Background Practice Problems

1. Write as a single fraction:
$$\frac{1}{x+2} + \frac{x}{x^2+5x+6}$$

2. Simplify $\dfrac{\frac{(x+2)^2}{x\cos x}}{\frac{(x+2)\cos x}{x^2}}$.

3. Simplify $(4^{1/2})(27^{2/3})$.

4. Find all solutions to $x^2 - 5x = 6$.

5. Find all solutions to $|2 - x| = 5$.

6. Find the equation of the line passing through the points $(-1,0)$ and $(-3,-4)$.

7. Find the equation of the line passing through the point $(1,1)$ with slope 5.

8. Find the y-intercepts and x-intercepts of $f(x) = x^2 + x - 2$.

9. Find the y-intercepts and x-intercepts of $f(x) = (3 - e^x)(e^x + 1)$.

10. If $\cos\theta = 2/3$ for a value of θ between 0 and $\pi/2$, find $\tan\theta$.

11. We know that $\sin(\pi/2) = 1$. Find $\sin(\pi/3)$, $\cos(3\pi/4)$, and $\cot(\pi/6)$.

12. Find all solutions to $e^{x^2-1} = 1$.

13. Simplify $\ln(xe^x\sqrt{x+1})$.

14. Write the domain of $\ln(x^2 - 4)$ in interval notation.

15. Let $f(x) = x^2$ and $g(x) = 3x + 1$. Compute $(f \circ g)(2)$.

16. Write $\sin(e^{x+1})$ as a composition of elementary functions.

17. Graph $f(x) = \begin{cases} x^2 + 2, & x < 1, \\ -x + 1, & 1 \le x < \pi, \\ \cos x, & x \ge \pi \end{cases}$ on the interval $(-1, 2\pi)$.

18. Draw the graph of $y = \tan x$ on the interval $(-\pi, \pi)$.

19. Draw the graphs of $y = e^x$ and $y = 1/x$.