Stats Quiz 3

① B_1 – Child has the Flu B_2 – Child has Measles A – Has a rash

$P(B_1) = .85$ $P(B_2) = .15$ $P(A|B_2) = .9$ $P(A|B_1) = .07$

Find $P(B_2|A) = P(A \cap B_2)/P(A) = P(A|B_2)P(B_2)/\Sigma P(A|B_i)P(B_i)$

$= (.9)(.15)/[(.9)(.15)+(.07)(.85)] \approx .69$

② a.)

x^2	x	$P(x)$
361	−19	5/15
324	−18	5/15
225	−15	3/15
100	−10	1/15
6400	80	1/15

b.) $cdf = F(x) =$
- 0 when $x < -19$
- 5/15 when $-19 \le x < -18$
- 10/15 when $-18 \le x < -15$
- 13/15 when $-15 \le x < -10$
- 14/15 when $-10 \le x < 80$
- 1 when $80 \le x$

c.) $E[x] = \sum_x xP(x) = (-19)(5/15)+(-18)(5/15)+(-15)(3/15)+(-10)(1/15)+80(1/15) = -10\ 2/3$

d.) $E[x^2] = \sum_x x^2 P(x) = (361)(5/15)+(324)(5/15)+(225)(3/15)+(100)(1/15)+(6400)(1/15) = 706\ 2/3$

e.) $SD = \sqrt{VAR[x]} = \sqrt{\sum_x x^2 P(x) - \mu^2} = \sqrt{706\ 2/3 - (-10\ 2/3)^2} = \sqrt{592.\overline{8}} \approx 24.35$

③

x^2	x	$p(x)$
0	0	7/16
1	1	1/16
4	2	2/16
9	3	2/16
16	4	1/16
36	6	2/16
81	9	1/16

b.) $cdf = F(x) =$
- 0 when $x < 0$
- 7/16 when $0 \le x < 1$
- 8/16 when $1 \le x < 2$
- 10/16 when $2 \le x < 3$
- 12/16 when $3 \le x < 4$
- 13/16 when $4 \le x < 6$
- 15/16 when $6 \le x < 9$
- 1 when $9 \le x$

c.) $E[x] = \sum_x xP(x) = 0 + 1/16 + 4/16 + 6/16 + 4/16 + 12/16 + 9/16 = 36/16$

d.) $E[x^2] = \sum_x x^2 P(x) = 0 + 1/16 + 8/16 + 18/16 + 1 + 72/16 + 81/16 = 180/16$

e.) $SD = \sqrt{VAR[x]} = E[x^2] - E[x]^2 = 180/16 - 36/16 = \sqrt{144/16} = 12/4 = 3$

For part d's, found explicitly $E[x^2]$ as asked, not variance