**MAT 012** **Quiz 6** **Name:** SOLUTIONS

Section: _____

1. a) Find the domain of the function $f(x)=\sqrt{x+7}$

$$\begin{array}{r} x+7 \geq 0 \\ -7 \quad -7 \\ \hline x \geq -7 \end{array}$$

Domain : $x \geq -7$

same as $[-7, \infty)$

b) Solve the following given equation $-5+\sqrt{x+7}=x$

$$\begin{array}{rcl} -5+\sqrt{x+7} & = & x \\ +5 & & +5 \\ \hline \sqrt{x+7} & = & x+5 \end{array}$$

$$\left(\sqrt{x+7}\right)^2 = (x+5)^2$$

$$x+7 = (x+5)(x+5)$$

$$x+7 = x^2+5x+5x+25$$

$$\begin{array}{rcl} x+7 & = & x^2+10x+25 \\ -x-7 & & -x-7 \\ \hline 0 & = & x^2+9x+18 \end{array}$$

$$0 = (x+3)(x+6)$$

$\boxed{x=-3}$ or $x \neq -6$

(see below)

c) Show the "checks" to identify extraneous solutions

$x=-3$ in $\sqrt{x+7}=x+5$

$$\sqrt{-3+7} = -3+5$$

$$\sqrt{4} = 2$$

$$2 = 2 \checkmark$$

$x=-6$ in $\sqrt{x+7}=x+5$

$$\sqrt{-6+7} = -6+5$$

$$\sqrt{1} = -1$$

$$1 \neq -1$$

d) List the solution(s)

$x=-3$

**OVER** →

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2. Rationalize the denominator:

$$\frac{\left(\sqrt{2}-4\sqrt{5}\right)}{\left(2\sqrt{3}+3\sqrt{7}\right)}\cdot\frac{\left(2\sqrt{3}-3\sqrt{7}\right)}{\left(2\sqrt{3}-3\sqrt{7}\right)} = \frac{2\sqrt{6}-3\sqrt{14}-8\sqrt{15}+12\sqrt{35}}{4\cdot 3-6\sqrt{21}+6\sqrt{21}-9\cdot 7}$$

$$= \frac{2\sqrt{6}-3\sqrt{14}-8\sqrt{15}+12\sqrt{35}}{12-63}$$

$$= \frac{2\sqrt{6}-3\sqrt{14}-8\sqrt{15}+12\sqrt{35}}{-51}$$

3. Subtract the following two complex numbers. *Simplify as much as possible.*

$$(7-4i)-(2+3i) = 7-4i-2-3i$$

$$= 5-7i$$

4. Multiply and express the answer as a simplified complex number:

$$(2+5i)(3-2i) = 6-4i+15i-10i^2$$

$$= 6+11i-10\cdot(-1)$$

$$= 6+11i+10$$

$$= 16+11i$$