NAME: _____

TIME LIMIT: 50 MINUTES   Calculator Allowed: Scientific

The point value of each problem is in the left-hand margin. You must show your work to receive full credit for your answers, except on problem 1. Round off all decimals in your answers to two places. Work neatly.

(20) 1. Fill in the blank.

(a) If $\sin \theta = -\frac{1}{2}$, then $\sin(-\theta) =$ _____ .

(b) $\cos^{-1}(\cos(\frac{7\pi}{6})) =$ _____ .

(c) $1 + \cot^2 \theta =$ _____ is an identity

(d) $\sin 2\theta =$ _____ is a double-angle identity.

(e) Using an angle-sum identity $\cos 85° = \cos 35° \cos 50° -$ _____ .

(f) $\sin(\alpha + \beta) = \sin \alpha$ _____ is an identity for the difference of two angles.

(g) $\sin x + 2 \cos x = \sqrt{5} \sin($ _____ $)$.

(h) The period of the function $y = 2 \tan(\pi x)$ is _____ .

(i) The frequency of the simple harmonic motion described by $d = 3 \sin(2t)$ is _____ .

(j) For any real number x, $\tan(\tan^{-1} x) =$ _____ .

(10) 2. Find the *exact* value of $\sin(165°)$.

(10) 3. Suppose angle α is in the first quadrant and angle $(\alpha + \beta)$ is in the second quadrant. Find the *exact* value of $\sin \beta$ if $\sin \alpha = \frac{3}{5}$ and $\cos(\alpha + \beta) = -\frac{5}{13}$.

(15) 4. Find the *exact* value of $\sin\left(\sin^{-1} \frac{12}{13} - \cos^{-1} \frac{4}{5}\right)$

(15) 5. Prove the identity $\frac{\sec x + \tan x}{\sec x - \tan x} = (\sec x + \tan x)^2$.

(15) 6. Draw the graph of $y = -\tan(\frac{x}{2})$ by first stating its period, phase shift, and plotting several points.

(15) 7. Draw the graph of $y = 2\sin(x - \frac{\pi}{6})$ by first stating its amplitude, period, phase shift, and plotting several points.