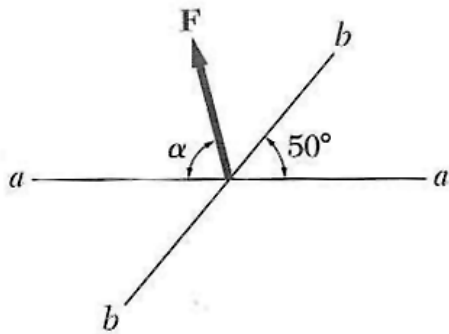
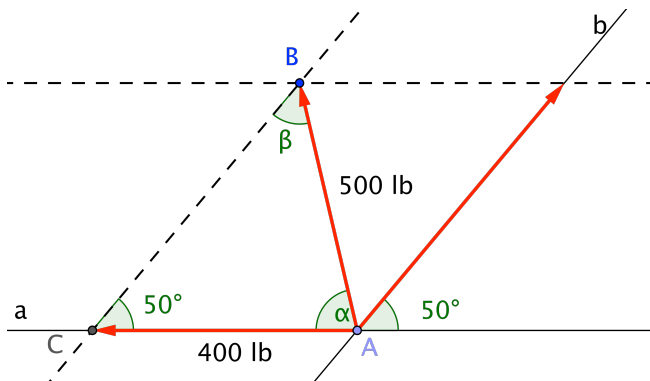


**Problem 2.5** The force  $F$  of magnitude 500 lb is to be resolved into two components along line  $a-a$  and  $b-b$ . Determine angle  $\alpha$ , knowing that the component of  $F$  along line  $a-a$  is to be 400 lb.



1. Draw and label diagram showing components and resultant. Obey the parallelogram law of vector addition.



2. Identify a triangle with three unknowns. In this case: for triangle  $A-B-C$ , we know two sides and one angle, since line  $CB$  is parallel to axes  $b-b$ . This is an Angle-Side-Side situation, so use Law of Sines to find angle  $\beta$ .

$$\frac{500}{\sin 50} = \frac{400}{\sin \beta} \Rightarrow \beta = 37.6^\circ$$

3. Now that you know two angles in the triangle, finding the unknown third angle  $\alpha$  is trivial.

$$\alpha = 180 - 50 - \beta$$

$$\alpha = 92.2^\circ$$