Chapter 3 Review Ad majorem Dei gloriam Accelerated Algebra 2 and Precalculus
Mr. Reis

Calculators are permitted on questions one through eight.

Solve the equations and round answers to three decimal places. You may use a calculator for 1-8.

1. $3^{x+5}+2=30$

$3^{x+5}=28$

$\ln 3^{x+5}=\ln 28$

$(x+5)\ln 3=\ln 28$

$x+5=\frac{\ln 28}{\ln 3}$

$x=\frac{\ln 28}{\ln 3}-5$

$x\approx -1.967$

2. $\log_2 x+\log_2 4=5$

$\log_2 4x=5$

$2^5=4x$

$32=4x$

$x=8$

3. $\frac{50}{1-2e^{-0.001x}}=1000$

$1000(1-2e^{-.001x})=50$

$1-2e^{-.001x}=.05$

$-2e^{-.001x}=-.95$

$e^{-.001x}=.475$

$\ln e^{-.001x}=\ln .475$

$-.001x=\ln .475$

$x=\frac{\ln .475}{-.001}$

$x\approx 744.440$

4. $\log_{10} x-\log_{10}(8-5x)=\log_{10}(x+1)$

$\log_{10}\left(\frac{x}{8-5x}\right)=\log_{10}(x+1)$

$\frac{x}{8-5x}=x+1$

$(8-5x)(x+1)=x$

$8x-5x^2-5x+8=x$

$5x^2-2x-8=0$

$x=\frac{2\pm\sqrt{4-4(5)(-8)}}{10}$

$x=\frac{2\pm\sqrt{164}}{10}$

$x=\frac{2\pm 2\sqrt{41}}{10}$

$x=\frac{1\pm\sqrt{41}}{5}$

negative invalid

5. Use the properties of logs to verify that $-\ln 24=-(3\ln 2+\ln 3)$

$-\ln 2^3\cdot 3=-(\ln 2^3+\ln 3)$ product rule

$=-(3\ln 2+\ln 3)$ power rule

prime factorization

6. Condense: $4[\ln z+\ln(z+5)]-2\ln(z-5)$

$4[\ln(z(z+5)]-\ln(z-5)^2$

$\ln[z^4(z+5)^4]-\ln(z-5)^2$

$\ln\left[\frac{z^4(z+5)^4}{(z-5)^2}\right]$

7. Expand: $\ln\frac{x}{\sqrt{x^2+1}}$

$\ln x-\ln(x^2+1)^{1/2}$

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

8. A sample contains 35 grams of carbon, which has a half-life of 5700 years. How much carbon remains after 3000 years?

$\frac{1}{2}=e^{5700r}$

$\ln .5=5700r$

$\frac{\ln .5}{5700}=r$

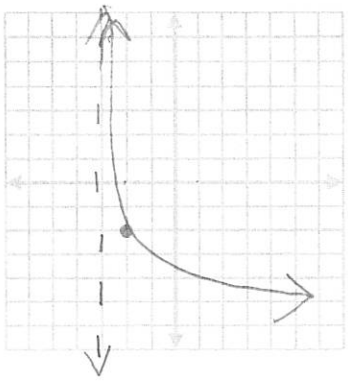
$r\approx -.0001216$

$y=35e^{-.0001216\cdot 5700}$

≈ 24.302 g

Graph the following without a calculator. Include at least one good point and any asymptotes.

9. $y=-\ln(x+3)-2$



10. $y=-e^{x}+5$