

What Are the Odds?

5th
Grade



Table of Contents

What Are the Odds?

Probability Dice Game
Probability Darts 1 *
Probability Darts 2 *
Probability Darts 3 *
Probability Darts 4 *
Probability Darts 5 *
Probability Toss 1 *
Probability Toss 2 *
Probability Toss 3 *
Probability Toss 4 *
Probability Toss 5 *
Probability Coin Toss *
Probability Dice Roll *
Probability: Rock Paper Scissors
Probability Cards *
Probability Bowling *

Certificate of Completion
Answer Sheets

** Has an Answer Sheet*

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Probability Dice Game

This probability dice game is a great way to cover and build on the basics of probability math. The different combinations dice offer are the perfect grounds for many probability questions, such as, "How likely is it that the total of two rolled dice will be six?" or "What is the probability the three-side will come up on both dice?"

Here's a quick game that can help your kid grasp the difference between rolling Snake Eyes and Lucky Number Seven!

What You Need:

- A pair of dice, two different colors (for example, red and blue)
- A piece of paper
- Some M&M's or another little treat



What You Do:

1. Tell your child that you're going to learn all about dice and probability.
2. Ask him how many different ways there are to roll 2 dice. Remind him that there are 6 options on both sides. Together, you can determine that there are $6 \times 6 = 36$ possible rolls.
3. Ask him how many ways there are to roll a total of "2" using two dice. After thinking, he should conclude that there's only one way: $1 + 1$
4. Ask him how many ways there are to roll a total of "7." He should come up with 6 combinations: $1 + 6, 6 + 1, 2 + 5, 5 + 2, 3 + 4, 4 + 3$.
5. Time to figure out all of the rolls. Have him fill out the last two columns of the following chart. He has already figured out "2" and "7," and he can do the rest the same way.

Total to Roll	Ways to Get the Total	Probability of that Roll
2	1	$1 / 36$
3		$ / 36$
4		$ / 36$
5		$ / 36$
6		$ / 36$
7	6	$6 / 36 = 1/6$
8		$ / 36$
9		$ / 36$
10		$ / 36$
11		$ / 36$
12		$ / 36$

6. When he's done, the chart should look like this:

Total to Roll	Ways to Get the Total	Probability of that Roll
2	1	$1 / 36$
3	2	$2 / 36 = 1/18$
4	3	$3 / 36 = 1/12$
5	4	$4 / 36 = 1/9$
6	5	$5 / 36$

7	6	$6 / 36 = 1/6$
8	5	$5 / 36$
9	4	$4 / 36 = 1/9$
10	3	$3 / 36 = 1/12$
11	2	$2 / 36 = 1/18$
12	1	$1 / 36$

7. Here's a dice challenge for him. First, tell him the roll you want him to try and get. Then, give him two opportunities to win a reward (like a small piece of candy.) He can win an award if he rolls what you asked him to get. And, he can win another award for guessing the correct probability of rolling what you've asked of him. Good luck!

- Roll a total of "9" $(1/9)$
- Roll a total of "11" $(1/18)$
- Roll a total of 8" $(5/36)$
- Roll a total of "12" $(1/36)$
- Roll a total of "5" $(1/9)$
- Roll a "7" or an "11" $(6/36 + 2/36 = 8/36 = 2/9)$
- Roll a "2" or "6" $(1/36 + 5/36 = 6/36 = 1/6)$
- Roll a "2" or a "6" or a "7" or an "11" $(1/36 + 5/36 + 6/36 + 2/36 = 14/36 = 7/18)$
- You can make up your own as you go

Probability Darts

Find the portion of the dart board that each panel occupies and use your knowledge of degrees and fractions to answer the following questions about probability.

REMEMBER: Probability is the likelihood a given outcome will occur. It is expressed as a fraction.

