Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Group\_\_\_\_\_\_\_\_\_\_ /44

**Logarithmic Functions**

1) Sketch the following functions (4 pts)

|  |  |
| --- | --- |
| a) $f\left(x\right)=-2log\_{3}7\left(x+8\right)-3$ | b) $f\left(x\right)=3log\_{0.5}-3(x+4)+6$ |

2) For each of the functions below, state the domain, whether the function is increasing or decreasing, the value of the zero, whether a y-intercept exists (Y or N) and the equation of the asymptote. (4 pts)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Domain** | **Increasing Decreasing** | **Zero** | **y-int?** | **Asymptote** |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

3) Find the rule of a logarithmic function passing through the points $(-9, 0) $and $(-25, 2)$, with an asymptote at $x=-7$.

 (4 pts)

4) Solve the following logarithmic functions (16 pts)

|  |  |
| --- | --- |
| a) $log\_{2}(5x)-4=-2$ | b) $log\_{4}\left(x^{2}+15x\right)=2$ |
| c) $log\_{2}\left(x^{2}+5\right)-log\_{2}5=log\_{2}6$ | d) 2$log\_{7}\left(-3x+9\right)-2\geq 1$ |
| e) $log\_{6}(x+3)+log\_{6}(x-2)=1$ | f) $log\_{2}\left(x-3\right)+log\_{2}(2x)=3$ |
| g) $log\_{2}\left(x-4\right)+log\_{2}(x+2)=4$ | h) $log\_{3}\left(x+4\right)=log\_{6}6-log\_{3}(x+2)$ |

6) In a manufacturing company, the assembly time (in minutes) varies throughout the training process of their employees according to the rule where *n* is the number of parts assembled. How many parts must be built if the assembly time is 60 minutes?

 (4 pts)

7) In 2001, Albert invested $4000. His investment was compounded annually and by 2009 had grown to $5474.28. He eventually was able to triple his initial investment.

At the same time in 2001, Jocelyn invested a sum of money at the same interest rate as Albert’s investment, compounded annually. In the number of years it took Albert to triple his initial investment, Jocelyn’s investment grew to $15,000.

What was Jocelyn’s initial investment?

 (4 pts)

8) Kelly loves to simplify logs! Dr. James gives her the following question for practice.



Kelly grumbles at the question for a little while, and then calculates a numerical answer to the above expression. What is Kelly’s answer?

 (4 pts)

9) Given $f\left(x\right)=3\left(0.5^{2\left(x+8\right)}\right)-4$ , $g\left(x\right)=3x+2$ , and $h\left(x\right)=f^{-1}\left(g\left(x\right)\right)$

Write the rule for $h(x)$. (4 pts)