1 First, since x is the only variable around, $\Delta_1^2(5-x^2)$ must mean $\Delta_{x=1}^{x=2}(5-x^2)$. Then,

$$\Delta_{x=1}^{x=2}(5-x^2) = \left(5-(2)^2\right) - \left(5-(1)^2\right) = 1-4 = -3.$$

5 First,

$$R(1000) = 60(1000) - 0.025(1000)^2 = 35000,$$

and

$$R(1050) = 60(1050) - 0.025(1050)^2 = 35437.5,$$

so

$$\Delta_{1000}^{1050} R(x) = 35437.5 - 35000 = 437.5.$$

Therefore, the change in revenue is

$$\$437.50.$$

19 By the Sum Rule,

$$\mathrm{d}(2x^3+1) = \mathrm{d}(2x^3) + \mathrm{d}(1);$$

by the Constant Rule, $\mathrm{d}(1) = 0$, so

$$\mathrm{d}(2x^3+1) = \mathrm{d}(2x^3),$$

which you could do directly with a combined rule. By the Product Rule,

$$\mathrm{d}(2x^3) = (x^3)\,\mathrm{d}(2) + 2\,\mathrm{d}(x^3);$$

by the Constant Rule, $\mathrm{d}(2) = 0$, so

$$\mathrm{d}(2x^3) = 2\,\mathrm{d}(x^3),$$

which you could do directly with a combined rule. By the Power Rule,

$$\mathrm{d}(x^3) = 3x^{3-1}\,\mathrm{d}x;$$

since $3-1=2$,

$$\mathrm{d}(x^3) = 3x^2\,\mathrm{d}x,$$

which you could do directly. Since $2\cdot 3 = 6$, therefore,

$$\mathrm{d}(2x^3+1) = \mathrm{d}(2x^3) = 2\,\mathrm{d}(x^3) = 6x^2\,\mathrm{d}x.$$