Math 30-2 Probability Lesson 4 Practice Questions [Solutions at the end]

Use the following information to answer the first question.

Sam and Betty keep a bag of mini-chocolate bars around the house to give to their visiting grandchildren. At the moment, there are three varieties; 16 Snickers, 12 Twix and 9 Mars Bars. Since Jake, their grandson, cannot decide which type he would like, he reaches in the bag and pulls out a treat one at a time.

1. The probability that Jake selects 1 Snickers and then 1 Twix, to the nearest thousandth, is

   A) 0.144 B) 0.140 C) 0.766 D) 0.757

Use the following information to answer the next question.

A box contains 5 red balls, 4 green balls, 2 blue balls and 1 purple ball. Jaxon randomly selects 2 balls one after the other, without replacement.

2. The probability that Jaxon selects a green ball, and then a ball that is **not** green is

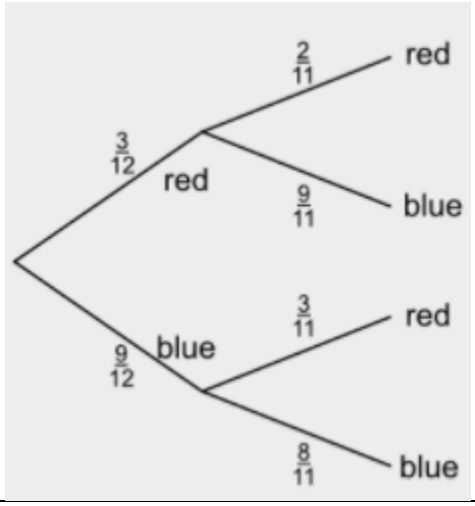
   A) $\frac{32}{144}$ B) $\frac{32}{120}$ C) $\frac{8}{14}$ D) $\frac{8}{33}$

3. The probability of drawing 3 red cards in a row, without replacement, from a standard deck of cards, to the nearest thousandth, is _____.

4. According to a survey, 73% of Albertans own a home. Of these people, it is estimated that 78% have a garage. Determine, to the nearest percent, the probability that any Albertan you met during the month in which the survey was conducted would have a garage.

Use the Probability Tree Diagram to answer the next question.

Suppose there are a number of red and blue balls in a bag. The fractions on the diagram indicate probabilities of particular events. There are two draws.



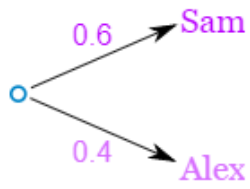
5. a) The number of red balls in the bag is ___.
   b) How many balls are in the bag on the second draw? ___
   c) Are the balls replaced after the first draw? ___
   d) To the nearest hundredth, the probability of drawing 2 blue balls is ____

Use the following information to answer the next question.

You are one of two goalies on a hockey team. The team has two co-head coaches, Sam and Alex. There is a big game today.

- With coach Sam being in charge, you have a 0.5 chance of being in net.
- With coach Alex being in charge, you have a 0.3 chance of being in net.
- Sam is coach more often; about 6 out of every 10 games (probability of 0.6)

The first part of the probability tree diagram is shown below.



6. Determine the probability that you will **not** be the goalie today.
   A) 0.30 B) 0.50 C) 0.58 D) 0.72

Use the following information to answer the next question.

Suppose that when you write your first Math exam, the probability of passing is 0.7.

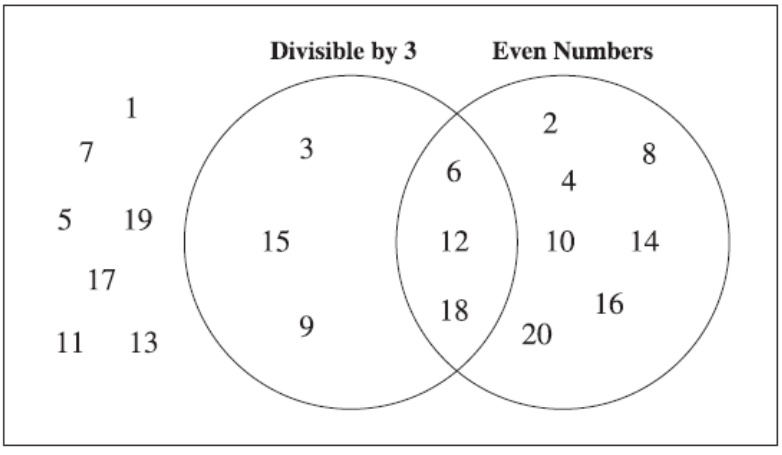
- If you pass the first test, the probability of passing the second test is 0.8.
- If you fail the first test, the probability of passing the second test is 0.6.

