MATH 16B

SOLUTIONS – Sec. 9.1

(7) Let E be the event that both systems fail.

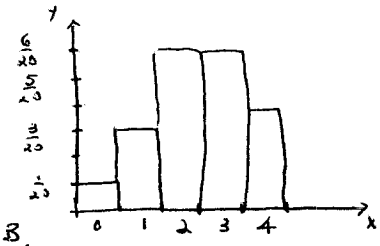
$P(E) = 1 - P(\text{not } E) = 1 - .9855 = \boxed{.0145}$

(13)

x	0	1	2	3	4
P(x)	$\frac{1}{20}$	$\frac{3}{20}$	$\frac{6}{20}$	$\frac{6}{20}$	$\frac{4}{20}$

a) $P(1 \le x \le 3) = \frac{3}{20} + \frac{6}{20} + \frac{6}{20} = \frac{15}{20} = \boxed{\frac{3}{4}}$

b) $P(x \ge 2) = \frac{6}{20} + \frac{6}{20} + \frac{4}{20} = \frac{16}{20} = \boxed{\frac{4}{5}}$



(17) a) $S = \{$GGGG, GGGB, GGBG, GBGG, GGBB, GBGB, GBBG, GBBB, BBBB, BBBG, BBGB, BGBB, BBGG, BGBG, BGGB, BGGG$\}$

b)

x	0	1	2	3	4
P(x)	$\frac{1}{16}$	$\frac{4}{16}$	$\frac{6}{16}$	$\frac{4}{16}$	$\frac{1}{16}$

(21)

x	1	2	3	4	5
P(x)	$\frac{1}{16}$	$\frac{3}{16}$	$\frac{8}{16}$	$\frac{3}{16}$	$\frac{1}{16}$

a) $E(x) = 1 \cdot \frac{1}{16} + 2 \cdot \frac{3}{16} + 3 \cdot \frac{8}{16} + 4 \cdot \frac{3}{16} + 5 \cdot \frac{1}{16} = \frac{48}{16} = \boxed{3}$

b) $V(x) = \left(1^2 \cdot \frac{1}{16} + 2^2 \cdot \frac{3}{16} + 3^2 \cdot \frac{8}{16} + 4^2 \cdot \frac{3}{16} + 5^2 \cdot \frac{1}{16}\right) - 3^2$

$= \frac{158}{16} - 9 = \frac{14}{16} = \boxed{\frac{7}{8}}$

c) $\sigma = \sqrt{V(x)} = \boxed{\sqrt{\frac{7}{8}}} = \boxed{\frac{\sqrt{14}}{4}}$

(25)

x	10	15	20	30	40
P(x)	.25	.30	.25	.15	.05

a) $E(x) = 10(.25) + 15(.30) + 20(.25) + 30(.15) + 40(.05) = \boxed{18.5}$

$V(x) = \left(10^2(.25) + 15^2(.30) + 20^2(.25) + 30^2(.15) + 40^2(.05)\right) - (18.5)^2$

$= 65.25 = \frac{261}{4}$ so $\sigma = \sqrt{V(x)} = \sqrt{\frac{261}{4}} = \sqrt{\frac{9 \cdot 29}{4}} = \boxed{\frac{3}{2}\sqrt{29}}$

b) Let R = Revenue $= 2.95(1000x) = \underline{2950x}$;

Then $E(R) = E(2950x) = 2950\,E(x) = 2950(18.5) = \boxed{\$54,575}$

(31) Let X be the net gain.

x	35	−1
P(x)	$\frac{1}{38}$	$\frac{37}{38}$

$E(x) = 35\left(\frac{1}{38}\right) + (-1)\left(\frac{37}{38}\right) = -\frac{2}{38} = \boxed{-\frac{1}{19}} \approx \underline{-.053}$