Problem 1.1

(a) \(236 \cos \left(\frac{\pi n}{2} + \frac{\pi}{2}\right)\)

(b) \(\cos \left(\frac{\pi n}{16} - \frac{\pi}{2}\right) = -\cos \left(\frac{\pi n}{16} + \frac{\pi}{2}\right) = \sin \left(\frac{\pi n}{16}\right)\)

Problem 1.2

(a) \(\Re \{544 \exp \left(j \frac{\pi n}{3}\right)\}\)

(b) \(\Re \{26e^{j\pi} e^{j\frac{\pi n}{10}}\}\)

(c) \(\Re \left\{5e^{j\frac{\pi n}{10}} e^{-j \tan^{-1}(3/4)}\right\}\)

Problem 1.3

(a) Diagram should show addition of the phasors 1 and -j.

(b) Diagram should show addition of the phasors 1 and -j.

(c) Diagram should show addition of the phasors 1 and \((3 - 3j)\).

Problem 1.4

(a) \(y[n] = \cos \left(2\pi \frac{3}{2} n\right) = \cos \left(\frac{2\pi n}{4}\right)\) aliased, so \(z(t) = \cos (2\pi 1500t)\)

(b) \(y[n] = \cos \left(2\pi \frac{3}{8} n\right)\) with no aliasing, so \(z(t) = \cos (2\pi 4500t)\)
Matlab Exercises

Problem 1.5

(a)

(b)
(c) 

(d)
Problem 1.6

(a)

(b) Same as part (a).

Problem 1.7

(a) Changing the frequency of a tone changes its perceived pitch.

(b) Changing the amplitude of a tone changes its perceived loudness.

(c) Changing the phase of a tone changes nothing perceptible.

Problem 1.8

(a)

(b)

(c)

(d)