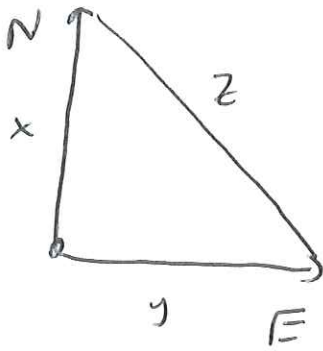


3



$$x^2 + y^2 = z^2$$

$$2x \frac{dx}{dt} + 2y \frac{dy}{dt} = 2z \frac{dz}{dt}$$

$$2(20)(6) + 2(15)(12) = 2(25) \frac{dz}{dt}$$

$$600 = 50 \frac{dz}{dt}$$

$$12 \text{ ft/sec} = \frac{dz}{dt}$$

find $\frac{dz}{dt}$ at $t=2$

$$\text{at } t=2 \quad x = 10 + 4(2) + \frac{2^2}{2}$$

$$x = 10 + 8 + 2$$

$$x = 20 \text{ ft}$$

$$y = 7 + (2)^3 = 7 + 8$$

$$y = 15$$

$$\frac{dx}{dt} = 4 + t$$

$$\left. \frac{dx}{dt} \right|_{t=2} = 4 + 2 = 6 \text{ ft/sec}$$

$$\frac{dy}{dt} = 3t^2$$

$$\left. \frac{dy}{dt} \right|_{t=2} = 3(4) = 12 \text{ ft/sec}$$

find z

$$x^2 + y^2 = z^2$$

$$20^2 + 15^2 = z^2$$

$$z = 25$$