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2.5 Coding

1) a) d : 60, 70, 80, 40, 50, 80, 70

$$x = \frac{60}{10} \rightarrow x = 6$$

x : 6, 7, 8, 4, 5, 8, 7

b) $\bar{x} = \frac{\text{sum of } x}{\text{Number of } x}$

$$\bar{x} = \frac{45}{7} \approx 6.43$$

c) If $x = \frac{d}{10}$ then $\bar{x} = \frac{\bar{d}}{10}$

$$6.43 = \frac{\bar{d}}{10}$$

$d = 64.3$

2) a) $\bar{y} = 15$

$$15 = 2x - 1$$

$$16 = 2x$$

$x = 8$

b) $\sigma_y = 6$

$$6 = 2x$$

$x = 3$

c) Variance $= \sigma^2$

$$3^2 = 9$$

3) a) $\bar{y} = \frac{\Sigma y}{n}$

$$n = \frac{20}{10} \rightarrow n = 2$$

$$\bar{y} = \frac{\bar{x} - 20}{100}$$

$$2 = \frac{x - 20}{100}$$

$$200 = x - 20$$

$$x = 220p$$

b) $$S_y = \sqrt{\frac{\Sigma y^2}{n} - \bar{y}^2}$$

$$S_y = \sqrt{\frac{48}{10} - 2^2}$$

$$S_y = 0.894$$

$$S_x = 0.894 \times 100$$

$$S_x = 89.4$$

4) a) $$\bar{x} = \frac{\Sigma x}{n}$$

$$\bar{x} = \frac{43.5}{10} = 4.35$$

$$\bar{x} = \frac{\bar{p} - 1000}{2}$$

$$4.35 = \frac{\bar{p} - 1000}{2}$$

$$\bar{p} = 1009 \text{ (4 sf)}$$

b) $$s_x^2 = \frac{\Sigma x^2}{n} - \bar{x}^2$$

$$s_x^2 = \frac{365.25}{10} - 4.35^2$$

$$s_x^2 = 17.6025$$

$$s_p = 4 \cdot 17.6025$$

$$s_p = 70.41$$

5) a) Coding makes large numbers easier to manage

b) $\sigma_y^2 = \frac{\Sigma y^2}{n} - \bar{y}^2$

$\sigma_y^2 = \frac{1634}{8} - \left(\frac{104}{8}\right)^2$

$\sigma_y^2 = 204.25 - 13^2 = 35.25$

$35.25 = a^2(881,250,000)$

$a = \pm\frac{1}{5000}$

Since the data increasing we use $\frac{1}{5000}$

$b = 13 - \left(\frac{1}{5000}\right)(165,000)$

$b = -20$