Trig Applications (Word Problems)
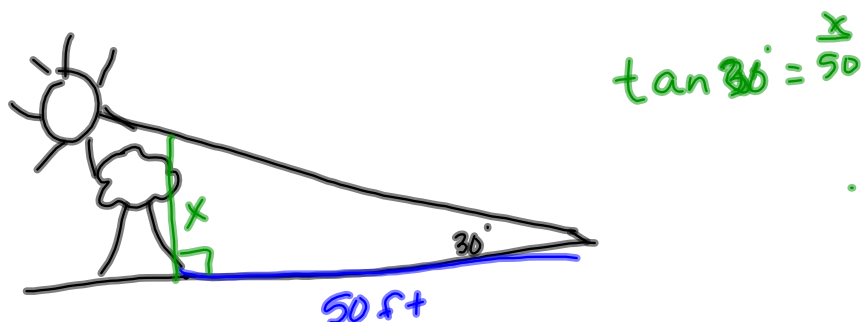
Applications

<u>Ex 4</u>

If the sun is 30° up from the horizon and shining on a tree
forming a 50-foot shadow, how tall is the tree?

$$\tan 30° = \frac{x}{50}$$

50 ft

A ship leaves at noon and heads due west at 20 knots, or 20 nautical miles per hour. At 2 p.m. the ship changes course to
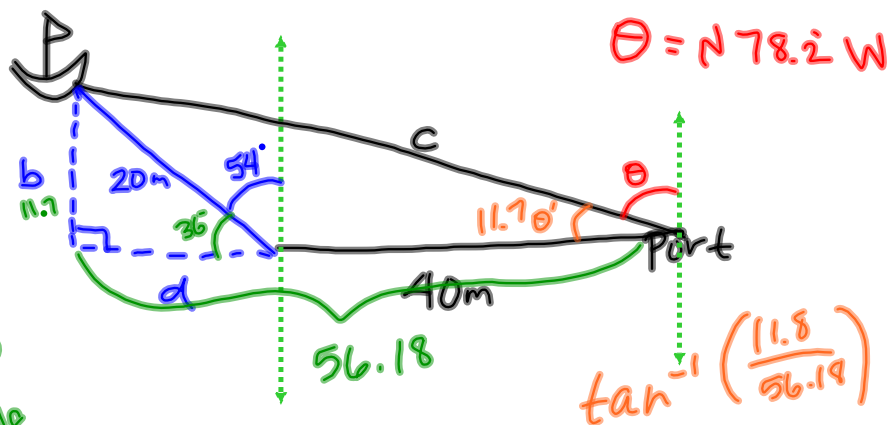N 54o W. Find the ships bearing and distance from the port of departure at 3 p.m.

$C = 57$ n.m.

$\theta = N\,78.2\,W$
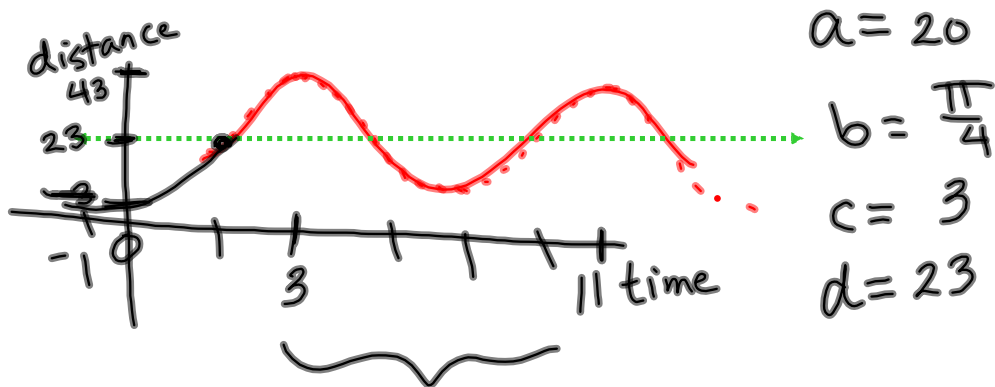
$\sin 36° = \dfrac{b}{20}$

$b = 11.8$

$\cos 36° = \dfrac{d}{20}$

$d = 16.18$

P

b
11.7

20m

54°

36°

c

11.7°

θ

Port

40m

56.18

$\tan^{-1}\left(\dfrac{11.8}{56.19}\right)$

As you ride the Ferris wheel, your distance from the ground varies sinusoidally with time. Let t be the number of seconds that have elapsed since the Ferris Wheel started (this does not include loading the Ferris wheel). You find that it takes you 3 seconds to reach the top, 43 feet above ground, and that the wheel makes a revolution once every 8 seconds. The diameter of the wheel is 40 feet.

$$a = 20$$

$$b = \frac{\pi}{4}$$

$$c = 3$$

$$d = 23$$

$$d = 20\cos\frac{\pi}{4}(t - 3) + 23 \qquad \frac{2\pi}{b} = 8$$

$$d = 20\cos -\frac{3\pi}{4} + 23 \qquad 8b = 2\pi$$

$$20\left(-\frac{\sqrt{2}}{2}\right) + 23 \qquad b = \frac{2\pi}{8} = \frac{\pi}{4}$$

$$-10\sqrt{2} + 23$$

$$8.86 \text{ ft}$$