Fractions

A $\frac{1}{12}$
 $30^\circ/360^\circ$

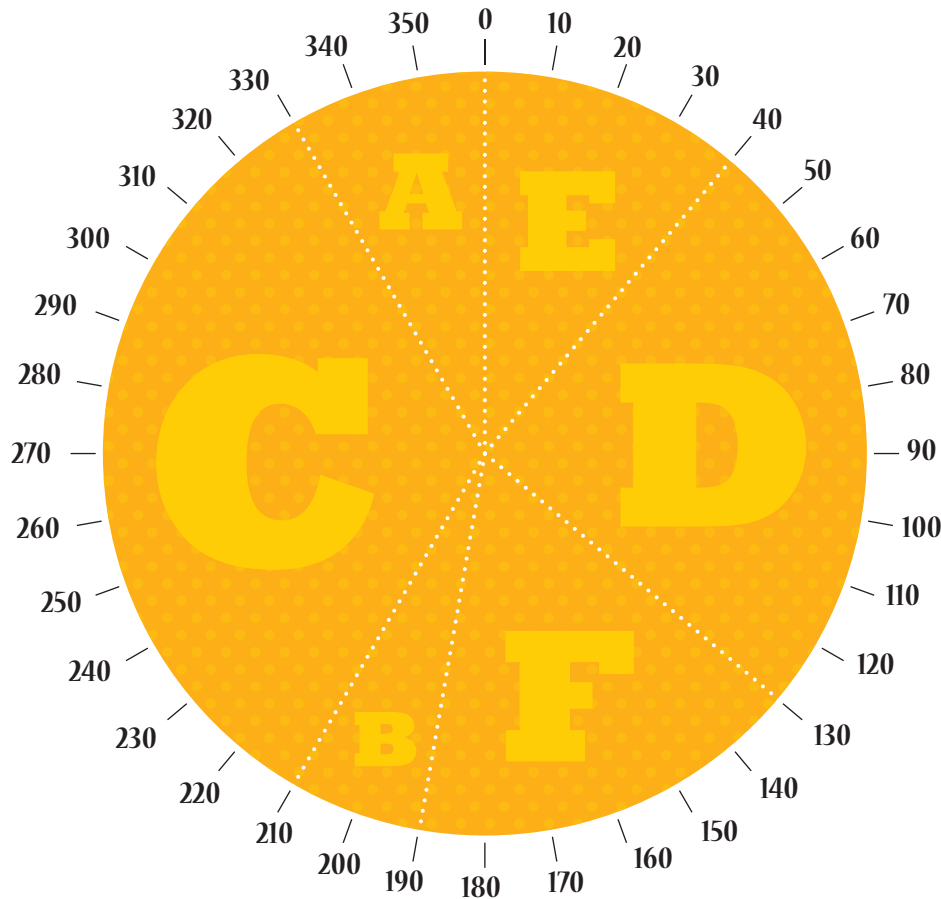
B _____

C _____

D _____

E _____

F _____



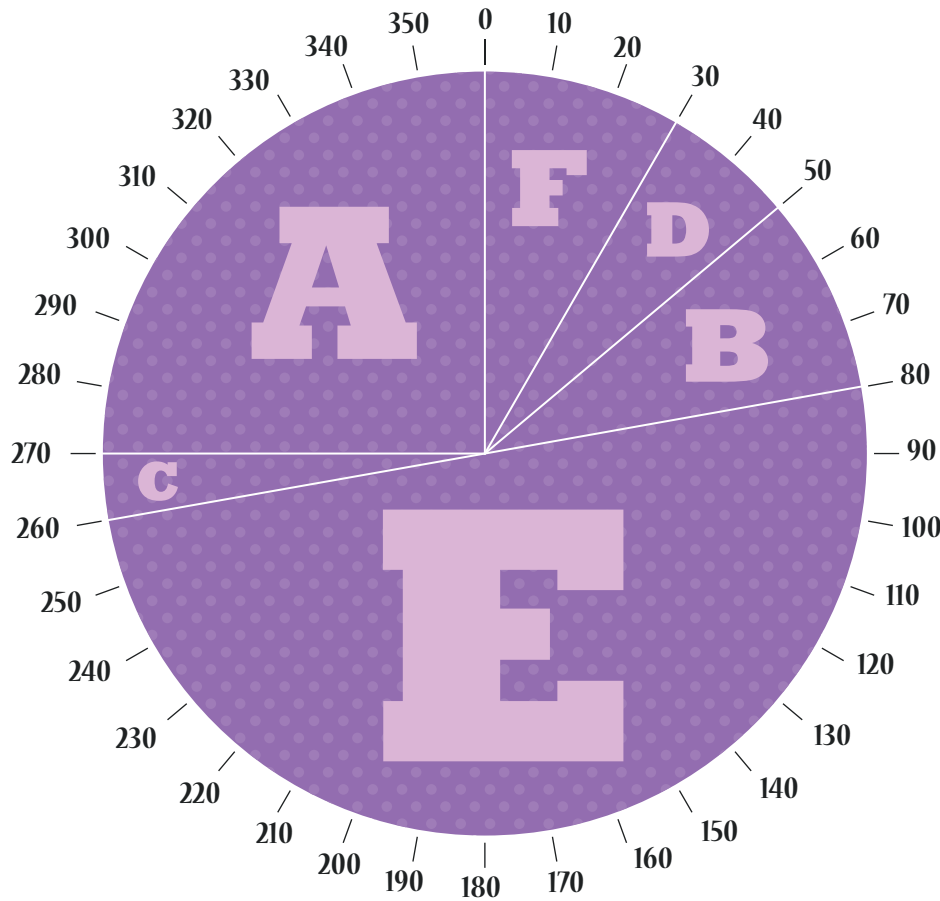
Use the information above to answer the questions below.

- 1 Is it more likely that the dart will hit Panel A or Panel D? Why?
- 2 What is the probability that the next dart thrown hits a panel with a consonant?
- 3 What is the probability that the next dart thrown hits a panel that alphabetically comes after C?

Probability Darts

Find the portion of the dart board that each panel occupies and use your knowledge of degrees and fractions to answer the following questions about probability.

REMEMBER: Probability is the likelihood a given outcome will occur. It is expressed as a fraction.



Fractions

A $\frac{1}{4}$

$90^\circ/360^\circ$

B _____

C _____

D _____

E _____

F _____

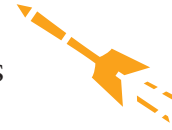
Use the information above to answer the questions below.

- 1 What is the probability that the next dart thrown hits panel C or B?
- 2 What is the probability that the next dart thrown hits panel A, D, or F?
- 3 Is the next dart thrown more likely to hit a vowel or a consonant?

Probability Darts

Find the portion of the dart board that each panel occupies and use your knowledge of degrees and fractions to answer the following questions about probability.

REMEMBER: Probability is the likelihood a given outcome will occur. It is expressed as a fraction.



Fractions

A 1/6

60°/360°

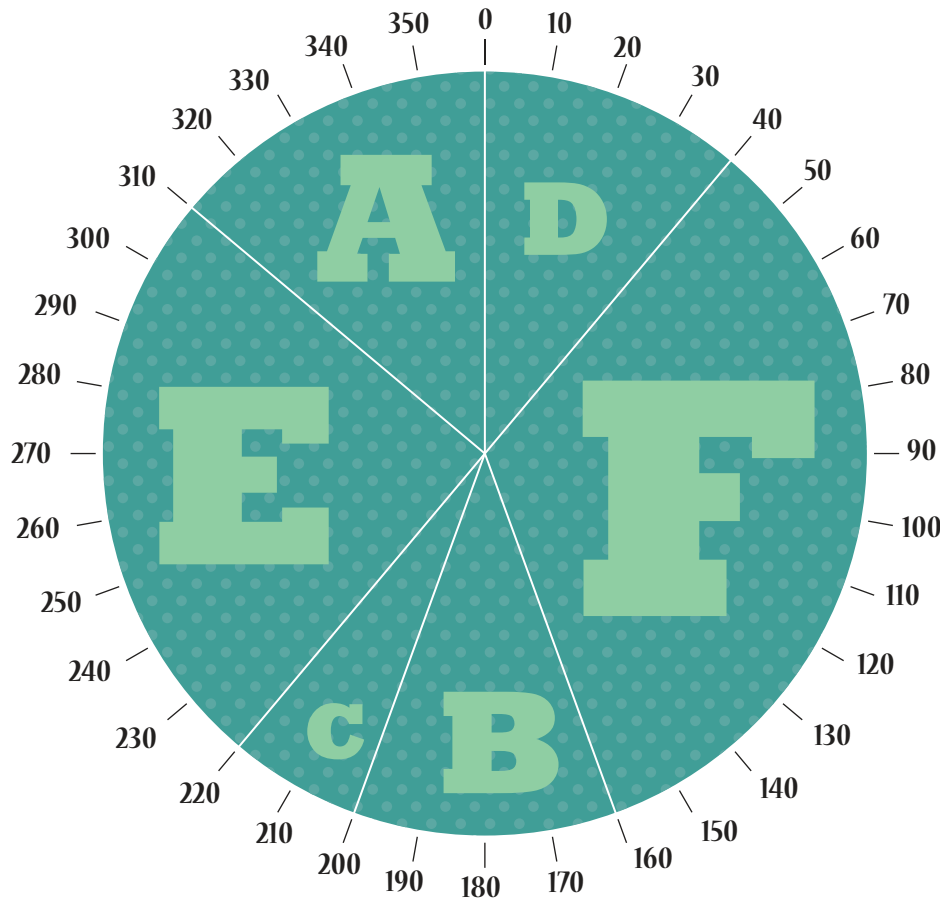
B _____

C _____

D _____

E _____

F _____



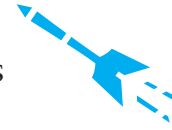
Use the information above to answer the questions below.

