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Question 1:

i) $X_1 \rightarrow$ discrete random variables
As well as follows Bernoulli's distribution.
There fore, this variable is
Bernoulli's random Variable.

ii) Range of X_1 = $\{0, 1\}$;

EX_1 = p   —— Value of P is given
         = 1/6   (P = 1/6)
         = 0.16

$Var X_1$ = $p(1-p)$
         = $1/6 \ (1 - 1/6)$
         = $1/6 \times 5/6$
         = 5/36
         = 0.139

iii) Y = Known Random Variable
     = include multiple Bernoulli's Random Variable
           $(n = 30)$

There fore, It is called Binomial Random Variable

iv) Range of Y = $\{0, 1, 2, 3, 4, \ldots, 30\}$

Expected Value EY = $n \times P$
                   = $30 \times (1/6)$
            EY = 5

$Var Y$ = $n \times p \times (1-p)$
         = $5 \times (1 - (1/6))$
         = $5 \times 5/6$
         = 25/6
$Var Y$ = 4.167

v) Expected Value of $P(8 < Y < 13)$

   Y - Discrete Random Variable

   Probability Mass Function (PMF) _____ using R

   R code :

```
sum( dbinom (9:12, 30, 0.166)
```

   calculation of $9 \le Y \le 12$

output:

| 0.04894431 |

vi) Approximate Value of $P(8 < Y < 13)$ _____
                              Using Normal Approximation

   $n = 30$
   $P = 0.6$

   There fore   Normal Approximation can be used.

     $\mu = 5$ _____ mean
     var $= 4.167$ _____ variance

   code

```
pnorm (13, 5, Sqrt (4.167) - pnorm( 8, 5, Sqrt (4.167))
```

   output

   0.07077