

## ODDS ANSWERS

Odds are the LOSS : WIN probability ratio of an event happening.

EXAMPLE: If the odds for Brazil winning the 2014 World Cup are given as 3 - 1 this means that :

$\Pr(\text{Brazil loses}) = \frac{3}{4}$  and  $\Pr(\text{Brazil wins}) = \frac{1}{4}$

$\frac{3}{4} : \frac{1}{4} = 3 : 1$  so the odds are 3 - 1 ( written with a hyphen rather than a ratio symbol).

### PAYOUTS

Consider a horse race where the following odds are quoted:

Horse	Odds	Probability of losing	Probability of winning
John's Victory	5 - 2	<del><math>\frac{14}{7}</math></del> $\frac{5}{7}$	$\frac{2}{7}$
Ruby Way	4 - 1	$\frac{4}{5}$	$\frac{1}{5}$
Malihide	10 - 1	$\frac{10}{11}$	$\frac{1}{11}$
True Grit	1 - 1	$\frac{1}{2}$	$\frac{1}{2}$
Blue Steel	8 - 5	$\frac{8}{13}$	$\frac{5}{13}$

Payouts are based on the odds. NOTE: Payout = Winnngs + Layout (Original sum bet)

Horse	Odds	Value of odds ratio	Layout	Amount won (if horse wins)	Payout = Winnings + Layout
John's Victory	5 - 2	\$ 5 won for every \$2 bet	\$30	$= (30 \div 2) \times 5$ $= 75$	\$105
Ruby Way	4 - 1	\$4 for every \$1 bet.	\$450	$4 \times 450$ $= \$1800$	\$2250
Malihide	10 - 1	\$10 for every \$1 bet	\$25	$10 \times 25$ $= \$250$	\$275
True Grit	1 - 1	\$1 for every \$1 bet	\$800	\$800	\$1600
Blue Steel	8 - 5	\$8 for every \$5 bet	\$102	$(102 \div 5) \times 8$ $= \$163.20$	\$265.20

**Question 1**

If Lewis bets \$180 on True Grit and it wins, what payout will Lewis receive from the bookmaker?

$$\$180 + \$180 = \$360$$

**Question 2**

If Gary bets \$35 on Malihide, and Malihide does win, what total payout will Gary receive from the bookmaker?

$$\$350 + \$35 = \$385$$

**Question 3**

- a. If the odds of a horse winning a race are 7-3, what is the probability that the horse will win?

$$\frac{3}{10}$$

- b. If Arnold bets \$150 on this horse and it wins, how much money will he win?

$$\text{Wins: } 50 \times 7 = \$350$$

$$\text{Payout} = 350 + 150 = \$500$$

- c. What will be the payout from the bookmaker?

$$\text{Payout} = \$500$$

**Question 4**

- a. If instead the odds of a horse winning a race are 3-7, what is the probability that the horse will win?

$$\frac{7}{10}$$

- b. i. If Alan bets \$147 on this horse and it wins, what will his total payout be?

$$\text{Wins: } \frac{147}{7} \times 3 = \$63 \quad \text{Payout} = 63 + 147 = \$210$$

- ii. If instead he bets \$400 on this horse and it wins, what will his total payout be? Give your answer to the nearest cent.

$$\text{Wins: } \frac{400}{7} \times 3 = 171.43$$

$$\text{Payout} = 171.43 + 400$$

$$= \$571.43$$

**Question 5**

- a. If the probability that Manchester will win the Premier's League flag next year is 0.65 how would this be expressed as odds?

$$\begin{array}{l} \text{Loss: Win} \\ \frac{35}{100} : \frac{65}{100} \\ = 35 : 65 = 7 : 13 \end{array}$$

- b. If a punter bets \$5000 on Manchester winning the Premier's League at these odds, and Manchester wins next year, what total payout would this punter receive? Give your answer to the nearest dollar.

$$\text{Wins: } \frac{5000}{13} \times 7 = 2692.31$$

$$\text{Payout} = 2692.31 + 5000$$

$$= 7692.31$$

$$\approx \$7692$$