**REVIEW – SBM#3 – Advanced Algebra**

1. **Solve** $\frac{-2}{5}x^{2}+10=0$
2. **Simplify** $\left(-6+2i\right)+\left(7-3i\right)-\left(8+5i\right)$
3. **Find the 3rd term in the expansion of** $\left(x-3\right)^{3}$
4. **Divide** $\left(n^{3}-4n+22\right)÷\left(n+3\right)$
5. **Factor completely** $x^{2}-49$
6. **Factor completely** $8x^{3}+27$
7. **Factor completely** $3x^{3}+9x^{2}+x+3$
8. **Solve** $10x^{2}-9x-9=0$
9. **List the “a”, “b”, and “c” for the equation** $x^{2}-8=3x$
10. **Use the Quadratic Formula to get the value(s) for x in the equation** $2x^{2}+x+3=0$
11. **Given the following equation in factored form, identify the zeros and the multiplicity of each root:** $\left(x+2\right)^{2}\left(x-5\right)^{5}\left(x+1\right)^{4}=0$
12. **List the leading coefficient, the degree of the function, and the end behavior for the function**

$f\left(x\right)= -5x^{3}+x^{2}+ 2x+7$**.**

1. **Simplify** $\frac{2x-6}{3}∙\frac{1}{x-3}$
2. **Simplify** $\frac{a^{2}-12a+36}{a-6}÷\frac{a^{2}+4a-60}{9}$
3. **Simplify the rational expression** $\frac{4x+4}{3x^{2}+6x}+\frac{3}{3x}$
4. **Solve** $\frac{1}{m+3}-\frac{5}{m^{2}+2x-3}=\frac{1}{m^{2}+2x-3}$
5. $Given f\left(x\right)=2x+1 and g\left(x\right)=-2x, find g\left(f\left(6\right)\right).$
6. **Write an equation that has a zero tangent to the x-axis at** $-5$ **but crosses it at** $6$**.**

**Condense or Expand each log**

1. $4log\_{4} x-log\_{4} y$
2. $log\_{7}\left(2⋅5^{5}\right)^{3}$
3. $5^{2x+3}=125^{x-1}$
4. $\sqrt{-5x+12}=x-4$
5. **Given** $f\left(x\right)=\left\{\begin{array}{c}2x-5 if x\leq -2\\-4x+3 if x>-2\end{array}\right.$ **Find** $f\left(0\right)and f(-2)$
6. $y=\sqrt{x+1}+4$ **Graph, give the domain and range**
7. **Find the inverse for the equation** $f\left(x\right)=\frac{-5}{7}x+6$

**Answers:**

1. $\pm 5$ **18.** $y=\left(x+5\right)^{even}(x-6)^{odd}$
2. $-9-6i$ **19.** $log\_{4}\frac{x^{4}}{y}$
3. $27x$ **20.** $3log\_{7}2+15 log\_{7}5$
4. $n^{2}-3n+5+\frac{7}{n+3}$ **21.** $x = 6$
5. $(x+7)(x-7)$ **22.** $x=\frac{3\pm i\sqrt{7}}{2}$
6. $(2x+3)(4x^{2}-6x+9)$ **23.** $f\left(0\right)=3; f\left(-2\right)=-9$
7. $(x+3)(3x^{2}+1)$ **24. Arm with “elbow” at** $(-1, 4)$
8. $(5x+3)(2x-3)$ **Domain: all reals**
9. $a = 1, b = -3, c = -8$ **Range:** $y\geq 4$
10. $\frac{1\pm i\sqrt{23}}{4}$ **25.** $f(x)^{-1}=\frac{-7}{5}(x-6)$
11. $zero=-2;multiplicity=2 $

$$zero=5;multiplicity=5 $$

$$zero=-1;multiplicity=4$$

1. $-5;3;as x\rightarrow \infty , y\rightarrow -\infty and as x\rightarrow -\infty , y\rightarrow \infty $
2. $\frac{2}{3}$
3. $\frac{9}{a+10}$
4. $\frac{7x+10}{3x(x+2)}$
5. $m=7$
6. $–26$