- 1 Is the next dart thrown more likely to hit E or F? Why?
- 2 What is the probability the next dart thrown hits a letter that comes before D alphabetically?
- 3 What is the probability the next dart thrown hits panel A, B, or D? Is it more or less than 1/2?

Probability Darts

Find the portion of the dart board that each panel occupies and use your knowledge of degrees and fractions to answer the following questions about probability.

REMEMBER: Probability is the likelihood a given outcome will occur. It is expressed as a fraction.



Fractions

A $\frac{1}{36}$

$\frac{10^\circ}{360^\circ}$

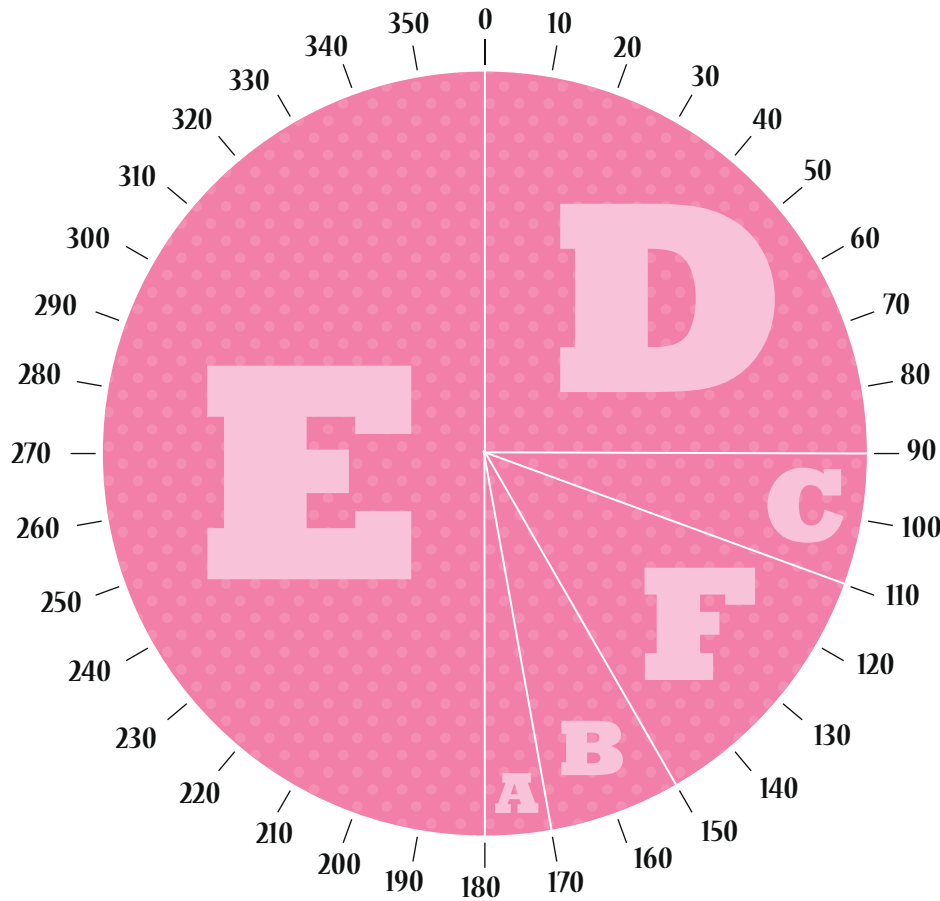
B _____

C _____

D _____

E _____

F _____



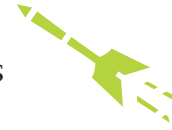
Use the information above to answer the questions below.

- 1 Is the next dart thrown more likely to hit a vowel or a consonant?
- 2 What is the probability that the next dart thrown hits panel C or panel B?
- 3 Which panels have a probability less than or equal to $\frac{1}{6}$ that they will be hit?
What is the probability that the next dart thrown hits one of them?

Probability Darts

Find the portion of the dart board that each panel occupies and use your knowledge of degrees and fractions to answer the following questions about probability.

REMEMBER: Probability is the likelihood a given outcome will occur. It is expressed as a fraction.



