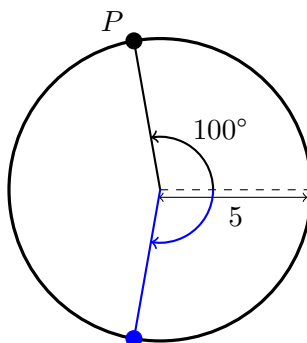


7. [8 points]

- a. [5 points] The point  $P$  lies on a circle with center  $(0,0)$  and radius 5.  $P$  makes an angle of  $100^\circ$  with the positive horizontal axis as shown below.



- i. Find the coordinates of  $P$ , either in exact form or rounded to 3 decimal places.

**Answer:**  $P = (5 \cos 100^\circ, 5 \sin 100^\circ)$

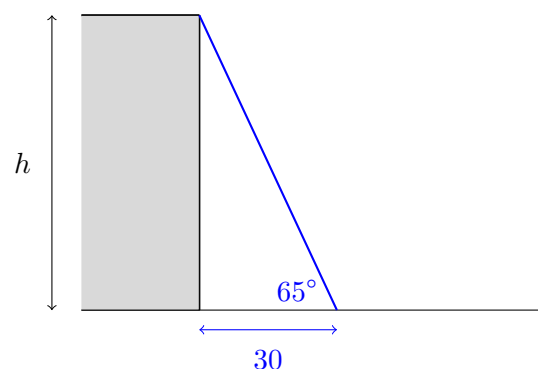
- ii. Find another angle  $\theta$  between  $0^\circ$  and  $360^\circ$  so that  $\cos(\theta) = \cos(100^\circ)$ , then briefly justify your answer. You can draw any relevant points and/or angles on the circle above as part of your justification.

**Answer:**  $260^\circ$

**Justification:**

*Solution:* An angle of  $360^\circ - 100^\circ = 260^\circ$  will have a corresponding point on the circle with the same  $x$ -coordinate as point  $P$  above, and therefore the same value of  $\cos$ . See the diagram above.

- b. [3 points] You are trying to determine the height  $h$  of a building on campus, as shown below. You are 30 meters in front of the building (that is, to the right in the diagram), and from that location, you measure that the angle between the ground and the top of the building is  $65^\circ$ .



**Answer:**  $h = 30 \tan 65^\circ \approx 64.335$  meters