MAC 1105 Section 1A27 Name: Solutions

Quiz 2A (Modules 3,4)

Be sure to show all your work for full credit!

**1. (a) (3 points) Perform the division using long division or synthetic division**

$$\frac{2x^3 - 16x + 12}{x - 1}$$

Long division: $x-1 \,\big)\, 2x^3 + 0x^2 - 16x + 12$, quotient $2x^2 + 2x - 14$

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

$2x^2 - 16x + 12$

$-2x^2 + 2x$

$-14x + 12$

$+14x - 14$

$-2$

OR

$x - 1 = 0$

$x = 1$

$$\begin{array}{c|cccc} & (3) & (2) & (1) & (0) \\ 1 & 2 & 0 & -16 & 12 \\ & \downarrow & 2 & 2 & -14 \\ \hline & 2 & 2 & -14 & \boxed{-2} \\ & (2) & (1) & (0) & \end{array}$$

$$\boxed{2x^2 + 2x - 14 - \frac{2}{x-1}}$$

(b) (1 point) True or False: $k = 1$ is a zero of $2x^3 - 16x + 12$ $\boxed{\text{False}}$

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**2. (4 points) Evaluate and simplify each expression. If not defined, write "not defined."**

(a) $(-4)^{3/2} = \sqrt[2]{(-4)^3}$ even ← negative

(a) $\boxed{\text{Not defined}}$

(b) $\sqrt[4]{(-4)^4} = |-4| = 4$

(b) $\boxed{4}$

(c) $\sqrt[3]{\sqrt[4]{x^{13}}} = \sqrt[3\cdot 4]{x^{13}} = \sqrt[12]{x^{13}} = x\sqrt[12]{x}$

(c) $\boxed{x\sqrt[12]{x}}$

OR $= \sqrt[3]{x^{13/4}} = (x^{13/4})^{1/3} = x^{13/12} = x \cdot x^{1/12} = x\sqrt[12]{x}$

(d) $\sqrt[3]{81x^6y^5z^{10}} = \sqrt[3]{3^4x^6y^5z^{10}} = 3x^2yz^3\sqrt[3]{3y^2z}$

(d) $\boxed{3x^2yz^3\sqrt[3]{3y^2z}}$

$3^{4/3} = 3 \cdot 3^{1/3} = 3\sqrt[3]{3}$

$y^{5/3} = y \cdot y^{2/3} = y\sqrt[3]{y^2}$

$x^{6/3} = x^2$

$z^{10/3} = z^3 \cdot z^{1/3} = z^3\sqrt[3]{z}$

3. (2 points) Simplify the complex fraction. Please, box or cirlce your answer.

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

Method 1 LCD$(1, x, x+1) = x(x+1)$

$$\frac{\left(\frac{2}{1}-\frac{1}{x}\right)}{\left(\frac{1}{x+1}\right)} \cdot \frac{\left(\frac{x(x+1)}{1}\right)}{\left(\frac{x(x+1)}{1}\right)} = \frac{\frac{2x(x+1)}{1} - \frac{1}{x} \cdot \frac{x(x+1)}{1}}{\frac{1}{x+1} \cdot \frac{x(x+1)}{1}}$$

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

$$\boxed{= \frac{2x^2+x-1}{x}}$$

Method 2

$$\frac{\left(\frac{x}{x}\right)\frac{2}{1} - \frac{1}{x}}{\frac{1}{x+1}} = \frac{\frac{2x}{x} - \frac{1}{x}}{\frac{1}{x+1}} = \frac{\frac{2x-1}{x}}{\frac{1}{x+1}} = \frac{2x-1}{x} \cdot \frac{x+1}{1}$$

$$= \frac{(2x-1)(x+1)}{x} = \frac{2x^2+2x-x-1}{x} = \boxed{\frac{2x^2+x-1}{x}}$$