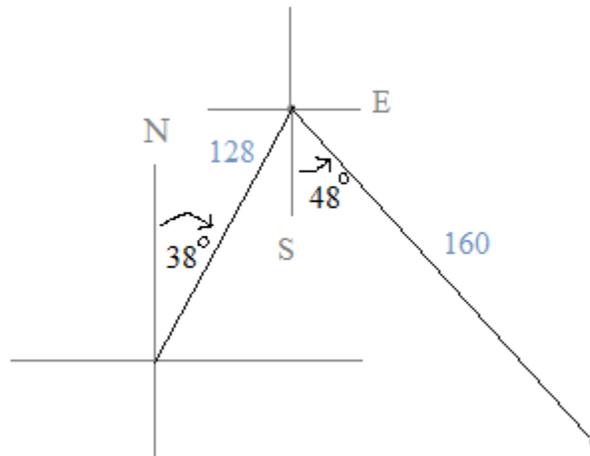
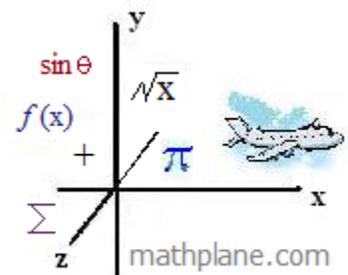


# Trigonometry: PREVIEW

## Navigation, Direction, and Bearings



Includes notes, terms, examples, and practice test (& solutions)



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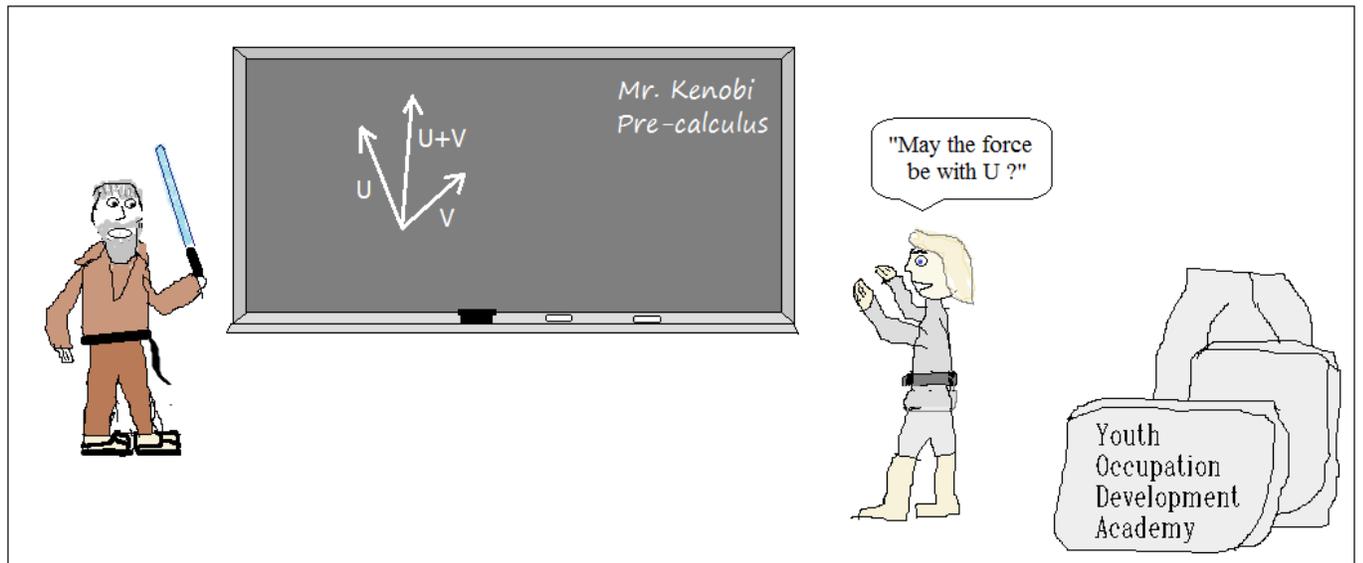
IV. Examples

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VI. Practice Quiz & Solutions

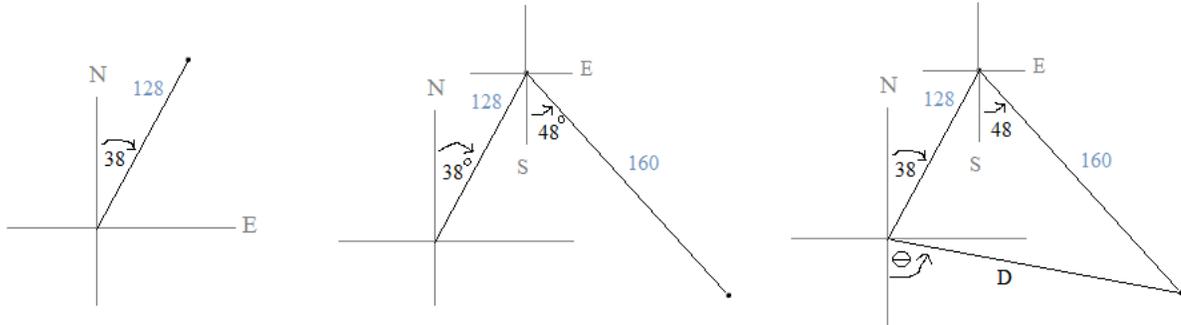
*A long time ago,  
in a classroom  
far, far away...*

Math Lessons  
from the Jedi

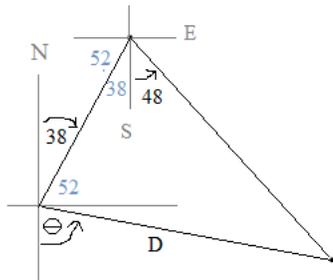


IV. Example: A hiker leaves his campsite and walks 128 meters N38E. Then, turns and walks 160 meters S48E.

- What is the *distance* from the campsite?
- What is the *compass reading* from the starting point?

