VATSAV SETHUPATHI

e - Worksheet

① (a) Since we role 3 dice, and each die has 6 possible outcomes, the total outcomes possible would be 6^3 or 216.

(b) The range of possible values is from 3 (all dice roll 1) to 18 (all dice roll 6)

(c) Sum of 2: No outcomes since minimum outcome is 3
Sum of 3: $\{(1,1,1)\}$
Sum of 4: $\{(2,1,1),(1,2,1),(1,1,2)\}$
Sum of 5: $\{(2,1,2),(2,2,1),(1,2,2),(3,1,1),(1,3,1),(1,1,3)\}$

(d) $P\{\text{Sum is } 2\} = 0$
$P\{\text{Sum is } 3\} = 1/216$
$P\{\text{Sum is } 4\} = 3/216$
$P\{\text{Sum is } 5\} = 6/216$

(e) Probability of getting an even number on one die $= \frac{1}{2} = \frac{\binom{3}{1}}{\binom{6}{1}}$

For the sum of 3 numbers to be even, either all the numbers have to be even or one of the 3 have to be even.

All numbers even $= \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$

One out of 3 even $= \left(\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}\right) + \left(\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}\right) + \left(\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}\right) = \frac{3}{8}$

$P\{\text{even sum}\} = \frac{1}{8} + \frac{3}{8} = \frac{4}{8} = \boxed{\frac{1}{2}}$