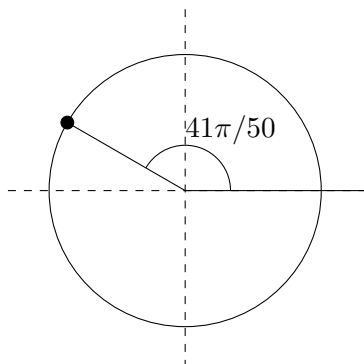**5.** [7 points] The parts of this problem are unrelated.

a. [2 points] Give another angle θ **in radians**, with $0 \le \theta \le 2\pi$, with the same value for cosine as the angle shown below:

b. [5 points] The graph of a function $y = M(x)$ has the following properties:

- The amplitude is 4
- The midline is $y = 2$
- The period is 3.
- $y = M(x)$ has a minimum at $x = 0$.

Consider the function

$$V(x) = 2M(-4x) - 1.$$

Find the following. For any that cannot be determined from the given information, write "cannot be determined".

  i. The amplitude of $y = V(x)$.

  ii. The midline of $y = V(x)$.

  iii. The period of $y = V(x)$.

  iv. The y-intercept of $y = V(x)$.

6. [10 points] In this problem you may assume your height is 0 meters (because you are much, much shorter than a building). You're standing at the base of Michigan's Tallest Building, and you want to know exactly how high it is. Measuring your steps, you walk 55 meters away, look at the top of the building, and measure that your line of sight makes an angle of 76 degrees with the ground.

a. [3 points] Draw a picture of the situation described above. Label all given distances and angles.

b. [3 points] What is the height of Michigan's Tallest Building? Leave your answer in exact form.

c. [4 points] You go to the top of Michigan's Tallest Building, and look down at a shorter building, which you know to be 170 meters. You want to know how far apart (horizontally) the shorter building and Michigan's Tallest Building are. You observe that the angle between horizontal and your line of sight to the top of the shorter building is 15 degrees. (Note that since you're above the shorter building, you're looking *below* horizontal!) How far away is the shorter building? Your answer may involve your answers to part b. Leave your answer in exact form. (Hint: draw a picture!)