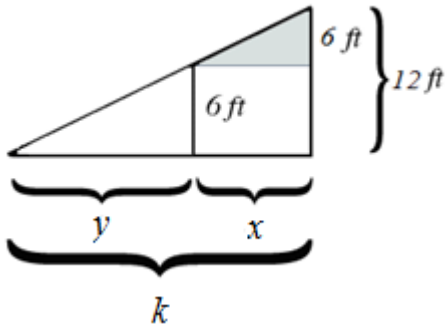
Answer on Question #71723 – Math – Calculus

Question

A street light is at the top of a 12 ft tall pole. A woman 6 ft tall walks away from the pole with a speed of 4 ft/sec along a straight path. How fast is the tip of her shadow moving along the ground when she is 50 ft from the base of the pole?

Solution



Let's draw a schematic diagram for the task.

Let the woman's distance from the pole be **x**, the length of the shadow **y**, the distance from the tip of the shadow to the base of the pole be is **k**.

Using the similar triangles in the diagram it follows from equations

$$(y+x)/12 = x/6$$

$$k = y+x$$

that

$$k= 2x$$

Now we can differentiate:

$$dk / dt = 2\, dx / dt$$

The rate at which the woman is walking is constant.

$$dx / dt = 4 \text{ ft} / s$$

Therefore,

$$dk / dt = 2 * 4 \text{ ft} /s = 8 \text{ ft} / s$$

Answer: 8 ft / s.

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