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Quiz 10 - Statistics

Summer 2024

① Sort: 4, 6, 7, ~~7~~, 8, 9, 12, 12

a) $Q_2 = P_{50} = \left(\frac{50}{100}\right) \times 8 = 4 \xrightarrow{+0.5} 4.5$

$$Q_2 = \frac{7+8}{2} = 7.5$$

b) $Q_1 = P_{25} = \left(\frac{25}{100}\right) \times 8 = 2 \xrightarrow{+0.5} 2.5$

$$Q_1 = \frac{6+7}{2} = 6.5$$

d) Mode: 7, 12

c) $s = \sqrt{\frac{\sum(x - \bar{x})^2}{n-1}}$

e) $P_{82} = \left(\frac{82}{100}\right) \times 8 = 6.56 \rightarrow 7$

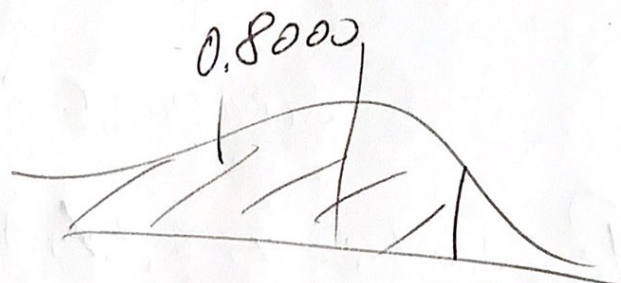
$$P_{82} = 12$$

f) $R = 12 - 4 = 8$

②

$$\mu = 128; \quad \sigma = 12;$$

$$P_{80} = ?$$



$$P_{80} = \mu + z\sigma = 128 + 0.84 \times 12$$

$$P_{80} = 138.08$$

③

$$\mu = 24; \quad \sigma = 6$$

$$a) \quad z_1 = \frac{18 - 24}{6} = ~~undert~~ -1.0$$

$$z_2 = \frac{24 - 24}{6} = -0.50$$

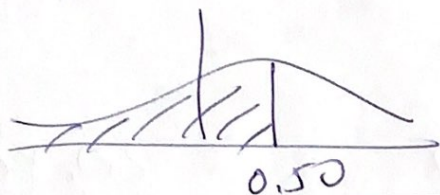
$$P(-1.00 < z < -0.50) = 0.3085 - 0.1587 = 0.1498$$



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$$b) \quad z = \frac{27-24}{6} = 0.50$$

$$P(z < 0.50) = 0.6915$$



$$(4) \quad p = 0.03 ; \quad q = 0.97$$
$$n = 18$$

$$a) \quad P(X=3) = {}^{18}C_3 \times 0.03^3 \times 0.97^{15}$$
$$= 0.01395 \dots$$
$$\approx \boxed{0.0140}$$

$$b) \quad P(X \leq 2) = P(0) + P(1) + P(2)$$
$$= {}^{18}C_0 \times 0.03^0 \times 0.97^{18} + {}^{18}C_1 \times 0.03^1 \times 0.97^{17}$$
$$+ {}^{18}C_2 \times 0.03^2 \times 0.97^{16} = \boxed{0.9843}$$

⑤

a) $a = 1.5098 \dots \approx 1.51$

$$a = \frac{n(\sum xy) - (\sum x)(\sum y)}{n(\sum x^2) - (\sum x)^2}$$

b) $b = 20.81527 \dots \approx 20.82$

$$b = \bar{y} - a \bar{x}$$

$$\sum x = 43$$

$$\sum y = 169$$

$$\sum xy = 1576$$

$$\sum x^2 = 451$$

⑥

a) $5.8 - 8$

b) $\frac{\cancel{47} 9}{21} \times 100 = \boxed{42.86\%}$