Fractions

A **1/18**

20°/360°

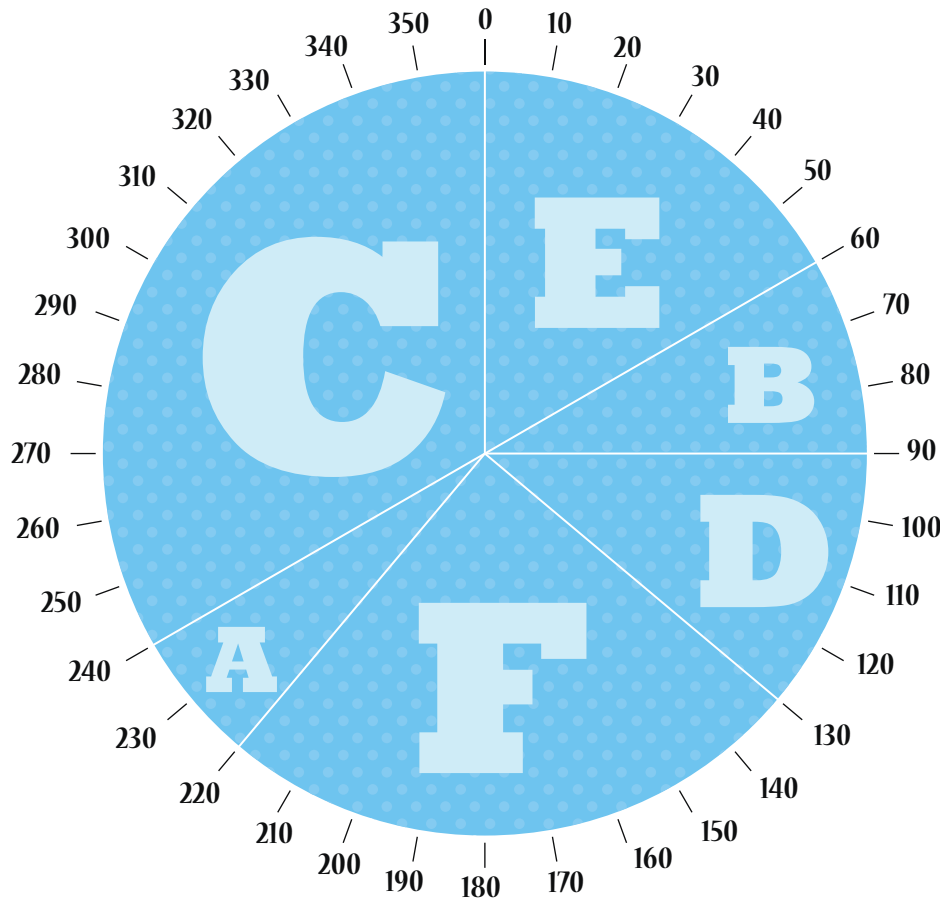
B _____

C _____

D _____

E _____

F _____



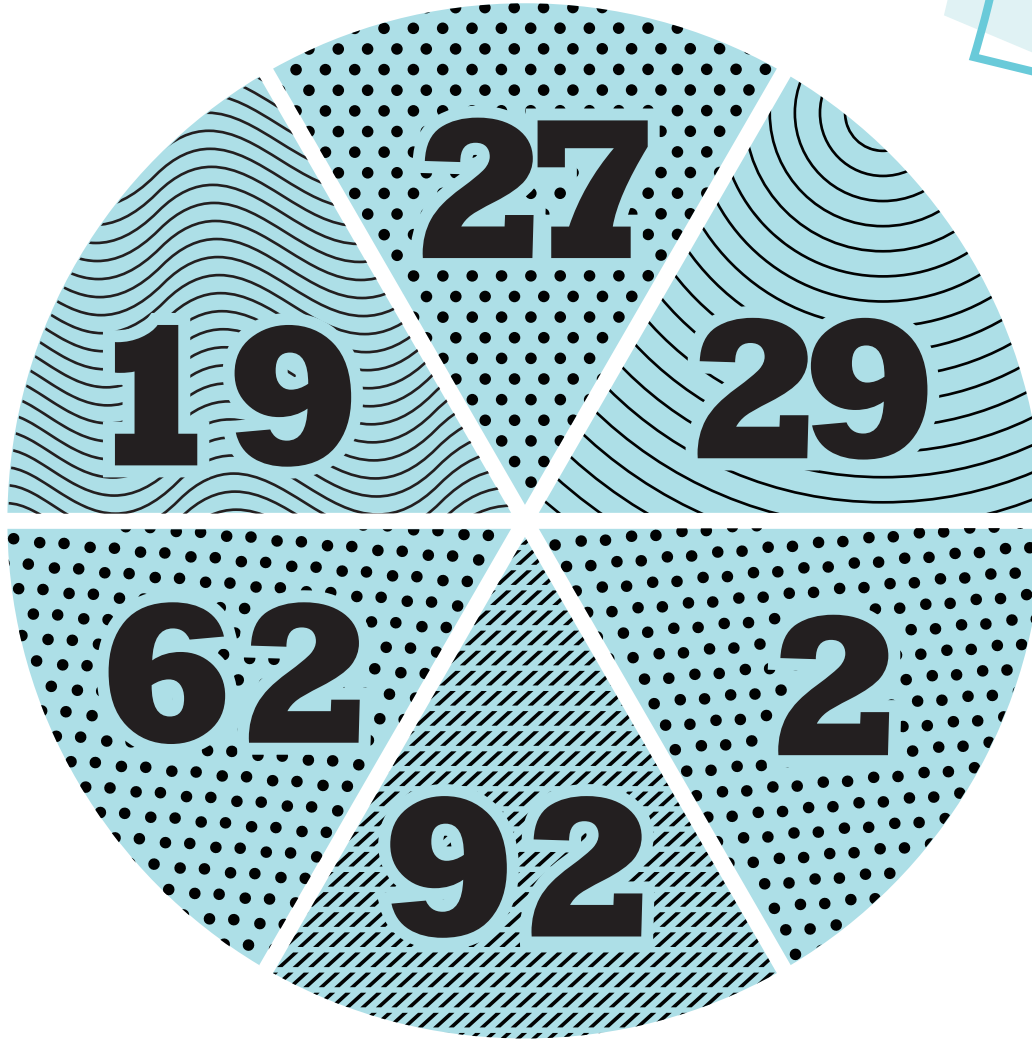
Use the information above to answer the questions below.

- 1 Is the next dart more likely to hit panel C, E, or F? Why?
- 2 What is the probability that the next dart thrown hits a panel with a letter that comes after C alphabetically?
- 3 Write the letters of the panel in the order of most to least probable of being hit.

PROBABILITY TOSS

Use fractions to express the probabilities of each outcome when a dart is thrown.

REMEMBER: Probability is the likelihood a given outcome will occur. It is expressed as a fraction.



What is the probability that the next dart thrown hits a number that....

is greater than 15?

5/6

is an even number?

is less than 61?

has a  pattern?

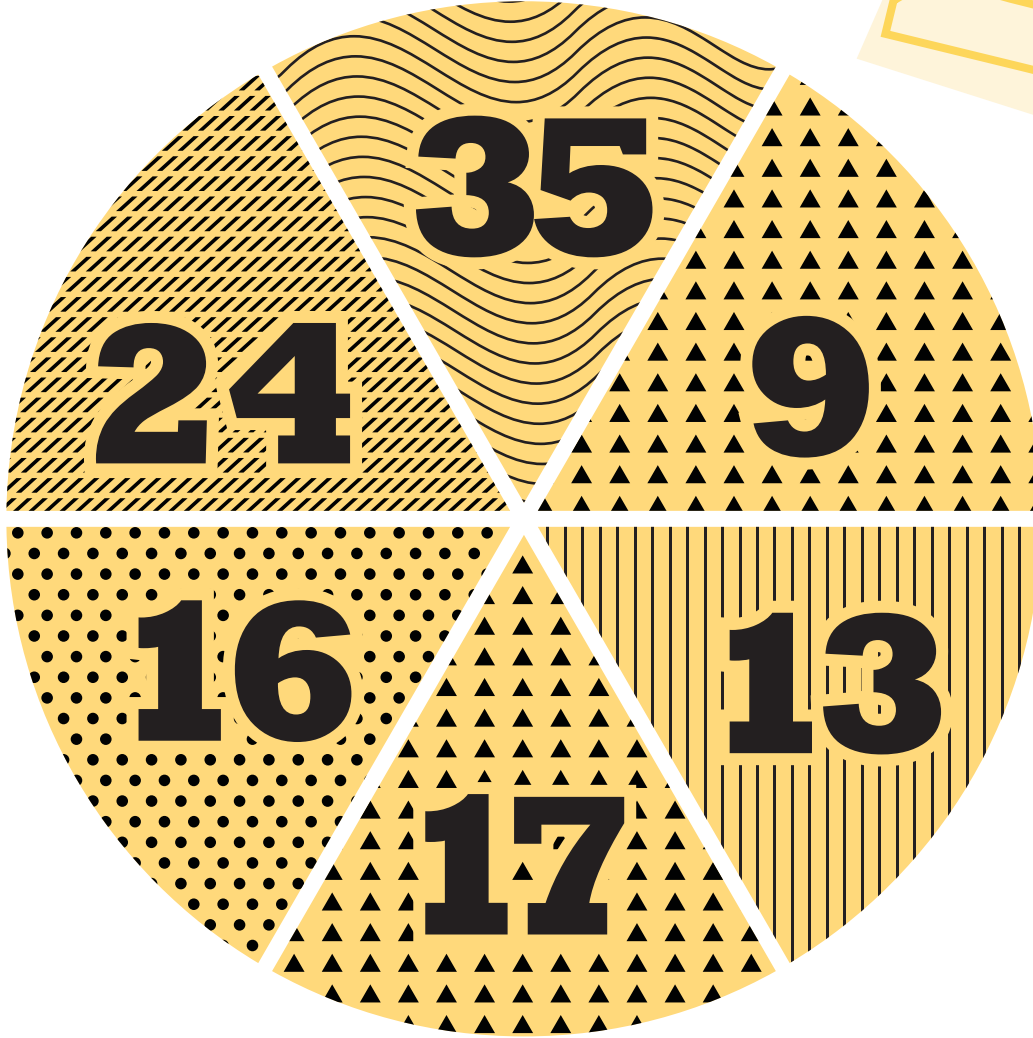
has 9 in the one's digit?

has a 2 in any digit?

