

Trigonometry Review (Part I)

Tips

- There are three fundamental skills you need to know for this unit. What makes questions more difficult is that you need to know when to use each of the skills. They are:
 1. Using the Pythagorean theorem to find the third side of a right triangle.
 2. Using trig functions to find the unknown side of a triangle
 3. Using inverse trig functions to find the unknown angle in a triangle.
- Never round numbers until you report your final answer. If necessary, write down 5 or 6 decimal places for any intermediate values you use in your calculations. Better yet, just don't erase anything from your calculator.
- Word problems require a picture. Don't even attempt a word problem without drawing a picture.
- Normally, the vertices of a triangle are labelled with capital letters, while the sides are labelled with lower-case letters. The side across from each vertex has the same letter.

Steps for finding an unknown side:

1. Locate the angle you know
2. Label the sides of the triangle from this perspective
3. Circle a side whose length is known and the side you're looking for.
4. Decide on which trig ratio to use.
5. Write an equation with that trig ratio.
6. Solve for the unknown side.

Steps for finding an unknown angle:

1. Locate the angle you are looking for.
2. Label the sides of the triangle from this perspective
3. Circle the sides you know.
4. Decide on which trig ratio to use.
5. Write an equation with that trig ratio and the unknown angle.
6. Use an inverse trig function to find the unknown angle.

Questions

1. In triangle ABC, angle B is a right angle. AB has a length of 5 units, and BC has a length of 12 units. What is the length of the third side? What is the measure of angle A?
2. A car accident occurs 100 km east of Vancouver. The nearest helicopter ambulance is 40 km north of Vancouver. If it flies to the scene of the accident at a speed of 180 km/h, how long will it take to get there?
3. A plane is flying straight north. It arrives at a point where it needs turn 32 degrees towards the east. If it flies along this path for 150 km, how much farther north is it than when it turned?
4. A person is standing on top of a building. If they look at the roof of a taller building, the angle of elevation is 11 degrees. If they look at the bottom of that same building, the angle of depression is 62 degrees. If the other building is 110 metres away from the one on which the person is standing, how tall is the other building?
5. A person is standing on top of a building. If they look at the roof of a shorter building, the angle of depression is 15 degrees. If they look at the bottom of that same building, the angle of depression is 45 degrees. If the buildings are 55 metres apart, how tall is the other building?
6. An airplane is flying at a speed of 850 km/h. A person on the ground watches the plane for one minute after it passes directly over top of them. After one minute, the angle of elevation required to look at the plane is 68 degrees. How high is the plane?
7. A person is watching the space shuttle launch. The shuttle flies directly up, and the launch pad is 4 km away from the person. After 20 seconds, the angle of elevation to the shuttle is 15 degrees. After 50 seconds it is 45 degrees. How many times higher is the space shuttle after 50 seconds than after 20 seconds?
8. In triangle DEF, angle E is a right angle, side DF has a length of 10 and side EF has a length of 5. If the length of side EF is doubled, describe how angle D changes. What if the length of EF is tripled? What if it is made ten times longer?