

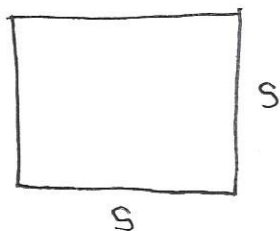
name: solution

1 (8 points). The sides of a square decrease in length at a rate of 1 m/s.

(a) At what rate is the area of the square changing when the sides are 5m long?

(b) At what rate are the lengths of the diagonals of the square changing when the sides are 5m long?

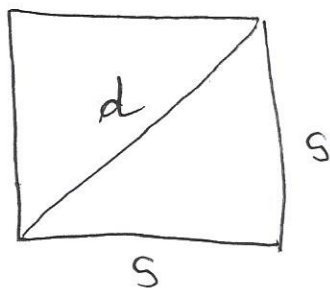
(a)



$$\begin{array}{l|l} A = s^2 & \frac{ds}{dt} = -1 \\ dA = 2s \frac{ds}{dt} & s = 5 \end{array}$$

$$\frac{dA}{dt} = 2(5)(-1) = \underline{\underline{-10}}$$

(b)



$$s = 5$$

$$\frac{ds}{dt} = -1$$

$$d = \sqrt{2s^2}$$

$$\frac{dd}{dt} = \frac{1}{2} (2s^2)^{-1/2} \cdot (4s \frac{ds}{dt})$$

$$= \frac{1}{2} (2(5)^2)^{-1/2} (4(5)(-1))$$

$$= \frac{-20}{2\sqrt{50}}$$

$$= \frac{-2}{\sqrt{2}}$$

[Signature]