Name: _____   Date: _____

4.2 Trigonometric Ratios and Special Angles

1. Use a calculator to evaluate each trigonometric ratio, to four decimal places.
   a) cos 3.43   **b)** sin 2.92
   c) tan 5.61   **d)** csc 1.27
   e) cot 4.53   **f)** sec 0.98

2. Use a calculator to evaluate each trigonometric ratio, to four decimal places.
   a) $\sin\dfrac{2\pi}{3}$ **b)** $\tan\dfrac{\pi}{6}$

   c) $\cos\dfrac{5\pi}{4}$ **d)** $\cot\dfrac{3\pi}{7}$

   e) $\sec\dfrac{16\pi}{3}$ **f)** $\csc\dfrac{5\pi}{11}$

3. Use the unit circle to determine exact values for the six trigonometric ratios for $\dfrac{11\pi}{6}$.

4. Julia is flying a kite at the end of a 36 m string. The string makes an angle of $\dfrac{\pi}{3}$ with the ground. The wind decreases and the kite flies lower until the string makes an angle of $\dfrac{\pi}{6}$ with the ground.
   a) Determine an exact expression for the horizontal distance that the kite moves between the two positions.
   b) Determine an approximate answer, to the nearest tenth of a metre, for the vertical distance that the kite moves between the two positions.

5. **a)** Determine an exact value for each expression.
   i) $\sin\dfrac{\pi}{3}\ \tan\dfrac{\pi}{4} - \cos\dfrac{\pi}{3}\ \tan\dfrac{\pi}{6}$

   ii) $\dfrac{\sin\dfrac{2\pi}{3} + \cos\dfrac{3\pi}{4}}{\cos\dfrac{5\pi}{4} - \sin\dfrac{5\pi}{3}}$

   iii) $\tan\dfrac{2\pi}{3} + \sec\dfrac{5\pi}{4}\ \sin\dfrac{7\pi}{6}$
   b) Use a calculator to check your answers to part a).

6. **a)** Determine an exact value for each expression.
   i) $\cos\dfrac{2\pi}{3}\ \cos\dfrac{5\pi}{6} + \sin\dfrac{2\pi}{3}\ \sin\dfrac{5\pi}{6}$

   ii) $\sin\dfrac{5\pi}{6}\ \cos\dfrac{4\pi}{3} - \cos\dfrac{5\pi}{6}\ \sin\dfrac{4\pi}{3}$

   iii) $\dfrac{\tan\dfrac{7\pi}{3} - \tan\dfrac{5\pi}{3}}{1 + \tan\dfrac{7\pi}{3}\ \tan\dfrac{5\pi}{3}}$
   b) Use a calculator to verify your answers to part a).

7. Determine an expression using trigonometric ratios of special angles that simplifies to an answer of zero. You must use three different angles and three different ratios.