Math 418: Worksheet 13

December 9, 2020

1. Suppose $f(x) = e^{2x^2}e^{4x}e$. Show that the graph of $y = \ln(f(x)$ is a parabola and find the vertex. Sketch $y = \ln(f(x))$.
2. Find the slope of the line given by $\tan\left(\frac{-4\pi}{3}\right)x + (\log_{128} 64)y = 12$
3. Use the fact that $x = -3$ is a double root of $f(x) = x^7+3x^6-49x^5-267x^4-360x^3$ to fully factor and sketch $f(x)$.
4. Find the domain of the following functions:
   a) $f(x) = \frac{2}{x^2+x-6}$
   b) $g(x) = \frac{1}{\ln(x)\sqrt{x}}$
   c) $h(x) = \frac{81x^3}{\log_5(2x-3)+10}$
   d) $w(x) = 2\csc(x+3) + \frac{9}{\sin(2x)-1}$
5. Solve the following equations
   a) $\log_2(3x+4) = 19$
   b) $\tan(\theta)\sin(\theta+2) = 0$
   c) $\sec^2(3\psi) = \frac{3}{4}$
   d) $2^{3^{4^x}} = 1000$