Math Analysis Honors – Worksheet 40 Exponential and Logarithmic Functions Review

For 1-5, solve each equation.

1	$e^{1-x}=5$
2	$8^{6x+3}=4$
3	$2\log_3 x-3=4$
4	$\ln(3x+4)-\ln(2x)=5$
5	$\log_6(x+3)+\log_6(x+4)=1$

Write each expression as a single logarithm.

6	$-2\log_3\left(\frac{1}{x}\right)+3\log_3\sqrt{x}$
7	$\log(x^2-9)-\log(x^2+7x+12)$
8	$2\log 2+3\log x-\frac{1}{2}\left[\log(x+3)+\log(x-2)\right]$

9	The half-life of radioactive cobalt is 5.27 years. There are initially 100 grams of radioactive cobalt present. a) Express the amount of cobalt *P* remaining as a function of time *t*. b) How much will be present in 20 years? c) When will there be 15 grams remaining?
10	Susan invests $4800 into an account that pays 6.2% interest compounded quarterly. a) Express the amount of money *A* in the account as a function of time *t.* b) How much will be in the account in 10 years? c) When will there be $13,000 in the account?
11	The population of Metrocity is 123,000 and is decreasing by 2.4% each year. a) Express the population *P* of Metrocity as a function of time *t*. b) How many people will be in Metrocity in 15 years? c) When will there be 50,000 people in Metrocity?
12	The number *P* of students infected with flu at Northridge High School *t* days after exposure is modeled by $P(t)=\frac{300}{1+e^{4-t}}$, where *t* is measured in days. a) What was the initial ($t=0$) number of students infected with the flue? b) How many students were infected after 3 days? c) When will 100 students be infected?
13	What interest rate compounded continuously is required for a $22,000 investment to grow to $36,500 in 5 years?
14	How long would it take for an initial investment of $1250 to grow to $1800 if it is placed into an account that pays 5.4% interest compounded continuously?
15	For $f(x)=4x^3+9x^2-30x-8$, use a graphing calculator to find: a) the real zeros of f. b) The local maxima and local minima

Answers

1) -0.609	2) -0.389	3) 1.140	4) 0.014	5) -1
6) $\log_3 x^{\frac{7}{2}}$	7) $\log\dfrac{x-3}{x+4}$	8) $\log\dfrac{4x^3}{\sqrt{x^2+x-6}}$	9) a) $P=100\left(\dfrac{1}{2}\right)^{\frac{t}{5.27}}$ b) 7.204 g c) 14.424 years	10) $A=4800(1.0155)^{4t}$ \$8880.52 16.194 years
11) $P=123000(0.976)^t$ 85,438 37.055 years	12) 5, 80, 3.307	13) 10.1%	14) 6.753 years	15) $x=-4,2,-\dfrac{1}{4}$ Max (-2.5, 60.75) Min (1, -25)