**MAT 110 - Test 3 - Open Response Portion - Version E** Name Key

EKU ID _____

Write answers, and only answers, in answer blanks. Show all work in spaces provided.
NO calculator use of any kind is permitted on this portion of the test.
Answers without supporting work may not receive credit. Each question is worth 6 points.

1) Simplify completely. Assume all variables represent positive numbers. $\sqrt{50a^2b^4c^5}$

Answer $5ab^2c^2\sqrt{2c}$

$\sqrt{50}\sqrt{a^2}\sqrt{b^4}\sqrt{c^5}$

$\sqrt{2(5\cdot 5)}\cdot a^{2/2}\cdot b^{4/2}\cdot c^{5/2}$

$5\sqrt{2}\cdot a\cdot b^2\cdot c^{2,R1}$

$5ab^2\sqrt{2}\cdot c^2\sqrt{c}$

$5ab^2c^2\sqrt{2c}$

2) Simplify. Write your final answer in radical form.

$$\frac{x^{\frac{4}{5}}}{x^{\frac{1}{5}}}$$

Answer $\sqrt[5]{x^3}$

$x^{4/5-1/5} = x^{\frac{4-1}{5}} = x^{3/5}$

$= (x^3)^{1/5}$

$= \sqrt[5]{x^3}$

or $(\sqrt{x^3})^{1/5}$

-2 pts if not converted to radical form

3) Read the following scenario. DO NOT actually solve the problem.
Just show how you would set the problem up in order to solve it using appropriate equation(s).

One number is three more than twice a second number. Their product is 119. Find the numbers.

Equation(s) 2 variables: $\begin{cases} x = 3+2y \\ xy = 119 \end{cases}$

one variable: $(3+2y)(y) = 119$

4) Solve the equation. Write only valid answer(s) in the answer blank.

$\sqrt{x+6} = x+4$

Answer(s) $x = -2$

-2 pts if $x=-5$ is listed

$(\sqrt{x+6})^2 = (x+4)^2$

$x+6 = (x+4)(x+4)$

$x+6 = x^2+8x+16$

$-x-6 \qquad -x-6$

$0 = x^2+7x+10$

$0 = (x+2)(x+5)$

$0 = x+2$ or $0 = x+5$

$-2 = x \qquad -5 = x$

extraneous

5) The function $f(x) = \sqrt{x+3}$ is one-to-one. Assume that $x \geq 0$. Find the inverse function, $f^{-1}(x)$.

Answer $f^{-1}(x) = x^2 - 3$

$f(x) = \sqrt{x+3}$

$y = \sqrt{x+3}$

$x = \sqrt{y+3}$

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

$x^2 = y+3$

$-3 \qquad -3$

$x^2 - 3 = y$

$x^2 - 3 = f^{-1}(x)$