Name _____ Date _____

The Expected Value of Random Variable - Guided Lesson Explanation

Explanation # 1

Let X = "the number that turns up." The probability distribution of X is

X	1	2
P(X=x)	$\frac{1}{2}$	$\frac{1}{2}$

Therefore,

$E(X) = 1(\frac{1}{2}) + 2(\frac{1}{2})$

$= (\frac{3}{2})$

$= 1.5$

So, the answer is 1.5.

Explanation # 2

$\frac{1}{5000}$ = 0.0002 chance of winning \$495 [\$500 - \$5(per ticket cost)]

$\frac{2}{5000}$ = 0.0004 chance of winning \$95 [\$100 - \$5(per ticket cost)]

$\frac{3}{5000}$ = 0.0006 chance of winning \$45 [\$50 - \$5(per ticket cost)]

$\frac{4994}{5000}$ = 0.9988 chance of winning -\$5

Therefore, the payoff table is:

X	\$495	\$95	\$45	-\$5
P	0.0002	0.0004	0.0006	0.9988

The expected value is:

E(X) = 495(0.0002) + 95(0.0004) + 45(0.0006) – 0.9988

= -0.8348

Thus E(X) = -0.8348 = -83.48¢.

So, the answer is -83.48¢.

Name _____ Date _____

Explanation # 3

Let X = "the number that turns up." The probability distribution of X is

X	1	2	3
P(X=x)	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$

Therefore,

$E(X) = 1(\frac{1}{3}) + 2(\frac{1}{3}) + 3(\frac{1}{3})$

$= (\frac{6}{3})$

$= 2$

So, the answer is 2.