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1.

$$P = \frac{E^2}{R}$$

$$\frac{dP}{dE} = \frac{2E}{R} \qquad \frac{dP}{dR} = \frac{-E^2}{R^2}$$

$\delta E = -5$, $dR = 0.2$, $E = 200$ $R = 8$

$$\delta P = \frac{2E\delta E}{R} \cdot \frac{E^2}{R^2} \delta R.$$

$$= \frac{2(200)(-5)}{8} - \frac{(200)^2(0.2)}{8^2}$$

$$= \frac{-2000}{8} - \frac{8000}{64}$$

$$= -250 - 125$$

$$\delta P = -375.$$

P decreases by 375W.

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$$y = \frac{Kwd^4}{r^2}$$

$$\delta y = K\left[\frac{\delta y}{\delta w}\delta w + \frac{\delta y}{\delta d}\delta d + \frac{\delta y}{\delta t}dt\right]$$

$$\delta y = \frac{\delta}{r^3} + \frac{\delta y}{\delta d} = \frac{4w\delta^3}{r^3}, \quad \frac{\delta y}{dt} = \frac{-3w\delta^4}{r^4}$$

$$\delta w = \frac{3w}{100}, \quad \delta d = \frac{5d}{200}, \quad \delta t = \frac{4t}{100}$$

$$\delta y = \left[\frac{Kd^4}{r^3}\left[\frac{3w}{w}\right] + \frac{Kwd^3}{r^2}\left[\frac{5d}{2w}\right] - \frac{K^2wd^4}{r^4}\left[\frac{w^2}{2w}\right]\right]$$

$$dy = \left[\frac{3Kwd^4}{100r^3} + \frac{100wd^4K}{200r^3} - \frac{K^2wd^4}{r^3}\right] \times \frac{1}{100}$$

$$dy = \frac{1}{100}\left[3y + 100y - 100y\right]$$

$$dy = \frac{1}{100}[y]$$

$$dy = 1/100\, y$$

y increase by 1/100 percent.