Probability questions

1.a) $p(identical\ twin/\ twin) = \dfrac{p(identical \cap twin)}{p(twin)} = \dfrac{\frac{5}{17}}{\frac{5}{17} + \frac{1}{2} * \frac{12}{17}} = \dfrac{5}{11}$

1.b) $p(bowl\ 1/\ chocolate) = \dfrac{p(bowl\ 1 \cap chocolate)}{p(chocolate)} = \dfrac{\frac{3}{8}}{\frac{5}{8}} = \dfrac{3}{5} = 0.6$

2)

$p((yellow \cap 1994)/\ 1\ yellow\ and\ 1\ green) = \dfrac{p((yellow \cap 1994) \cap (1\ yellow\ and\ 1\ green))}{p(1\ yellow\ and\ 1\ green)} =$

$= \dfrac{\frac{1}{2} * \frac{2}{10} + \frac{1}{2} * \frac{2}{10}}{\frac{1}{2} * \frac{1}{10} + \frac{1}{2} * \frac{2}{10} + \frac{1}{2} * \frac{2}{10} + \frac{1}{2} * \frac{14}{100}} = \dfrac{5}{8} = 0.625$

3.a) $p(swine\ flu/\ positive) = \dfrac{p(swine\ flu \cap positive)}{p(positive)} = \dfrac{\frac{1}{10^4} * 0.99}{\frac{1}{10^4} * 0.99 + \frac{9999}{10^4} * 0.01} = \dfrac{1}{102}$

3.b)

$p(swine\ flu/\ positive\ after\ thailand) = \dfrac{p(swine\ flu \cap positive\ after\ thailand)}{p(positive\ after\ thailand)} = \dfrac{\frac{1}{200} * 0.99}{\frac{1}{200} * 0.99 + \frac{199}{200} * 0.01} = \dfrac{99}{298}$

4) is the same question as 1.a

Questions about random variables

1)

X	+ 6$	− 3$
P(X)	$\frac{1}{3}$	$\frac{2}{3}$

$E(X) = 6 * \dfrac{1}{3} - 3 * \dfrac{2}{3} = 0\$$
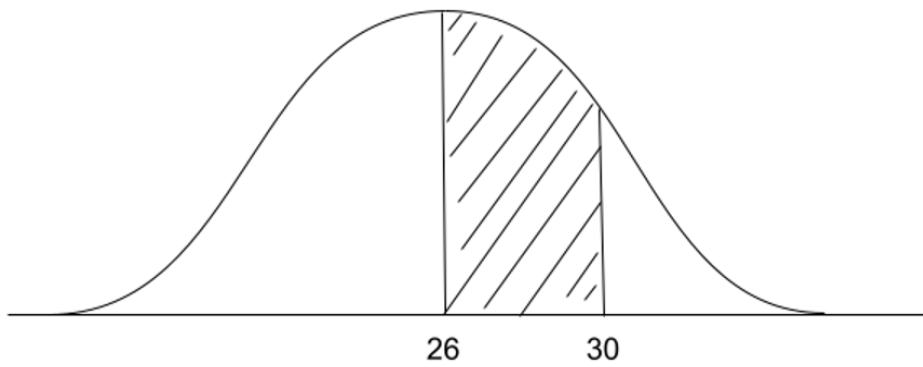
2)

X	+ 5$	0	− 6$
P(X)	$\frac{6}{25}$	$\frac{4}{25}$	$\frac{15}{25}$

$E(X) = 5 * \dfrac{6}{25} + 0 * \dfrac{4}{25} - 6 * \dfrac{15}{25} = -1.68\$$

3) $mean = \bar{x} = 8 * 0.4 = 3.2$

$S = \sqrt{\dfrac{0.4(1-0.4)}{8}} = \sqrt{\dfrac{0.24}{8}} = \dfrac{\sqrt{3}}{10}$

4) $\bar{x} = 26,\ \sigma = 2$

26   30

$p(26 < x < 30) = p(x < 30) - p(x < 26) = 0.97725 - 0.5 = 0.47725$

5) $p(x > 3) = \frac{2*0.4}{2} = 0.4$

6) $p(3\ of\ 4\ have\ children) = \binom{4}{3} * (0.6)^3 * (0.4) = 0.3456$

7)

X	-10	-5	0	5	10
$P(X)$	0.1	0.35	0.1	0.35	0.1

$E(X) = (-10) * 0.1 - 5 * 0.35 + 0 * 0.1 + 5 * 0.35 + 10 * 0.1 = 0$