7. You passed the second test. The probability you passed the first test, to the nearest hundredth, is ____.

Use the following information to answer the next question.

The diagram shows the set whole numbers 1-20 inclusive. Each number will be written on a ball and all of the balls will be placed in a box.

- Let D = numbers divisible by 3
- Let E = even numbers



8. You are asked to choose one ball at random from the box. P((D $\cup$ E)') can be written in the form $\frac{K}{20}$. The value of K is _____.

9. Events A and B are conditional. If P(A) = $\frac{3}{5}$ and P(A and B) = $\frac{3}{10}$, determine P(B | A).

10. Based on previous performance, the probability of a particular volleyball team winning any match is $\frac{2}{5}$. What is the probability that the team will win one game and lose one game out of the next two games? Explain.

Math 30-2 Probability Lesson 4 Practice Questions Solutions

Use the following information to answer the first question.

Sam and Betty keep a bag of mini-chocolate bars around the house to give to their visiting grandchildren. At the moment, there are three varieties; 16 Snickers, 12 Twix and 9 Mars Bars. Since Jake, their grandson, cannot decide which type he would like, he reaches in the bag and pulls out a treat one at a time.

1. The probability that Jake selects 1 Snickers and then 1 Twix, to the nearest thousandth, is

   A) 0.144 B) 0.140 C) 0.766 D) 0.757

Solution

The probability of selecting a Snickers bar is $\frac{16}{37}$.

There is now one less bar in the bag, so the total number of outcomes changes from 37 to 36.

The probability of selecting a Twix is $\frac{12}{36} or \frac{1}{3}$.

The probability of both of these events occurring is $\left(\frac{16}{37}\right)\left(\frac{1}{3}\right)$ or 0.144

Use the following information to answer the next question.

A box contains 5 red balls, 4 green balls, 2 blue balls and 1 purple ball. Jaxon randomly selects 2 balls one after the other, without replacement.

2. The probability that Jaxon selects a green ball, and then a ball that is **not** green is

   A) $\frac{32}{144}$ B) $\frac{32}{120}$ C) $\frac{8}{14}$ D) $\frac{8}{33}$

Solution

The probability of selecting a green ball is $\frac{4}{12} or \frac{1}{3}$.

Since there is no replacement, for the second draw the total number of balls in the box is now 11. The favourable outcomes, of which there are 8, consist of the non-green balls (5 red, 2 blue, 1 purple).

The probability of not getting a green on the second draw is $\frac{8}{11}$.

Multiply these two probabilities together: $\left(\frac{1}{3}\right)\left(\frac{8}{11}\right) = \frac{8}{33}$.

3. The probability of drawing 3 red cards in a row, without replacement, from a standard deck of cards, to the nearest thousandth, is __0.118__.

Solution

There are 26 red cards and 26 black cards in a standard deck of 52 cards.

The probability of selecting a red card on the first draw is $\frac{26}{52} or \frac{1}{2}$.

Without replacement, there is now one less red card and one less total card.

The probability of selecting a red card on the second draw is $\frac{25}{51}$.

Without replacement, there is now one less red card and one less total card.

The probability of selecting a red card on the third draw is $\frac{24}{50} or \frac{12}{25}$.

Multiply these three probabilities: $\left(\frac{1}{2}\right)\left(\frac{25}{51}\right)\left(\frac{12}{25}\right) = 0.118$

4. According to a survey, 73% of Albertans own a home. Of these people, it is estimated that 78% have a garage. Determine, to the nearest percent, the probability that any Albertan you met during the month in which the survey was conducted would have a garage.

