More Practice Problems on Background Material

1. Write as a single fraction:

\[
\frac{3}{x(x - 3)} - \frac{2x}{(x - 3)(x + 2)} + \frac{1}{x}.
\]

2. Simplify

\[
\frac{8x^3 + x}{x + x\sqrt{4x}}.
\]

3. Find all the solutions to \(|x^2 - 3| = 1\).

4. Find all the solutions to \((x^2 - 4)(x^2 + 5x + 4) = 0\).

5. Find the equation of the line that passes through the points \((\pi, 0)\) and \((0,5)\).

6. Find the equation of the line that passes through the point \((5, -1)\) and has slope e.

7. Find the \(y\)-intercepts and \(x\)-intercepts of \(f(x) = e^{x^2} - 2\).

8. Problem removed.

9. If \(\tan \theta = 3/4\), find \(\sin \theta\).

10. What is the value of \(\sin(5\pi/6)\), \(\cos(7\pi/4)\), \(\cot(\pi/2)\) and \(\csc(\pi/6)\)?

11. Find all the solutions to \(\ln((2x^2 - 1)^2) = 0\).

12. Simplify \(\ln\left(\frac{e^{2x} \sqrt{x}}{x^2 - \sqrt{x}}\right)\).

13. Write the domain of \(y = \sqrt{x} + \frac{1}{x - 2}\) in interval notation.

14. Let \(f(x) = \tan x\) and \(g(x) = 8x^2 + e^1\). Find \((g \circ f)(x)\).

15. Write \(2^{\ln(4x)}\) as a composition of simpler functions.

16. Graph \(f(x) = \begin{cases} 
  e^x & : x \leq 0 \\
  1 & : 0 < x < 2 \\
  -x^2 & : x \geq 2
\end{cases}\).

17. Draw the graph of \(y = \ln x\).

18. Draw the graph of \(y = x^2 - 4x + 3\).