Question 11.16.3.8
Probability and Random Processes

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A team of medical students doing their internship have to assist during surgeries at a city hospital. The probabilities of surgeries rated as very complex, complex, routine, simple or very simple are respectively, 0.15, 0.20, 0.31, 0.26, .08. Find the probabilities that a particular surgery will be rated

1) complex or very complex;
2) neither very complex nor very simple;
3) routine or complex
4) routine or simple

Solution:

Event	Description
E_1	very complex
E_2	complex
E_3	routine
E_4	simple
E_5	very simple

1) complex or very complex

$$= \Pr(E_1 + E_2) \tag{1}$$
$$= \Pr(E_1) + \Pr(E_2) - \Pr(E_1E_2) \tag{2}$$
$$= 0.15 + 0.20 - 0 \tag{3}$$
$$= 0.35 \tag{4}$$

2) neither very complex nor very simple

$$= \Pr\left(E_1'E_5'\right) \tag{5}$$
$$= \Pr(E_1 + E_5)' \tag{6}$$
$$= 1 - \Pr(E_1 + E_5) \tag{7}$$
$$= 1 - \Pr(E_1) - \Pr(E_5) \tag{8}$$
$$= 1 - 0.15 - 0.08 \tag{9}$$
$$= 0.77 \tag{10}$$

3) routine or complex

$$= \Pr(E_2 + E_3) \tag{11}$$
$$= \Pr(E_2) + \Pr(E_3) - \Pr(E_2E_3) \tag{12}$$
$$= 0.20 + 0.31 - 0 \tag{13}$$
$$= 0.51 \tag{14}$$

4) routine or simple

$$= \Pr(E_3 + E_4) \tag{15}$$
$$= \Pr(E_3) + \Pr(E_4) - \Pr(E_3E_4) \tag{16}$$
$$= 0.31 + 0.26 - 0 \tag{17}$$
$$= 0.57 \tag{18}$$