PROBABILITY TOSS

Use fractions to express the probabilities of each outcome when a dart is thrown.

REMEMBER: Probability is the likelihood a given outcome will occur. It is expressed as a fraction.



What is the probability that the next dart thrown hits a number that....

is an odd number?

4/6

has a 3 in any digit?

is less than 20 ?

is in the teens ?

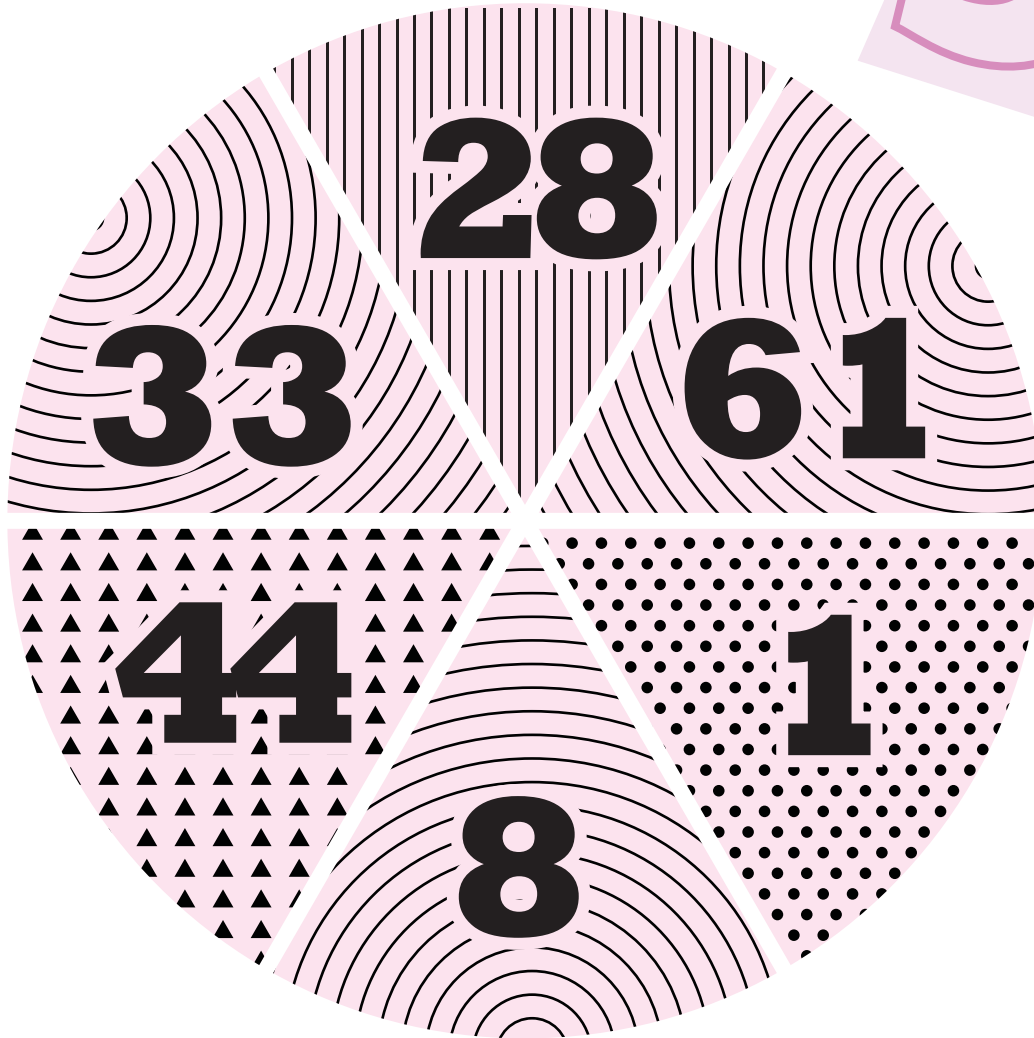
has a  pattern?

has a  pattern?

PROBABILITY TOSS

Use fractions to express the probabilities of each outcome when a dart is thrown.

REMEMBER: Probability is the likelihood a given outcome will occur. It is expressed as a fraction.



What is the probability that the next dart thrown hits a number that....

is a multiple of 11 ?

2/6

is an odd number?

is less than 10 ?

is more than 50 ?

