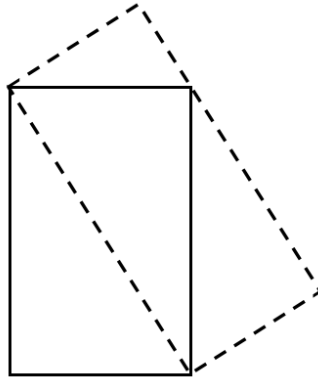


## Two Rectangles

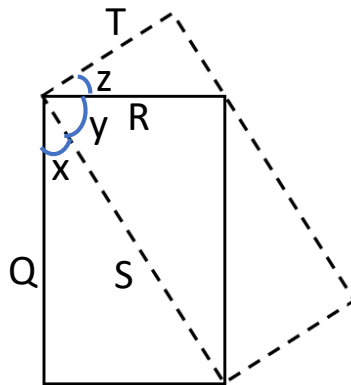
The vertical rectangle below (solid lines) has area A and the tilted rectangle (dashed lines) has area B. Which of the following statements is true?

1. A must be less than B.
2. A must equal B.
3. A must be greater than B.
4. The relationship between A and B is indeterminate.



## Solution to Two Rectangles

Label lines Q, R, S, and T and angles x, y, and z as shown below.



Then, the cosines of x and z can be expressed in terms of Q, R, S, and T:

$$\cos(x) = \frac{Q}{S} \quad \text{and} \quad \cos(z) = \frac{T}{R}$$

Note that:  $x + y = 90^\circ$  and  $y + z = 90^\circ$

So the angles  $x$  and  $z$  are equal, as are their cosines:  $x = z$ ,  $\cos(x) = \cos(z)$

Thus: 
$$\frac{Q}{S} = \frac{T}{R}$$

And: 
$$QR = ST$$

Q.E.D. The areas of the two rectangles must be equal.