Solution

Let H represent owning a home

Let G represent having a garage

P(H) = 0.73

P(G) = 0.78

$P(G \mid H) = \frac{P(G \cap H)}{P(H)}$

$0.78 = \frac{P(G \cap H)}{0.73}$

$(0.78)(0.73) = P(G \cap H)$

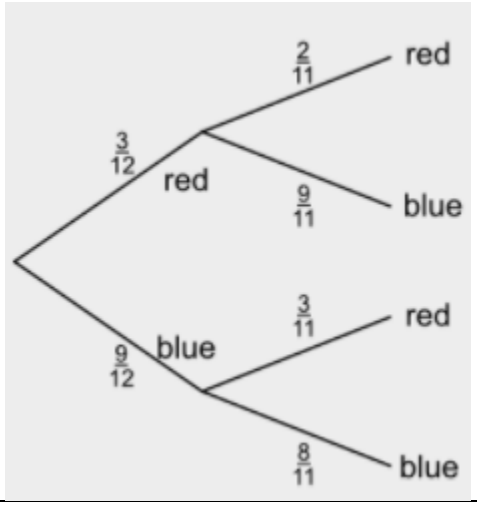
0.5694

Having a garage is a subset of owning a home.

To the nearest percent, the probability that any Albertan you met during the month in which the survey was conducted would have a garage is 57%.

Use the Probability Tree Diagram to answer the next question.

Suppose there are a number of red and blue balls in a bag. The fractions on the diagram indicate probabilities of particular events. There are two draws.



5. a) The number of red balls in the bag is _3_.
   b) How many balls are in the bag on the second draw? _11_
   c) Are the balls replaced after the first draw? _no_
   d) To the nearest hundredth, the probability of drawing 2 blue balls is _0.55_.

Solution

a) The probability of selecting a red ball on the first draw is $\frac{3}{12}$. This tells us that there are 3 red balls in the bag.

b) The probabilities on the second draw are $\frac{2}{11}$, $\frac{9}{11}$, $\frac{3}{11}$, and $\frac{8}{11}$. This tells us that the number of balls in the bag on the second draw is 11.

c) Since the total number of balls on each draw changes, from 12 to 11, this tells us that the balls are not replaced after the first draw.

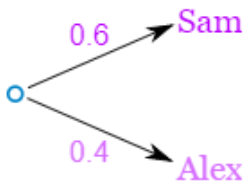
d) The probability of drawing two blue balls in a row is the product of $\left(\frac{9}{12}\right)$ and $\left(\frac{8}{11}\right)$. The probability is 0.55.

Use the following information to answer the next question.

You are one of two goalies on a hockey team. The team has two co-head coaches, Sam and Alex. There is a big game today.

- With coach Sam being in charge, you have a 0.5 chance of being in net.
- With coach Alex being in charge, you have a 0.3 chance of being in net.
- Sam is coach more often; about 6 out of every 10 games (probability of 0.6)

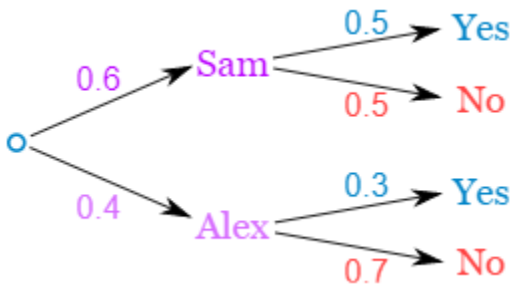
The first part of the probability tree diagram is shown below.



6. Determine the probability that you will **not** be the goalie today.

A) 0.30 B) 0.50 C) 0.58 D) 0.72

Solution



If Sam is coach, the product of (0.6)(0.5) represents the probability of you not being in goal. The probability of Sam coaching and you not being in net is 0.3.

If Alex is coach, the product of (0.4)(0.7) represents the probability of you not being in goal. The probability of Alex coaching and you not being in net is 0.28.

The sum of these two probabilities (0.3 + 0.28) represents the probability of you not being in net.

The probability that you will not be the goalie today is 0.58.

