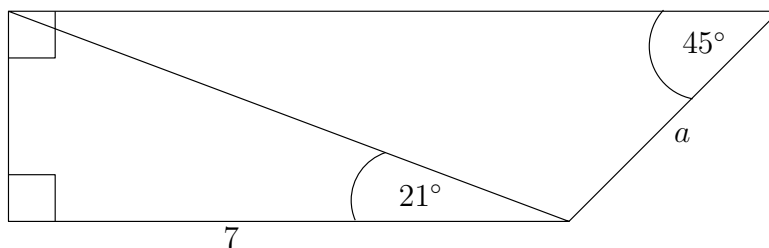


Math 152 Sec S0601/S0602
Practice Problems for Test 2

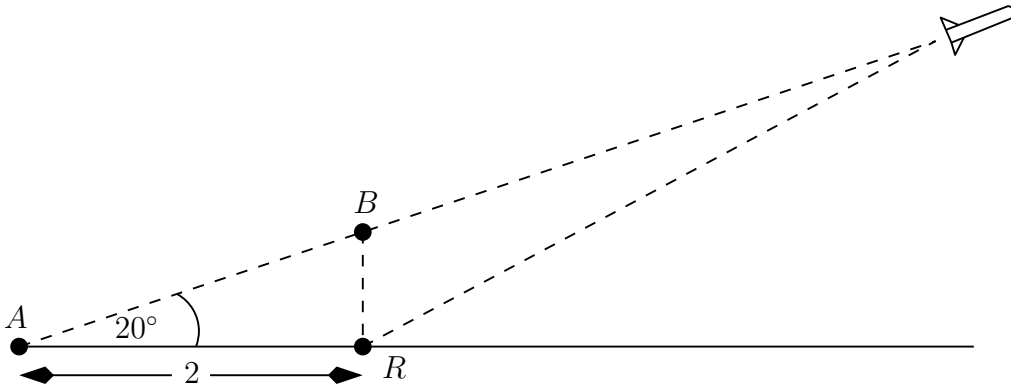
The following problems are good practice for the upcoming test. Some are challenging, but completely within the scope of the material we have covered. Round any final calculator answers to 1 decimal.

- Express $-\frac{5}{2} \cos(2(x - \pi/4)) - \frac{5}{2}$ as a sine function. (a trig identity may help here).
- The maximum value of $y = \pi^2 \sin(\pi x + 1) + 1$ is $y = \pi^2 + 1$. What is the smallest positive value of x where this maximum occurs?
- Carefully graph $y = \frac{1}{3} \sin(3x + \pi/2) + \frac{2}{3}$. Be sure to show the x and y axes with labels, as well as the scale on both axes.
- What is the period of $y = 6 \sin(2t) \cos(2t)$?
- The function $y = [\sqrt{3}(\sin t + \cos t)]^2$ can be written as a single transformed sine function. Find the period, phase-shift, amplitude and vertical displacement of this function.
- Compute exactly:
 - $\csc(-77\pi/4)$
 - $\sec(13\pi/6 + \pi)$
 - $\cot(1035\pi/6) \tan(1035\pi/6)$
- Compute exactly, making use of trig identities if necessary:
 - $\sec(-\pi/12)$ (hint: $1/4 - 1/6 = 1/12$)
 - $\cos^2(-\pi/8)$
 - $(\sin(\pi/7) + \cos(\pi/7))^2 - \sin(2\pi/7)$
- Suppose $\cos(\alpha + \pi) = 1/2$. What is $\cos(\alpha)$?
- Suppose $\sin(\alpha + \pi/6) = 7/8$ and $\cos \alpha = 1/3$. What is $\sin \alpha$?
- A right triangle has angle α with $\sec \alpha = 3/2$ and hypotenuse of length 6. How long is the side opposite α ?
- A right triangle has angles 90° , α and β , with $\csc \alpha = 5/4$; what then is $\tan \beta$?
- Find the length of the side a in the following figure:

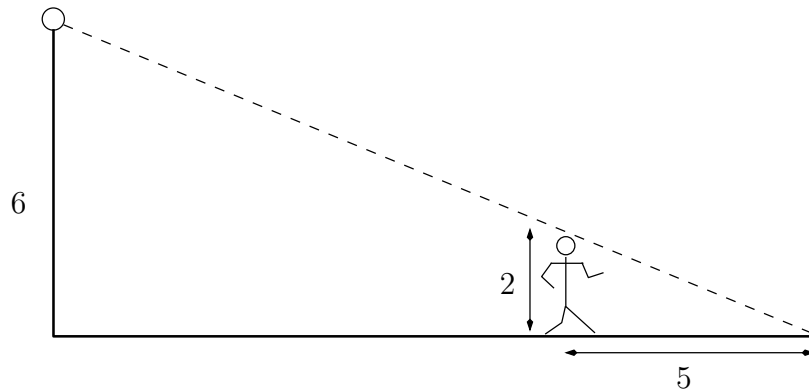


13. A test rocket traveling at 900 km/hr is climbing at an angle of 20° as shown in the figure below. A radar station at point R located 2 km from the launch point A is tracking the rocket.

- (i) How far away is the rocket from the radar station 3 seconds after the rocket passes through point B directly overhead?
- (ii) How far is the rocket from the launch point at this same instant?
- (iii) How high above the ground is the rocket at this same instant?



14. A person of height 2 m casts a shadow of length 5 m while standing a certain distance from a light atop a 6 m tall lamppost. How far from the lamppost is the person? (If you think about it you can do this without trig.)



15. Two observers located 5 km apart see a UFO between them in the sky. One observer measures the angle of elevation to the UFO to be 23° , while the other measures it to be 31° . How far is the UFO from each observer, and how far is it above the ground?