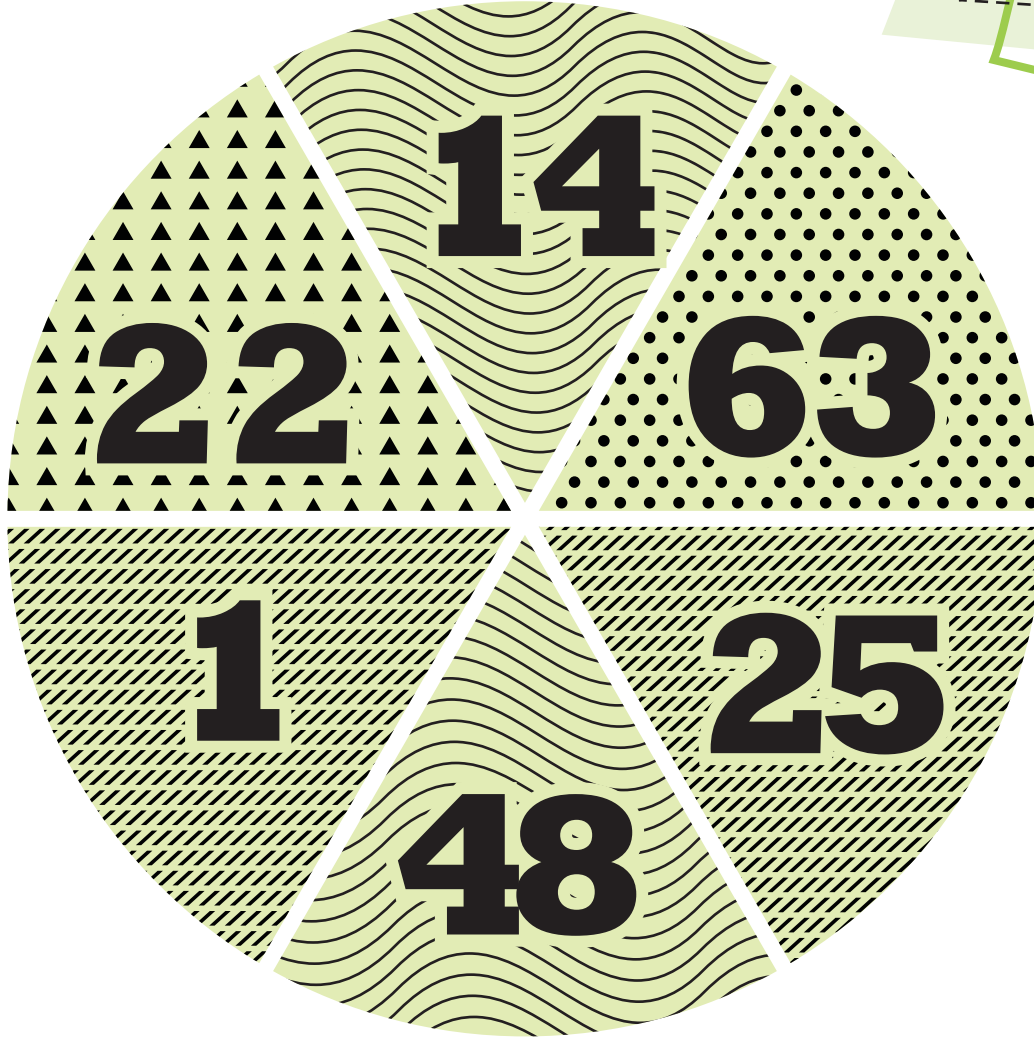
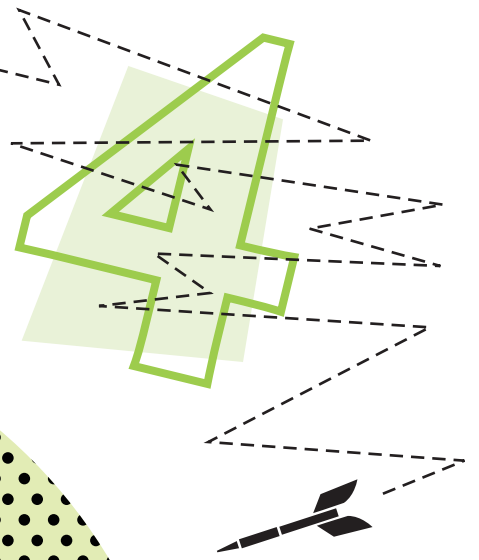
has a  pattern?

has a 1 in the one's digit?

PROBABILITY TOSS

Use fractions to express the probabilities of each outcome when a dart is thrown.

REMEMBER: Probability is the likelihood a given outcome will occur. It is expressed as a fraction.



What is the probability that the next dart thrown hits a number that....

has a **1** in the **ten's** digit? is a multiple of **4** ?

1/6

has a  pattern?

has a  pattern?

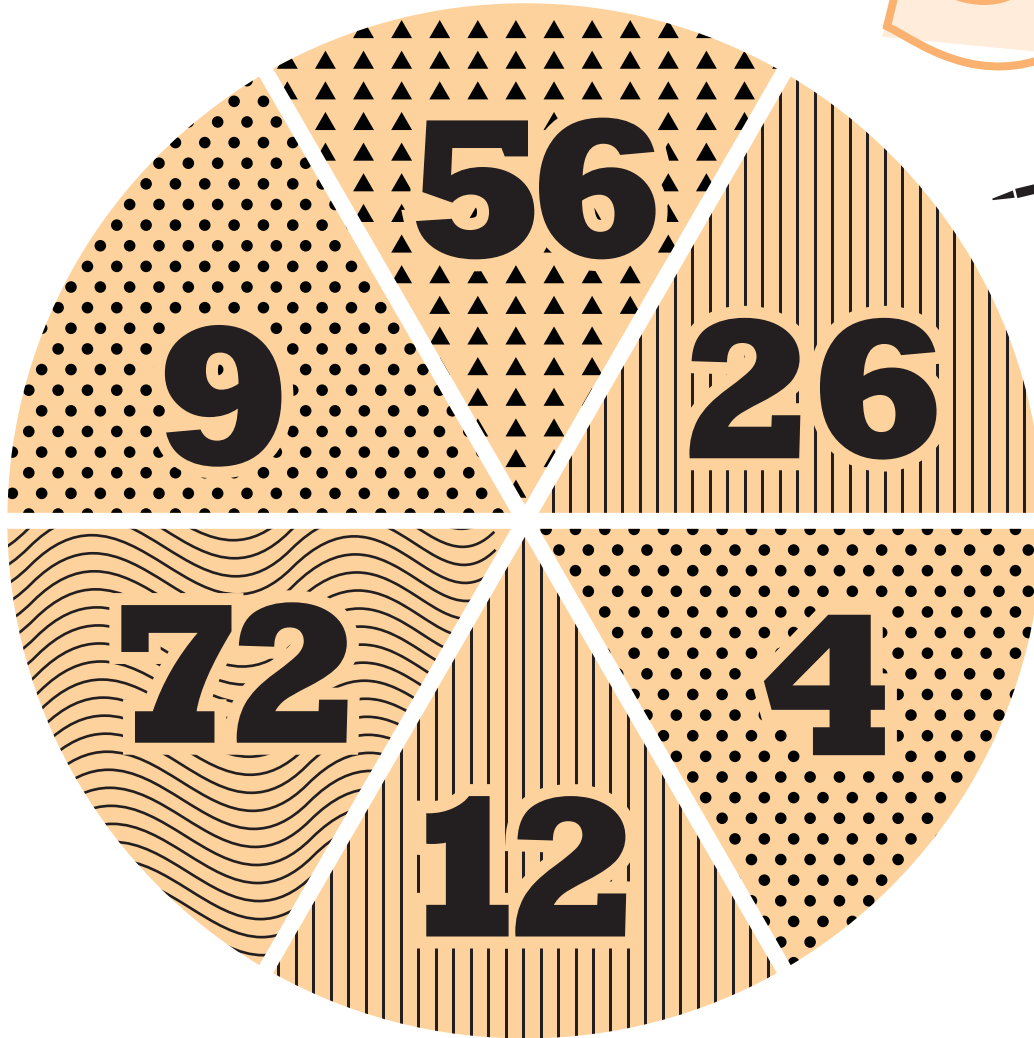
is less than **34** ?

has a **2** in the **ten's** digit?

PROBABILITY TOSS

Use fractions to express the probabilities of each outcome when a dart is thrown.

REMEMBER: Probability is the likelihood a given outcome will occur. It is expressed as a fraction.



What is the probability that the next dart thrown hits a number that....

is an **even** number?

is a multiple of **3** ?

