5.1 Worksheet – Probability Distributions

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1) Which of the following are valid probability distributions? Explain

a)

x	$P(x)$
0	0.5
1	0.25
2	0.25

b)

x	$P(x)$
0.5	0.2
0.2	0.3
0.3	0.25

c)

x	$P(x)$
0	0.3
1	0.25
2	0.25
3	0.2

2) Given the following probability distributions, determine the expected values.

a)

x	$P(x)$
5	0.3
10	0.25
15	0.45

b)

x	$P(x)$
1 000	0.25
100 000	0.25
1 000 000	0.25
10 000 000	0.25

c)

x	$P(x)$
1	$\frac{1}{6}$
2	$\frac{1}{5}$
3	$\frac{1}{4}$
4	$\frac{1}{3}$
5	$\frac{1}{20}$

3) A spinner has eight equally-sized sectors, numbered 1 through 8.

- **a)** Create a probability distribution for the outcome of a spin
- **b)** What is the probability that the arrow on the spinner will stop on a prime number?
- **c)** What is the expected outcome?

4) A lottery has a \$1 000 000 first prize, a \$25 000 second prize, and five \$1 000 third prizes. A total of 2 000 000 tickets are sold.

- **a)** Create a probability distribution for the amount of money you could win
- **b)** Calculate the expected winnings
- **c)** If a ticket costs \$2.00, what is the expected profit per ticket?

5) A game consists of rolling a die. If an even number shows, you receive double the value of the upper face in points. If an odd number shows, you lose points equivalent to triple the value of the upper face.

a) Create a probability distribution for the amount of points you receive on a single roll
b) How many points would you expect to get on a single roll?

6) Make a probability distribution from the following frequency distribution to represent the number of fish caught in a 6-hour period. Then calculate the expected number of fish caught in 6 hours.

# of fish caught	0	1	2	3	4
frequency	88	72	30	8	2