Exam 4 Review

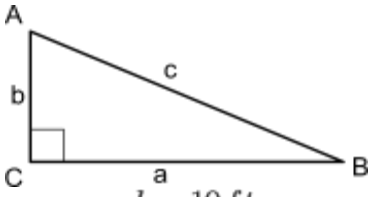
1. a. Convert $\frac{3\pi}{4}$ to degrees.

   b. Convert 320° to radians.

   c. Are the angles -27° and 337° coterminal?

   d. Find an angle between 0° and 360° that is coterminal with 477°

2. Refer to the diagram to answer the following questions. Round answers to two decimal places.



   a. If side $b = 10ft$ and angle $B = 35^\circ$, find sides *a* and *c* and angle A.

   b. If angle $A = 52^\circ$ and side $c = 1.02m$, find sides *a* and *b* and angle B.

3. For each angle θ in standard position, find the corresponding point (x,y) on the unit circle:

   a. $\theta = 30^\circ$ b. $\theta = 135^\circ$ c. $\theta = 240^\circ$

4. For each of the following angles θ: i) find the reference angle, and ii) find $\sin\theta,\ \cos\theta$ and $\tan\theta$ (give exact answers, not decimal approximations).

   a. $\theta = 120^\circ$ b. $\theta = 225^\circ$ c. $\theta = 330^\circ$ d. $\theta = \frac{9\pi}{4}$

5. From the information given, find the quadrant of the terminal side of the angle θ, and find the values of the six trig functions of θ (give exact answers).

   a. $\cos\theta = -\frac{4}{5}$ and $\sin\theta < 0$

   b. $\sin\theta = \frac{1}{3}$ and $\tan\theta > 0$

   c. $\tan\theta = -\frac{5}{2}$ and $\cos\theta < 0$

6. a. The beach in Brooklyn Bridge park is 1716 feet from the nearest tower of the

Brooklyn Bridge. Standing on the beach, the angle of elevation to the top of the tower is 9.14°. Find the height of the tower above the water, to the nearest foot.

b. From the top of a 100m cliff, the angle of depression to a distant lighthouse is 25°. How far is the lighthouse from the base of the cliff? Round your answer to the nearest tenth of a meter.

7. For each of the following functions, find the amplitude, the period, and sketch a graph (showing at least one complete cycle). *NOTE: angles are measured in degrees.*

a. $f(t)=3\sin(2t)$ b. $g(t)=-\frac{1}{2}\sin(\frac{2}{3}t)$ c. $h(t)=2\cos(4t)$

8. Given each triangle ΔABC (*not* necessarily right triangles), answer the following. Round answers to one decimal place.
   a. If $a=7, b=9$ and $c=4$, find angle B.
   b. If $A=30^\circ$, $C=80^\circ$ and $a=14ft$, find side *c*.
   c. If $b=35$, $c=22$ and $A=17^\circ$, find side *a*.

9. Verify the following identities:
   a. $\tan\theta(\cot\theta+\tan\theta)=\sec^2\theta$
   b. $(1+\sin\theta)(1-\sin\theta)=\cos^2\theta$
   c. $\frac{\sin\theta\cos\theta+\cos\theta}{\sin\theta+\sin^2\theta}=\cot\theta$
   d. $\frac{1-\cos x}{\sin x}=\frac{\sin x}{1+\cos x}$

Answer Key

1. a. 135° b. $\frac{16\pi}{9}$ c. No, they are not coterminal. d. 117°

2. a. $A = 55^\circ, a = 14.28ft, c = 17.43ft$

   b. $B = 38^\circ, a = 0.80m, b = 0.63m$

3. a. $(\frac{\sqrt{3}}{2}, \frac{1}{2})$ b. $(-\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$ c. $(-\frac{1}{2}, \frac{\sqrt{3}}{2})$

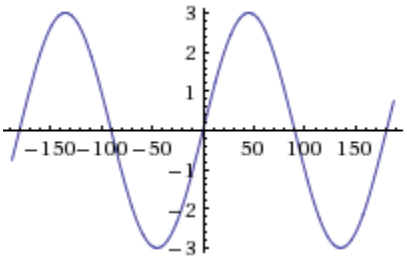
4.	reference angle θ_r	$\sin\theta$	$\cos\theta$	$\tan\theta$
a.	60°	$\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	$-\sqrt{3}$
b.	45°	$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$	1
c.	30°	$-\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{3}}{3}$
d.	$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1

5.	Quadrant	$\sin\theta$	$\cos\theta$	$\tan\theta$	$\sec\theta$	$\csc\theta$	$\cot\theta$
a.	QIII	$-\frac{3}{5}$	$-\frac{4}{5}$	$\frac{3}{4}$	$-\frac{5}{4}$	$-\frac{5}{3}$	$\frac{4}{3}$
b.	QI	$\frac{1}{3}$	$\frac{2\sqrt{2}}{3}$	$\frac{\sqrt{2}}{4}$	$\frac{3\sqrt{2}}{4}$	3	$2\sqrt{2}$
c.	QII	$\frac{5\sqrt{29}}{29}$	$-\frac{2\sqrt{29}}{29}$	$-\frac{5}{2}$	$-\frac{\sqrt{29}}{2}$	$\frac{\sqrt{29}}{5}$	$-\frac{2}{5}$

6. a. The height of tower above the water is 276 ft.

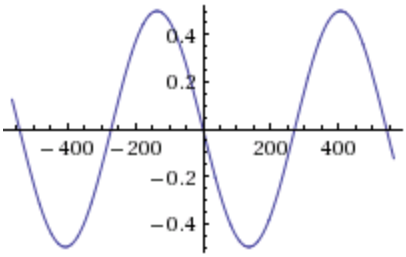
b. The lighthouse is 214.5 meters from the base of the cliff.

7. a. amplitude = 3, period = 180



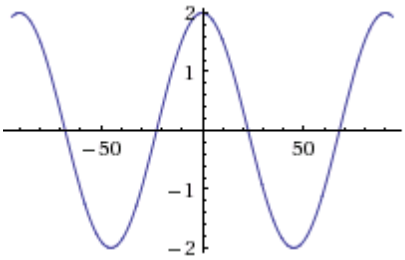
(x from −150 to 150)

b. amplitude = $\frac{1}{2}$, period = 540



(x from −400 to 400)

c. amplitude = 2, period = 90



(x from −75 to 75)

8. a. $B = 106.6^\circ$ b. $c = 27.58 ft$ c. $a = 15.37$

9. *HINTS:*

a. Remember that $\tan\theta \cot\theta$ *is equal to 1 (this is because* $\cot\theta = \frac{1}{\tan\theta}$*)*

b. Multiply using FOIL. Then use the identity $\sin^2\theta + \cos^2\theta = 1$ *(you will have to rearrange this identity before you use it!)*

c. Factor the top and bottom of the fraction, then see if there is anything you can

cancel.

d. Start with the left hand side, multiply top and bottom by $1+\cos x$