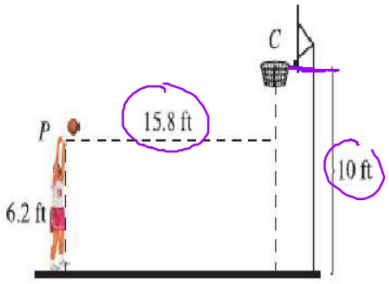
Find a set of parametric equation for the circle

25. Center (5, -2) with radius 8

$x = 8\cos\theta + 5 \qquad y = 8\sin\theta - 2$

- Through the 2007–2008 season, Mark Price had the best ever lifetime free-throw percentage in the National Basketball Association at 0.904. Suppose that when Price releases the ball, its center is 15.8 feet from the center of the basket. The basket is 10 ft above the floor. A free-throw will go in the basket if the center of the ball is within 4.25 in. of the center of the basket as shown below.
- When Mark Price shoots from the free-throw line, the ball follows a path that can be described by the following parametric equations.

$x = 25t \cos 65^\circ$ $\qquad$ $y = 25t \sin 65^\circ - 16t^2 + 6.2$



$x = 25t \cos 65^\circ$ $\quad\quad$ $y = 25t \sin 65^\circ - 16t^2 + 6.2$

a. Explain what the 23 and ~~60~~ 65° tell you about the free-throw shot.

Initial velocity the ball is shot with is 23 ft/sec

The ball is shot an angle of 65°

b. At what time t does the ball reach the height of the basket? Show your algebra.

$10 = 25t \sin 65 - 16t^2 + 6.2$

$-10 \quad\quad\quad -10$

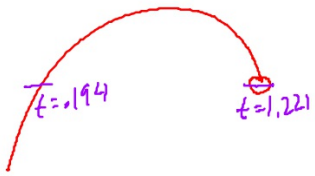
$0 = -16t^2 + 25t \sin 65 - 3.8$

$0 = -16t^2 + 22.657t - 3.8$

$A = -16 \quad B = 22.657 \quad C = -3.8$

$t = \frac{-B \pm \sqrt{B^2 - 4AC}}{2A}$

$t = .194, 1.221$



$x = 25t \cos 65^\circ$ $y = 25t \sin 65^\circ - 16t^2 + 6.2$

c) Assuming that Price shoots the ball on an accurate path toward the center of the basket, will the shot go in the basket? Show your work.

$t = 1.221$

$x = 25(1.221)\cos 65^\circ$

$x = 12.907$

Air Ball

d. Assuming Mark Price shoots the ball at the same angle of ~~68~~ 65°, what should the velocity be to get the ball in the basket.

$x = vt\cos 65^\circ$

$\frac{15.8}{t\cos 65^\circ} = \frac{vt\cos 65^\circ}{t\cos 65^\circ}$

$\frac{15.8}{t\cos 65^\circ} = v$

$\frac{15.8}{1.371\cos 65^\circ} = t$

27.269 ft/sec

$y = vt\sin 65^\circ - 16t^2 + 6.2$

$y = \left(\frac{15.8}{t\cos 65^\circ}\right) t\sin 65^\circ - 16t^2 + 6.2$

$y = 15.8\tan 65 - 16t^2 + 6.2$

$10 = 15.8\tan 65 - 16t^2 + 6.2$

$-6.2 \quad\quad -6.2$

$3.8 = 33.883 - 16t^2$

$-33.883 \quad -33.883$

$-30.083 = -16t^2$

$t^2 = 1.880$

$t = 1.371$