5/6

is a multiple of **9** ?

has a **2** in any digit?

has a  pattern?

is greater than **50** ?

Probability Coin Toss

What is probability? Probability is the chance that a particular outcome will occur.



Find the probability of a coin toss. Get together with a partner and record the number of heads or tails you get as you toss a coin.

Toss a coin 10 times.

of heads _____

of tails _____

Write the number
in fraction form.

heads ____ / ____

tails ____ / ____

Toss a coin 20 times.

of heads _____

of tails _____

Write the number
in fraction form.

heads ____ / ____

tails ____ / ____

Toss a coin 30 times.

of heads _____

of tails _____

Write the number
in fraction form.

heads ____ / ____

tails ____ / ____

A. What is the total number of heads tossed? _____ Tails? _____

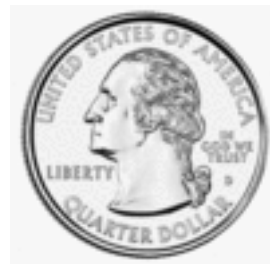
B. What is the probability of total heads tossed? _____ Tails? _____

C. What do these results tell you? _____

Probability Coin Toss

Find the probability of a coin toss.
Answer the questions about tossing a quarter.

What is probability? Probability is the chance that a particular outcome will occur.



If you toss a quarter...

- 1.) What is the probability you get tails?
- 2.) What is the probability you get heads?
- 3.) You toss the quarter and get heads. What is the probability you get heads again on a second toss?
- 4.) You toss the quarter three times and get tails each time. What is the probability you get heads the fourth time you toss it?

Probability

Dice Roll



Reminder: Probability is the chance that something will happen.



What is the probability of...

- 1.) Rolling a six-sided die and getting a 2?
- 2.) Rolling a six-sided die and getting a number less than 4?
- 3.) Rolling a six-sided die and getting a number over 2?
- 4.) Rolling a six-sided die and getting a 1 or a 5?
- 5.) Rolling two six-sided dice and getting a 5?
- 6.) Rolling two six-sided dice and getting a 3 and a 6?

Probability

Rock, Paper, Scissors



Probability: The chance that something will happen.

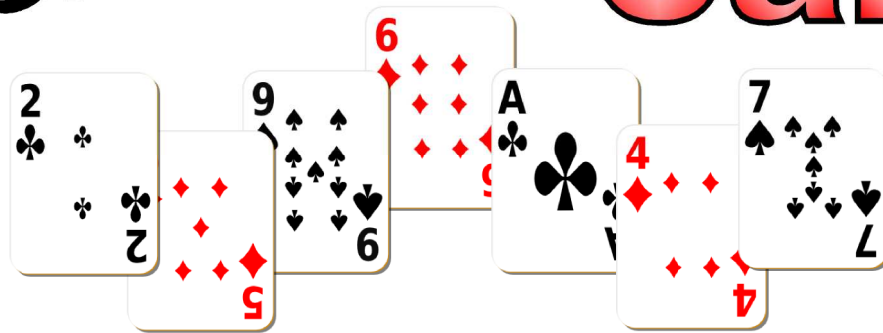
If you and a friend are playing rock, paper, scissors...

1. What is the probability that your friend will throw a rock?
2. What is the probability that your friend will not throw paper?

Get together with a partner and play rock, paper, scissors. Play a total of 20 times and record your data.

1. How many times was rock thrown by your partner? _____
A. What was the probability? _____ / _____
2. How many times was paper thrown by your partner? _____
A. What was the probability? _____ / _____
3. How many times was scissors thrown by your partner? _____
A. What was the probability? _____ / _____
4. What do these results tell you? _____

Probability Cards



PROBABILITY: The chance that an event will occur.

Tip: There are 52 cards in a deck. Ace is high.

What is the probability of picking...

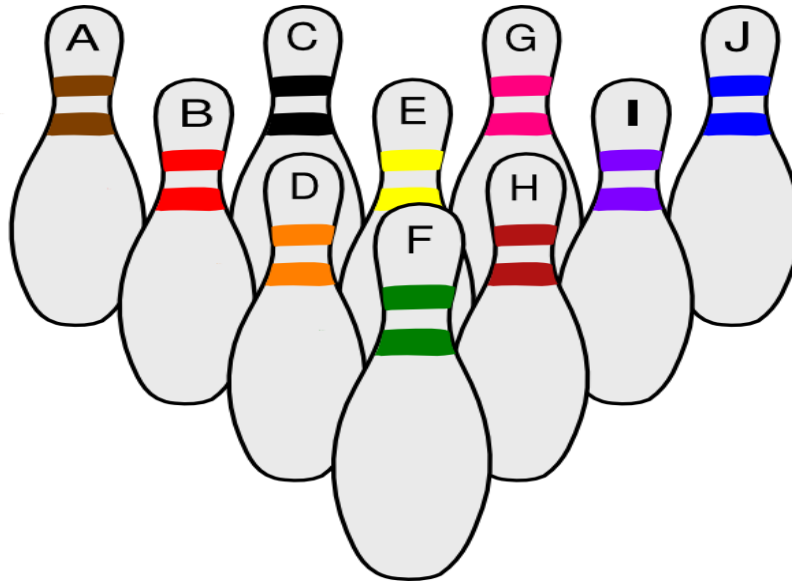
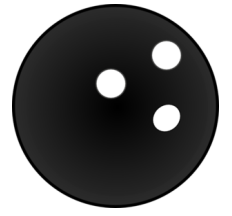
1. an ace from a deck of cards?
2. a number less than 4 from a deck of cards?
3. a face card from a deck of cards?
4. a spade from a deck of cards?
5. an 8 or a 9 from a deck of cards?

Bonus: If two jokers are present in a deck of cards, what is the probability of picking one joker?





Probability Bowling



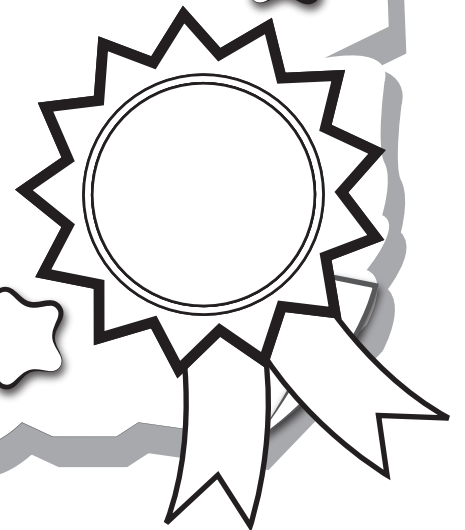
Probability is the likelihood that a particular event will occur.

Todd is a beginning bowler! If he were to knock down only one pin on his first try, what is the probability that he knocks down...

1. a blue or green pin?
2. an orange pin?
3. a yellow, brown or pink pin?
4. a black or purple pin?
5. a pin with a letter between B and F?
6. a pin with a letter before E?
7. a pin with the letter J or C?
8. a pin with the letter I?
9. a green or brown pin, or a pin with a letter after D?

