## PART 1 - Graphs of Basic Functions

For each of the following graphs, graph them using DESMOS and include a screen-shot of each function in your lab. Then complete the required analysis and include that in your table of results

| Function | Graph | Analysis (D,R, $\mathbf{x}$-int, y -int, asymp) |
| :--- | :--- | :--- |
| $f(x)=-1 / 2(x+1)^{2}+3$ |  |  |
| $f(x)=\frac{2 x-1}{x+4}$ |  |  |
| $f(x)=e^{x}$ |  |  |
| $f(x)=e^{2 x}$ |  |  |
| $f(x)=\ln (x)$ |  |  |
| $f(x)=\ln (2 x)$ |  |  |
| $g(x)=-2 e^{x}+4$ |  |  |
| $h(x)=\tan (x)$ on |  |  |
| $-2 \pi<x<2 \pi$ |  |  |
| $g(x)=-\ln (x+4)$ |  |  |

## PART 2 - Graphing Compositions

For the following graphs, determine the equation of the composite and then graph the composite. For the analysis, describe the transformations of the "parent" function, as well as determining the domain, range, and equations of the asymptotes of the composite function

| Functions and Compositions | Graphs | Analysis (transformations, D/R, asymp) |
| :---: | :---: | :---: |
| $f(x)=e^{x} \text { and } g(x)=x+4$ <br> Graph 1: $y=f \circ g(x)$ <br> Graph 2: $y=g \circ f(x)$ |  | Transformations of $y=e^{x}$ in each of the compositions are $\qquad$ <br> The D/R and asymp of the composite fcn are ... |
| $f(x)=e^{x} \text { and } g(x)=2 x+4$ <br> Graph 1: $y=f \circ g(x)$ <br> Graph 2: $y=g \circ f(x)$ |  | Transformations of $y=e^{x}$ in each of the compositions are ..... <br> The D/R and asymp of the composite fcn are ... |
| $f(x)=\ln (x) \text { and } g(x)=x-5$ <br> Graph 1: $y=f \circ g(x)$ <br> Graph 2: $y=g \circ f(x)$ |  | Transformations of $y=$ $\ln (x)$ in each of the compositions are ..... <br> The D/R and asymp of the composite fcn are ... |
| $f(x)=\ln (x) \text { and } g(x)=1 / 4 x+2$ <br> Graph 1: $y=f \circ g(x)$ <br> Graph 2: $y=g \circ f(x)$ |  | Transformations of $y=$ $\ln (x)$ in each of the compositions are ..... <br> The $D / R$ and asymp of the composite fcn are ... |

## PART 3 - Analysis of Complex Functions

For the following functions, graph them on the required domain and then complete the required analysis (looking for extrema/turning points/stationary points as well as intervals of increase and decrease)

| Function \& domain | Graph | Analysis (extrema, inc/dec) |
| :--- | :--- | :--- |
| $p(x)=x^{3}-2 x^{2}-3 x$ on $x \in R$ |  |  |
| $q(x)=1 / 2 x^{4}-x^{3}+1 / 4 x^{2}+x+1$ <br> on $x \in R$ |  |  |
| $c(x)=\sin \left(e^{0.5 x}\right)$ on <br> $-\frac{\pi}{2} \leq x \leq \frac{3 \pi}{2}$ |  |  |
| $P(x)=e^{0.5 x} \sin (x)$ on <br> $-\pi \leq x \leq 2 \pi$ |  |  |
| $a(x)=2 \ln (3+\cos (x))$ <br> on $-5 \leq x \leq 8$ |  |  |