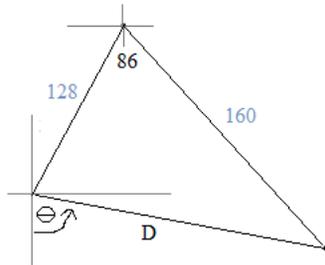


Use Geometry concepts to identify angles.  
Then, use trig concepts to find side and compass reading.



Parallel lines cut by transversal  
(alternate interior angles)

complementary angles  
(add up to 90 degrees)



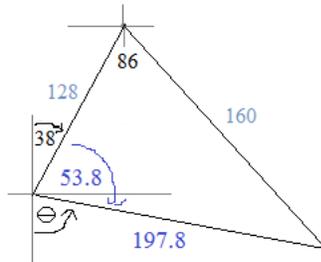
Law of cosines to find D:

$$D^2 = 128^2 + 160^2 - 2(128)(160)\cos 86^\circ$$

$$D^2 = 41984 - 40960(\cos 86)$$

$$D^2 = 39127$$

$$D = 197.8$$



Law of sines to find angle:

$$\frac{\sin x}{160} = \frac{\sin 86}{197.8}$$

$$\sin x = \frac{160(\sin 86)}{197.8} = .807$$

$$x = 53.8 \text{ degrees}$$

Distance back to the campsite? 197.8 meters

Compass reading from the campsite?  $180 - 38 - 53.8 = \ominus$   
 $\ominus = 88.2^\circ$

S88.2E

Trigonometry quiz: Navigation

1) A ship leaves port and travels 20 miles at a bearing of  $N32E$ . Then, another ship leaves the port and travels 28 miles at a bearing  $S42E$ . What is the distance between the two ships?

2) What direction has a bearing of 225 degrees?

3) A racer runs 5 miles north, 2 miles west, 3 miles north, and 4 miles west. How far is he from the starting line?

4) A math explorer leaves his home base and travels in the direction  $N 70^\circ W$ . He travels 30 miles and reaches the rest station. The next week, he travels 50 miles in the direction  $N 10^\circ E$ , reaching his destination.

a) Find the distance between the home base and the destination.

b) Find the bearing from the final destination back to the home base.

5) If the bearing from A to B is 115 degrees, what is the bearing from B to A?

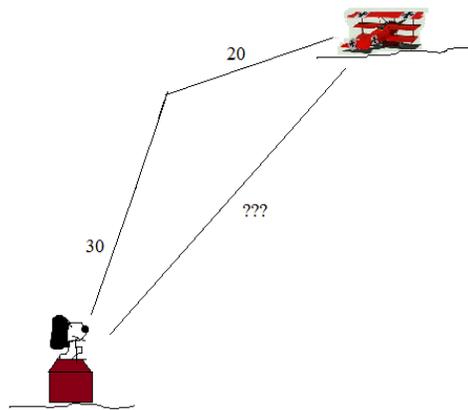
6) Two planes simultaneously take off from an airport. A plane flies 400 miles/hour at a bearing of 70 degrees. And, B plane flies 500 miles at a bearing of 300 degrees. How far apart are they after three hours?

- 7) On a map, Maytown is due south of Davidville and southeast of Vicksburg.  
If Maytown is 40 miles from Davidville, and Maytown is 55 miles from Vicksburg, and Vicksburg is 45 miles from Davidville,  
what *bearing* is required to get from Maytown to Vicksburg?

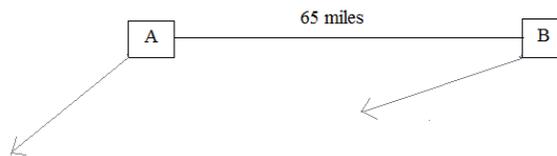
- 8) Airports A and B are 400 miles apart.  
Maverick flies northwest from airport A to airport C.  
From C, he flies 350 miles at a heading (bearing) of 215 degrees to airport B.  
How far is airport C from A?

- 9) The Red Baron leaves Peanuts Airfield at noon and travels  $N25^{\circ}E$  for 30 miles. Then, the Baron turns and flies another 20 miles in the  $N72^{\circ}E$  direction before landing at Woodstock Airfield to refuel.

At 1:00 PM, Snoopy leaves Peanuts Airfield to pursue the Baron. How far, and in which direction, should Snoopy travel to get to Woodstock as fast as possible?



- 10) Car 1 leaves Station A and goes 40 miles/hour at  $S45^{\circ}W$ . Simultaneously, 65 miles due East, Car 2 leaves Station B and travels  $S70^{\circ}W$ . Two hours later, Car 2 collides with Car 1!! Assuming each car was going straight at their constant speeds, how fast was Car 2 traveling?



Thanks for checking out this **PREVIEW**. To see more examples, notes, and the solutions to the practice test, order the "Product file" at TeachersPayTeachers, or visit mathplane.com. (Trigonometry/Navigation)

Best always,

Lance

(\*\*Appreciate your support. All proceeds go to site maintenance and treats for my dog, Oscar!)

