

⑤ Find $P(A - 0.5B - 0.5C > 0.5)$

$$E(A - 0.5B - 0.5C) = 1.2 - \frac{1+1}{2} = 0.2$$

$$SD(A - 0.5B - 0.5C) = \sqrt{Var(A - 0.5B - 0.5C)}$$

$$Var(A - 0.5B - 0.5C) = Cov(A - 0.5B - 0.5C, A - 0.5B - 0.5C)$$

expansion

$$= Cov(A, A) + Cov(A, -0.5B) + Cov(A, -0.5C)$$

$$+ Cov(-0.5B, A) + Cov(-0.5B, -0.5B) + Cov(-0.5B, -0.5C)$$

$$+ Cov(-0.5C, A) + Cov(-0.5C, -0.5B) + Cov(-0.5C, -0.5C)$$

Now $Cov(A, A) = Var(A) = 0.5^2 = 0.25$

because $Cov(B, B) = 0.4^2 = 0.16$

$$Cov(C, C) = 0.3^2 = 0.09$$

$$Cov(A, B) = Corr(A, B) SD(A) SD(B) = 0.6 \cdot 0.5 \cdot 0.4 = 0.12$$

$$Cov(A, C) = Corr(A, C) SD(A) SD(C) = 0.7 \cdot 0.5 \cdot 0.3 = 0.105$$

$$Cov(B, C) = 0.8 \cdot 0.4 \cdot 0.3 = 0.096$$

continued

$$= 0.25 - 0.5 \cdot 0.12 - 0.5 \cdot 0.105$$

$$- 0.5 \cdot 0.12 + 0.5^2 \cdot 0.16 + 0.5^2 \cdot 0.096$$

$$- 0.5 \cdot 0.105 + 0.5^2 \cdot 0.096 + 0.5^2 \cdot 0.09$$

$$= 0.135$$

Once Mean and SD are obtained then standardize

$$\text{So } P(A - 0.5B - 0.5C > 0.5)$$

$$= P\left(Z > \frac{0.5 - 0.2}{SD(A - 0.5B - 0.5C)}\right)$$

$$= P\left(Z > \frac{0.3}{\sqrt{0.135}}\right) = P(Z > 0.88) \quad \text{look up the table}$$

$$= 1 - \text{value from table}$$

$$= 1 - 0.794$$