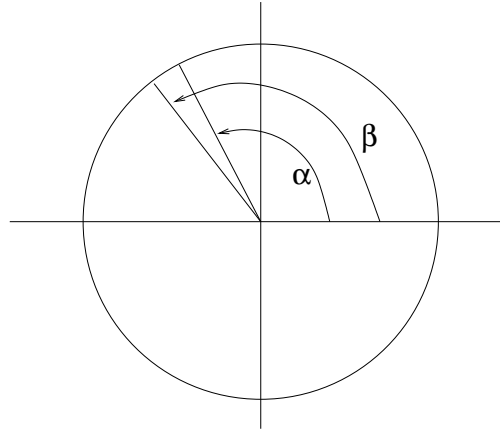


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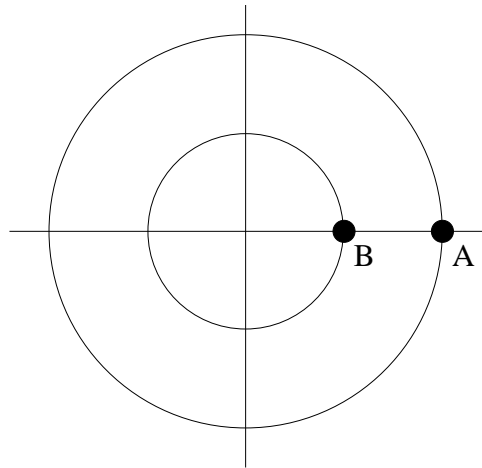
Instructions: You have 25 minutes. You **MUST** show work for credit. If in doubt, ask for clarification.

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1. (2 pts) Two angles have measures  $122^\circ$  and  $2.1$  radians; label each in the picture and justify your answer.  
 $122^\circ = 2.12$  radians, so  $\alpha = 2.1$  rad and  $\beta = 122^\circ$ .



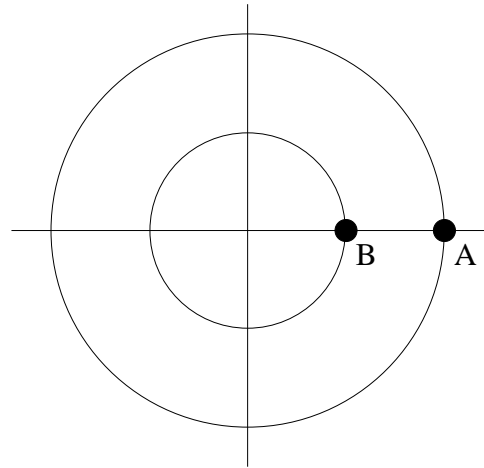
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2. (4 pts) Here are two concentric circles of radius  $5$  ft and  $10$  ft; the two circles have the same center. An object A starts at the pictured location and is moving counterclockwise around the outer circle with an angular speed of  $\omega = 1.2$  rad/sec. Another object B starts at the pictured location and moves counterclockwise around the inner circle with an angular speed of  $\omega = 60$  deg/sec.



Find the linear speed of each object in units of feet/sec.

$$v_A = 12 \text{ ft/sec}, v_B = 5.24 \text{ ft/s.}$$

3. (6 pts) Here are two concentric circles of radius 5 ft and 10 ft; the two circles have the same center. An object A starts at the pictured location and is moving counterclockwise around the outer circle with a linear speed of  $v = 20$  ft/sec. Another object starts at location B and moves counterclockwise around the inner circle with the same linear speed of  $v = 20$  ft/sec.



- (a) (4 pts) Find the angular speed of each object?

$$\omega_A = 2 \text{ rad/sec. } \omega_B = 4 \text{ rad/sec.}$$

- (b) (2 pts) How long does it take each object to complete one revolution?

A takes  $\pi$  seconds; B takes  $\pi/2$  seconds.

4. (8 pts) Here is a graph of the function

$$y = f(x) = (x - 1)^2 + 1$$

on the domain  $1 \leq x \leq 4$ .

- (a) (2 pts) What is the range of  $y = f(x)$ ?

General Fact:

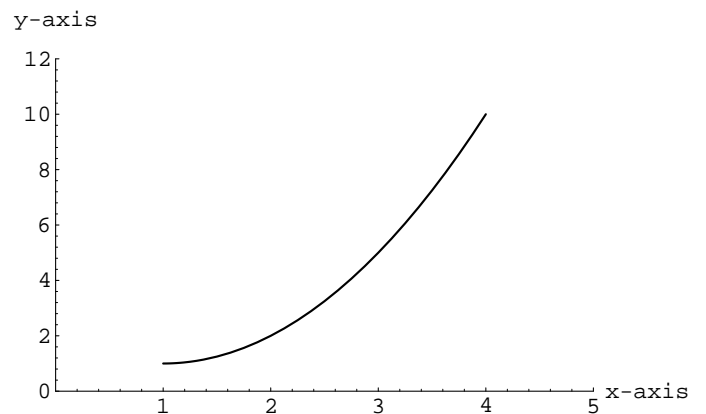
$$\text{min value } f \leq y \leq \text{max value } f$$

is the range. From vertex form, min value  $f=1$  and max value  $f=10$ , since graph is increasing. So range is  $1 \leq y \leq 10$ .

- (b) (3 pts) Find a formula for the inverse function

$$x = f^{-1}(y).$$

$$x = f^{-1}(y) = 1 + \sqrt{y - 1}.$$



- (d) (3 pts) Sketch the graph of  $x = f^{-1}(y)$  below. Make sure to indicate the domain and range. domain of  $f^{-1}$  = range  $f$  computed in (a); range  $f^{-1}$  = domain  $f$  is given to us. To get graph, follow p.168 procedure.