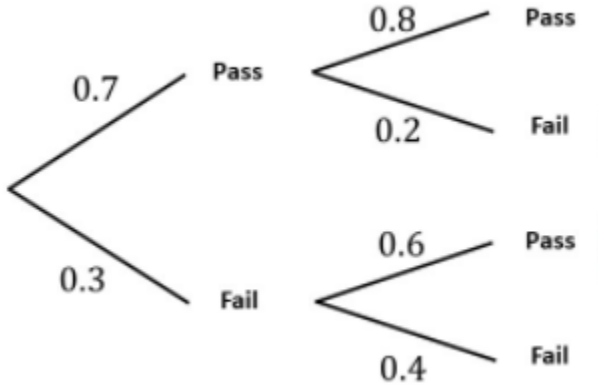
Use the following information to answer the next question.

Suppose that when you write your first Math exam, the probability of passing is 0.7.

- If you pass the first test, the probability of passing the second test is 0.8.
- If you fail the first test, the probability of passing the second test is 0.6.

7. You passed the second test. The probability you passed the first test, to the nearest hundredth, is _0.76_.

Solution



The 4 possible outcomes:

Pass (0.7) X Pass (0.8) = 0.56

Pass (0.7) X Fail (0.2) = 0.14

Fail (0.3) X Pass (0.6) = 0.18

Fail (0.3) X Fail (0.4) = 0.12

Since you passed the second test, the total outcomes is represented by the **sum** of: Pass (0.7) X Pass (0.8) = 0.56 **and** Fail (0.3) X Pass (0.6) = 0.18, which is 0.74.

The favourable outcome is represented by Pass (0.7) X Pass (0.8) = 0.56.

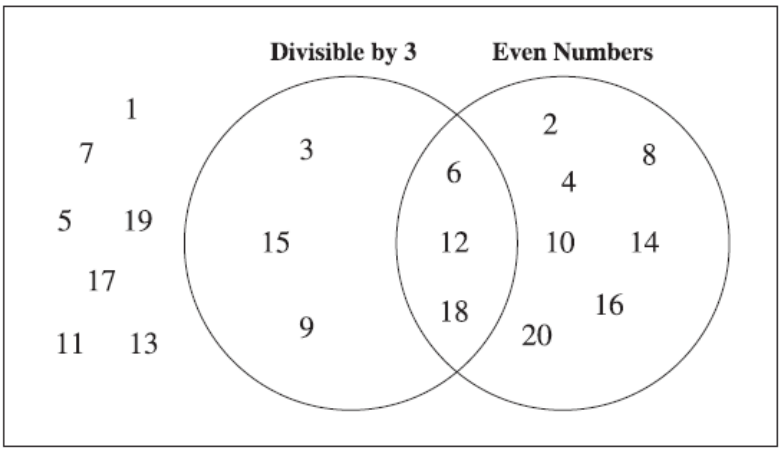
The probability is determined by $\frac{0.56}{0.74}$.

The probability you passed the first test, to the nearest hundredth, is _0.76_.

Use the following information to answer the next question.

The diagram shows the set whole numbers 1-20 inclusive. Each number will be written on a ball and all of the balls will be placed in a box.

- Let D = numbers divisible by 3
- Let E = even numbers



8. You are asked to choose one ball at random from the box. P((D ∪ E)') can be written in the form $\frac{K}{20}$. The value of K is _7__.

Solution

The complement of the union of sets D and E are represented by the numbers 1, 5, 7, 11, 13, 17, and 19. There are 7 favourable outcomes.

The value of K is _7__.

9. Events A and B are conditional. If P(A) = $\frac{3}{5}$ and P(A and B) = $\frac{3}{10}$, determine P(B | A).

Solution

The appropriate formula is P(A) X P(B | A) = P(A and B)

$\left(\frac{3}{5}\right)$ (P(B | A)) = $\frac{3}{10}$

$$P(B \mid A) = \frac{\frac{3}{10}}{\frac{3}{5}}$$

P(B | A) = $\frac{1}{2}$.

10. Based on previous performance, the probability of a particular volleyball team winning any match is $\frac{2}{5}$. What is the probability that the team will win one game and lose one game out of the next two games? Explain.

Solution

With a 0.4 chance of winning, there is a 0.6 chance of losing.

To win one game and lose the next involves two cases.

Case 1- Win First/Lose Second	+	Case 2 – Lose First/Win Second
(0.4)(0.6)	+	(0.6)(0.4)
0.24	+	0.24

= 0.48

The probability that the team will win one game and lose one game out of the next two games is 0.48.