x-2$ is a factor of $x^4 - 2x^2 + x - 6$.

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

$$\begin{array}{r} x-2 \overline{) x^4 + 0x^3 - 2x^2 + x - 6} \\ \underline{-(x^4 - 2x^3)} \\ 2x^3 - 2x^2 \\ \underline{-(2x^3 - 4x^2)} \\ 2x^2 + x \\ \underline{-(2x^2 - 4x)} \\ 5x - 6 \end{array}$$

$$- (x^4 - 2x^3)$$

$$2x^3 - 2x^2$$

$$- (2x^3 - 4x^2)$$

$$2x^2 + x$$

$$- (2x^2 - 4x)$$

$$\left. \begin{array}{l} 5x - 6 \\ 5x - 10 \end{array} \right\} \text{diff} = 4 \text{ (the remainder)}$$

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$$\frac{y+1}{y^3+1} \div \frac{y^4-1}{y^2+1} = \frac{y+1}{y^3+1} \cdot \frac{y^2+1}{y^4-1}$$

$$= \frac{\cancel{y+1}}{(y+1)(y^2-y+1)} \cdot \frac{\cancel{y^2+1}}{(y^2-1)(y^2+1)} = \frac{1}{(y^2-y+1)(y^2-1)}$$

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$$- (x^4 - 2x^3)$$

$$2x^3 - 2x^2$$

$$- (2x^3 - 4x^2)$$

$$2x^2 + x$$

$$- (2x^2 - 4x)$$

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