2 (a)

$A = 1.5$ $B = 1.25$

(a) Assumption 1:

There are only two outcomes ⇒ W, L

P of winning ⇒ 0.5

P of A winning with goal expectance

⇒ 0.5×1.5

⇒ 0.75 // expected goal expectancy

Poisson distribution gives the probability of the change in event, here the new event

$y = 0.75$ $\lambda = 1.5$ $e = 2.72$

$$P(y) = \frac{e^{-\lambda} \times \lambda^{y}}{\lfloor y}$$

$$\Rightarrow \frac{(2.72)^{-1.5} \times (1.5)^{0.75}}{\lfloor 0.75}$$

$$\Rightarrow \frac{0.22 \times 1.35}{0.91} \Rightarrow 0.326 //$$

Assumption 2:

Since there are three outcomes
$\Rightarrow$ Win, Draw, lose
$P(win) = \frac{1}{3} \Rightarrow 0.33$

A's winning probability $= 1.5 * 0.33$
$= 0.495$

$y = 0.495 \quad \lambda = 1.5 \quad e = 2.72$

$$P(y) = \frac{e^{-\lambda} \times \lambda^{y}}{\lfloor y} \Rightarrow \frac{(2.72)^{-1.5} * (1.5)^{0.495}}{\lfloor 0.495}$$

$$\Rightarrow \frac{0.22 * 1.222}{0.88} = \frac{0.26884}{0.88}$$

$\Rightarrow 0.3055//$

30% chance to win.

(b) Atleast 2.5 goals.

$A \Rightarrow 1.58 \qquad B = 1.25$

we can expect max of $(A+B = 2.75$ goals between them.

$\lambda = 2.75 \qquad y = 2.5, 2.75$ (atleast 2.5 goal)

P(atleast 2.5) = P(2.5 goals) + P(>2.5 goals)

(i) $y = 2.5 \qquad \lambda = 2.75 \qquad e = 2.72$

$$P(2.5) = \frac{(2.72)^{-2.75} \times (2.75)^{2.5}}{\lfloor\underline{2.5}}$$

$$\Rightarrow \frac{0.063 \times 12.54}{3.32} \Rightarrow \frac{0.787}{3.32}$$

$$\Rightarrow 0.237$$

$P(2.5) = 0.237$ — (1)

~~P(2.72)~~ $y = 2.75 \qquad \lambda = 2.75$

$$P(2.75) = \frac{(2.72)^{-2.75} \times (2.75)^{2.75}}{\lfloor\underline{2.75}}$$

$$\Rightarrow \frac{0.063 * 16.14}{4.42} = \frac{1.016}{4.42}$$

$$\Rightarrow 0.2285 \quad \text{— (iii)}$$

i + (ii)

P (atleast 2.5 goals) = 1 0.237 + 0.2285

$\Rightarrow 0.4655$

$\Rightarrow 46.5\%$ //

(c) Appropriate level of odds.

Given data is only for goal expectancy

In order to solve the odds, we are not gonna consider the amt of goals between them, but rather with the given goal, expectancy, their probability to draw.

(i) ~~A~~ draw Probability.

$P(A) = 1.5 \times 0.33 \Rightarrow 0.495$

$y = 0.5 \quad \lambda = 1.5 \quad e = 2.72$

$$P(0.5) = \frac{e^{-1.5} \times (1.5)^{0.5}}{\lfloor 0.495}$$

$$\Rightarrow \frac{(2.72)^{-1.5} \times (1.5)^{0.5}}{\lfloor 0.495}$$

$$\Rightarrow \frac{0.22 \times 1.222}{0.88} \Rightarrow 0.3055$$

(ii) $P(B\ draw) \Rightarrow 1.25 \times 0.33 \Rightarrow 0.4125$

$y = 0.4125 \quad \lambda = 1.25 \quad e = 2.72$

$$P(y) = \frac{(2.72)^{-1.25} \times (1.25)^{0.4125}}{\lfloor 0.4125}$$

$$\Rightarrow \frac{0.286 \times 1.096}{0.8866} \Rightarrow \frac{0.3134}{0.886}$$

$$\Rightarrow 0.35\%$$

Since this is based on goal expectancy

draws prob = P(A ~~odds~~ draw) + P(B draw)

$\Rightarrow 0.3055 + 0.35$

$\Rightarrow 0.6555$

converting probability to odds.

$$\text{Odds} \Rightarrow \frac{P(\text{of draw})}{1-P(\text{of draw})}$$

$$\Rightarrow \frac{0.655}{0.345} = 1.898 //$$

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(3)

$P(A) = 0.52$ // while serving.

$1 - P(A) = 0.48$ // B is recieving

In Tennis game only one player will serve the entire game.

Assumption: A has 0.52% in every se
B will 0.48% to win ag
... serve