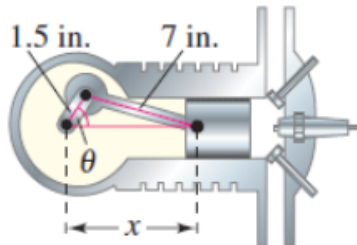


3.2 #12

An engine has a seven-inch connecting rod fastened to a crank (see figure).



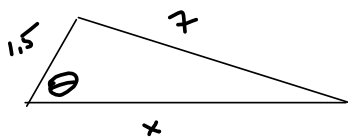
(a) Use the Law of Cosines to write an equation giving the relationship between x and θ .

$\theta = \cos^{-1}\left(\frac{x^2 - 46.75}{3x}\right)$ ✗
 $x^2 - 3x \cos(\theta) - 46.75 = 0$

(b) Write x as a function of θ . (Select the sign that yields positive values of x .)

$x = \sqrt{30.25 \cos(\theta)}$ ✗
 $\frac{1}{2}\left(3 \cos(\theta) + \sqrt{9 \cos^2(\theta) + 187}\right)$

(c) Use a graphing utility to graph the function in part (b).



$7^2 = x^2 + 1.5^2 - 2(1.5)(x) \cos \theta$
 $-7^2 =$ -7^2
 $\Rightarrow x^2 - (3 \cos \theta)x + 1.5^2 - 7^2 = 0$
 $a = 1, b = 3 \cos \theta, c = 2.25 - 49 = -46.75$
 $b^2 - 4ac = 9 \cos^2 \theta - 4(1)(-46.75)$
 $= 9 \cos^2 \theta + 187$
 $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
 $\Rightarrow x = \frac{-3 \cos \theta \pm \sqrt{9 \cos^2 \theta + 187}}{2}$

46.75	.95
4	4
184	320
3	
187	