Trigonometry Review

Topics:

- Trigonometric ratios (Primary and Reciprocal)
- Sine Law and Cosine Law
- The ambiguous case for sine law
- Word Problems
- Angles on the Cartesian Plane
- Special angles
- Trigonometric Identities
- Solving equations

Suggested review questions to work on:
Make sure you have a complete set of notes and have done all the homework questions first!

pg. 265 #1 – 5
pg. 313 #1 – 4, 6 – 15, 17 – 19
pg. 413 #10, 11, 13, 14 use $0 \leq \theta < 360^\circ$
pg. 416 #32, 33, 35 – 37 (obviously not the graphing calculator part) use $0 \leq \theta < 360^\circ$
note: you are <u>not</u> responsible for radian measure; which is in your textbook but not in this course

Supplementary problems
(These are sample questions for each topic; look at the textbook questions as well!):

#1: Evaluate each of the following (to 4 decimal places).

a) csc 47° c) sec 16° e) cot 29°
b) sin 158° d) cos 98° f) tan 118°

#2: When do you need to consider the ambiguous case of the sine law?

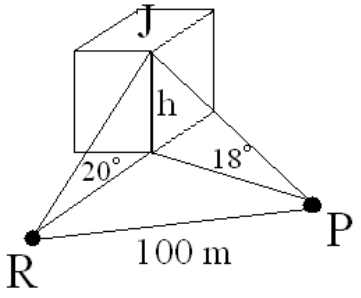
#3: Solve each of the following triangles - you will either get two triangles, one triangle or no triangles

a) ∠A = 42° a = 30 b = 25
b) ∠B = 27° b = 25 a = 30
c) ∠E = 38.7° e = 10 b = 25

#4: An airplane flying at a height of 9750 m observes that the angle of depression with one shore of a lake is 32º and the angle of depression with the opposite shore of the lake is 40º. What is the width of the lake, to the nearest metre?

#5: The interior angles of a triangle are 120º, 40º, and 20º. The longest side is 10 cm longer than the shortest side. Determine the perimeter of the triangle to the nearest centimetre.

#6: Suppose Romeo is serenading Juliet while she is on her balcony. Romeo is facing north and sees the balcony at an angle of elevation of 20º. Paris, Juliet's other suitor, is observing the situation and is facing west. Paris sees the balcony at an angle of elevation of 18º. Romeo and Paris are 100 m apart as shown. Determine the height of Juliet's balcony above the ground, to the nearest metre.



#7: Predict the quadrant(s) which will contain the terminal arm for the angle in each of the following rations.

a) $\sin\theta=-0.43$ b) $\tan\theta=0.8562$ c) $\sec\theta=-1.7691$

#8: Given $\cos\theta=\frac{12}{13}$ with the terminal arm of θ in Q4, determine the exact value of the other two ratios.

#9: Determine two angles, one positive and one negative, co-terminal with $115°$.

#10: Determine the measure of the angle θ, $0\le\theta<360°$ if:

a) $\cos\theta=\frac{-1}{2}$ b) $\sin\theta=\frac{\sqrt{3}}{2}$ c) $\cos\theta=\frac{-1}{\sqrt{2}}$ and $\sin\theta=\frac{-1}{\sqrt{2}}$

#11: Without using your calculator, state the exact values for:

a) sin 30° b) cos 45° c) sin 135° d) cos 120° e) sin 240° f) cos 300°

#12: What is the point (*x*, *y*) on the unit circle at an angle of rotation of:

a) 60° b) 90° c) 150° d) 225°

#13: Find the measure of the angle θ to the nearest degree ($0\le\theta<360°$).

a) sin θ = –0.4848 c) cos θ = –0.4384 e) tan 2θ = 7.1154

b) csc θ = 1.0154 d) $7\cos\theta+3=5\cos\theta+4$

#14: Find the measure of the angle θ to the nearest tenth of a degree ($0\le\theta<360°$).

a) $\cos^2\theta+3\cos\theta-4=0$ b) $2\cos\theta+3\tan\theta=0$

c) $-10-7\cos\theta=6\cos^2\theta-9$ d) $\sec^2\theta=3\tan^2\theta+\tan\theta$

#15: Verify the following identities.

a) $\tan\theta+\cot\theta=\sec\theta\ \csc\theta$ b) $\sin^2\theta\ \sec^2\theta=\sec^2\theta-1$ c) $\frac{\sin x}{\csc x}+\frac{\cos x}{\sec x}=1$

d) $\sin\theta=\frac{\sec\theta}{\tan\theta+\cot\theta}$ e) $\frac{\tan^2 x-1}{\sec^2 x}=\frac{\tan x-\cot x}{\tan x+\cot x}$ f) $\sin^2\theta+\tan^2\theta=\sec^2\theta-\cos^2\theta$

Answers to Supplementary Problems:

1. a) 1.3673 b) 0.3746 c) 1.0403 d) –0.1392 e) 1.8040 f) –1.8807
2. When you are given SSA (two sides and an angle opposite one of them – the known angle is not contained between given sides)
3. a) $\angle$ B = 34°, $\angle$ C = 104°, c = 44
   b) $\angle$ A = 33°, $\angle$ C = 120°, c = 48 or $\angle$ A = 147°, $\angle$ C = 6°, c = 5.8
   c) no solution
4. 27000 m 5. 35 cm 6. 24 m 7. a) Q3 & Q4 b) Q1 & Q3 c) Q2 & Q3
8. $\sin\theta=\frac{-5}{13},\tan\theta=\frac{-5}{12}$ 9. 475° and -245°, answers may vary.
10. a) 120° and 240° b) 60° and 120° c) 225°
11. a) $\frac{1}{2}$ b) $\frac{1}{\sqrt{2}}$ c) $\frac{1}{\sqrt{2}}$ d) $\frac{-1}{2}$ e) $-\frac{\sqrt{3}}{2}$ f) $\frac{1}{2}$
12. What is the point (*x*, *y*) on the unit circle at an angle of rotation of:
    a) $\left(\frac{1}{2},\frac{\sqrt{3}}{2}\right)$ b) (0, 1) c) $\left(-\frac{\sqrt{3}}{2},\frac{1}{2}\right)$ d) $\left(-\frac{1}{\sqrt{2}},-\frac{1}{\sqrt{2}}\right)$
13. a) 209° or 331° b) 80° or 100° c) 116° or 244° d) 60°, or 300° e) 41°, 131°, 221°, or 311°
14. a) 0° b) 210° or 330° c) 100°, 180°, or 260° d) 26°, 135°, 209°, or 315°