

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 $0 \leq \theta \leq 360^\circ$

pg. 416 #32, 33, 35 – 37 (obviously not the graphing calculator part) use $0 \leq \theta \leq 360^\circ$

note: you are not responsible for radian measure; which is in your textbook but not in this course – next year ☺

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) $\csc 47^\circ$ | c) $\sec 16^\circ$ | e) $\cot 29^\circ$ |
| b) $\sin 158^\circ$ | d) $\cos 98^\circ$ | f) $\tan 118^\circ$ |

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

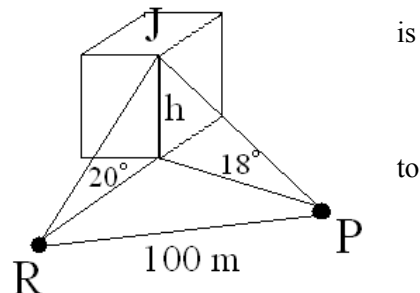
#3: Solve each of the following triangles - you will either get two triangles, one triangle or no triangles

- | | | |
|----------------------------|--------|--------|
| a) $\angle A = 42^\circ$ | a = 30 | b = 25 |
| b) $\angle B = 27^\circ$ | b = 25 | a = 30 |
| c) $\angle E = 38.7^\circ$ | 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 32° and the angle of depression with the opposite shore of the lake is 40° . What is the width of the lake, to the nearest metre?

#5: The interior angles of a triangle are 120° , 40° , and 20° . 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 20° . Paris, Juliet's other suitor, is observing the situation and is facing west. Paris sees the balcony at an angle of elevation of 18° . Romeo and Paris are 100 m apart as shown. Determine the height of Juliet's balcony above the ground, the nearest metre.



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

- a) $\sin \theta = -0.43$ b) $\tan \theta = 0.8562$ c) $\sec \theta = -0.7691$

#8: Given $\cos \theta = \frac{12}{13}$ with the terminal arm of θ in QIV, 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 , $0^\circ < \theta \leq 360^\circ$ 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: State the exact values for:

- a) $\sin 30^\circ$ b) $\cos 45^\circ$ c) $\sin 135^\circ$ d) $\cos 120^\circ$ e) $\sin 240^\circ$ f) $\cos 300^\circ$

#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 ($0^\circ < \theta \leq 360^\circ$).

- a) $\sin \theta = -0.4848$ c) $\cos \theta = -0.4384$ e) $\tan 2\theta = 7.1154$
b) $\csc \theta = 1.0154$ d) $7 \cos \theta + 3 = 5 \cos \theta + 4$

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

- a) $\cos^2 \theta + 3 \cos \theta - 4 = 0$ b) $3 \cos \theta + 3 \tan \theta = 0$
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) $\angle B = 34^\circ$, $\angle C = 104^\circ$, $c = 44$, b) $\angle A = 33^\circ$, $\angle C = 120^\circ$, $c = 48$ or $\angle A = 147^\circ$, $\angle C = 6^\circ$, $c = 5.8$
c) no solution
4. 4139 m 5. 35 cm 6. 24 m 7. a) QIII & VI b) QI & III c) QII & III
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° f)
14. b) 210° or 330° d) 26° , 135° , 209° , or 315°