

Q8).

| X/Y | 0 | 1 |
|-----|-----|-----|
| 0 | 0.2 | 0.1 |
| 1 | 0.1 | 0.6 |

What is the covariance between X and Y?

$$\text{cov}(X, Y) = \sum_{i=1}^n (x_i - \mu_x)(y_i - \mu_y) P(X=x_i, Y=y_i)$$

$$= (0 - 0.6)(0 - 0.6)(0.2) + (0 - 0.6)(1 - 0.6)(0.1) \\ + (1 - 0.6)(0 - 0.6)(0.1) + (1 - 0.6)(1 - 0.6)(0.6)$$

$$= \frac{18}{125} + 2(0.1)(0.4)(-0.6) + (0.4)^2(0.6)$$

↑ 9/125

$$= 0.072 + (-0.048) + 0.096$$

$$= 0.12 (\approx 0.11)$$

Probability & Statistics. for ML and DS, Deep Learning. (Week 2 Summative - Quiz Q8)