

# Algebra and Trig-Walk Down Memory Lane

*Instructions:* All of these exercises should be worked out without the use of a calculator.

1. Solve the inequalities

(a)  $4 \leq 3x - 2 < 13$

(b)  $x^2 \leq 5x - 6$

(c)  $\frac{1+x}{1-x} \geq 1$

2. Evaluate each expression

(a)  $\cos(\frac{2\pi}{3})$

(b)  $\tan(-\frac{3\pi}{4})$

(c)  $\csc(\frac{7\pi}{6})$

(d)  $\cot(\frac{7\pi}{3})$

(e)  $\sin(-\frac{5\pi}{4})$

3. Solve the given equation.

(a)  $4 \sin^2 \theta - 3 = 0, 0 \leq \theta \leq 2\pi$

(b)  $\sin \theta + 1 = 2 \cos^2 \theta, 0 \leq \theta \leq 2\pi$

(c)  $P = \frac{A_0}{1 + Be^{-0.8t}},$  (solve for  $t$ )

(d)  $\sin 2\theta = \cos \theta, 0 \leq \theta \leq 2\pi$

(e)  $\tan \theta = \sqrt{3}, -\pi \leq \theta \leq \pi$

(f)  $\frac{2x^2+7x}{x^2+x-2} = \frac{4}{x^2+x-2}$

(g)  $y^2 - 3y = 1 - 2x,$  (solve for  $y$ )

4. Graph the functions. Clearly label all key features like intercepts, asymptotes, max/min values. State the domain and range.

(a)  $y = \frac{2x^2+7x-4}{x^2+x-2}$

(b)  $g(x) = 3 \sin(5x)$  over one full period. State the amplitude, period, and phase shift as well.

(c)  $y = \frac{3}{4} \cos(2\theta + \frac{2\pi}{3})$  over one full period. State the amplitude, period, and phase shift as well.

(d)  $y = t^2 - t - 1$

(e)  $f(t) = 2e^{-6t} + 3$

(f)  $y = \sqrt{2 - 3x} + 1$

(g)  $h(x) = \begin{cases} 3, & |x| < 2 \\ 5, & x = 2 \\ x^2, & |x| > 2 \end{cases}$