Great job!

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Answer Sheets

What Are the Odds?

Probability Darts 1
Probability Darts 2
Probability Darts 3
Probability Darts 4
Probability Darts 5
Probability Toss 1
Probability Toss 2
Probability Toss 3
Probability Toss 4
Probability Toss 5
Probability Coin Toss
Probability Dice Roll
Probability Cards
Probability Bowling

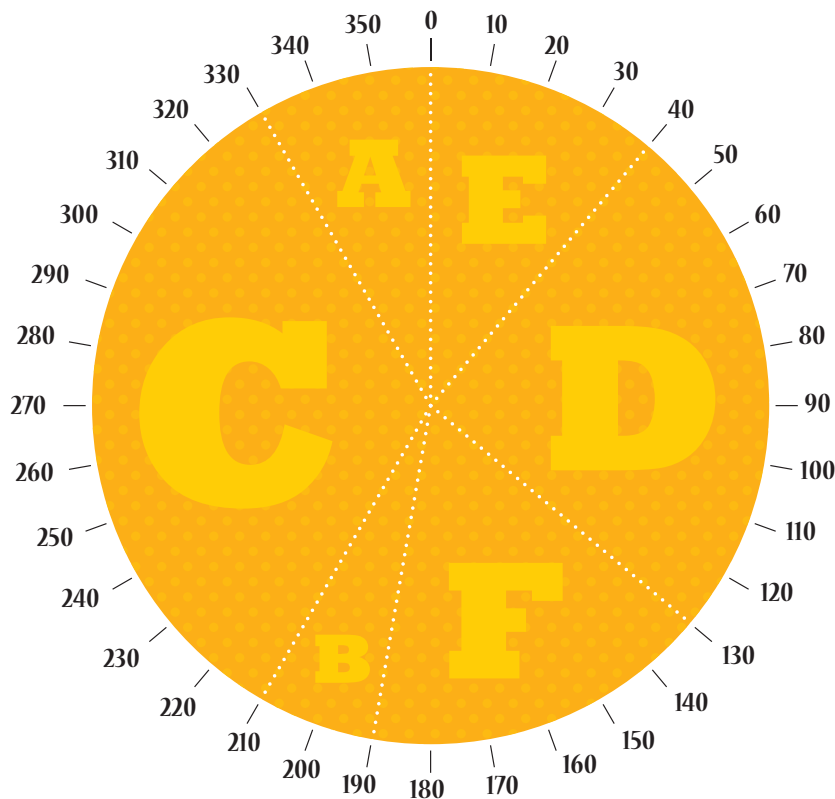
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Answer Sheet

Probability Darts

Find the portion of the dart board that each panel occupies and use your knowledge of degrees and fractions to answer the following questions about probability.

REMEMBER: Probability is the likelihood a given outcome will occur. It is expressed as a fraction.



ANSWERS

Fractions

A $\frac{1}{12}$

$30^\circ/360^\circ$

B $\frac{1}{18}$

C $\frac{1}{3}$

D $\frac{1}{4}$

E $\frac{1}{9}$

F $\frac{1}{6}$

Use the information above to answer the questions below.

1 Is it more likely that the dart will hit Panel A or Panel D? Why?

D - It is more likely to hit panel D because $\frac{1}{4}$ is greater than $\frac{1}{12}$

2 What is the probability that the next dart thrown hits a panel with a consonant?

$\frac{1}{18} + \frac{1}{3} + \frac{1}{4} + \frac{1}{6} = \frac{29}{36}$

3 What is the probability that the next dart thrown hits a panel that alphabetically comes after C?

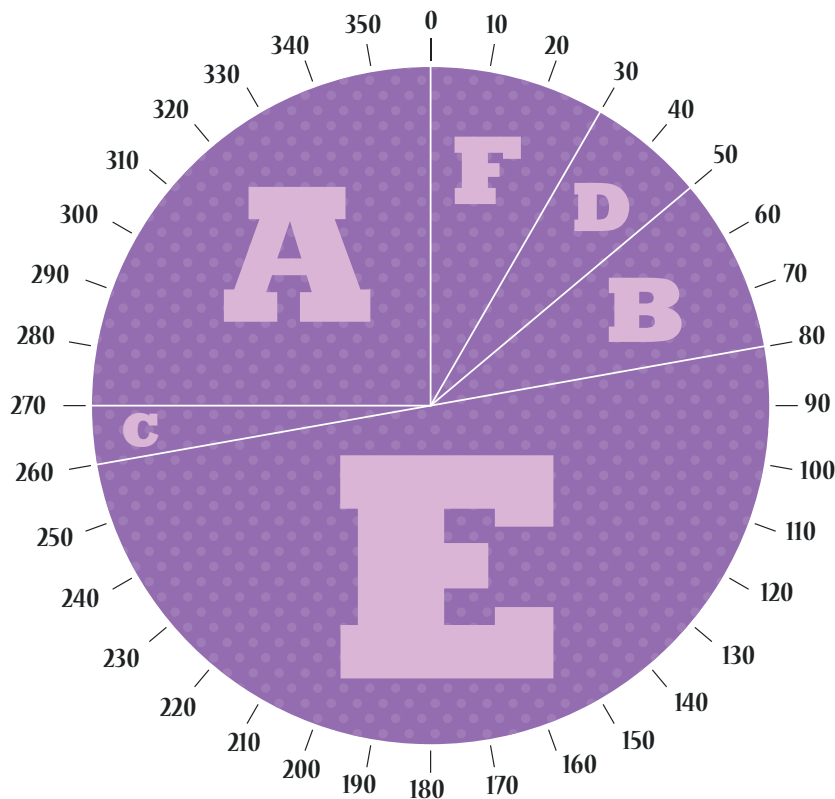
$\frac{1}{4} + \frac{1}{9} + \frac{1}{6} = \frac{19}{36}$

Answer Sheet

Probability Darts

Find the portion of the dart board that each panel occupies and use your knowledge of degrees and fractions to answer the following questions about probability.

REMEMBER: Probability is the likelihood a given outcome will occur. It is expressed as a fraction.



ANSWERS

Fractions

A $\frac{1}{4}$
 $90^\circ/360^\circ$

B $\frac{1}{9}$

C $\frac{1}{36}$

D $\frac{1}{18}$

E $\frac{1}{2}$

F $\frac{1}{12}$

Use the information above to answer the questions below.

1 What is the probability that the next dart thrown hits panel C or B?

$$\frac{1}{36} + \frac{1}{18} = \frac{1}{2}$$

2 What is the probability that the next dart thrown hits panel A, D, or F?

$$\frac{1}{4} + \frac{1}{18} + \frac{1}{12} = \frac{7}{18}$$

3 Is the next dart thrown more likely to hit a vowel or a consonant?

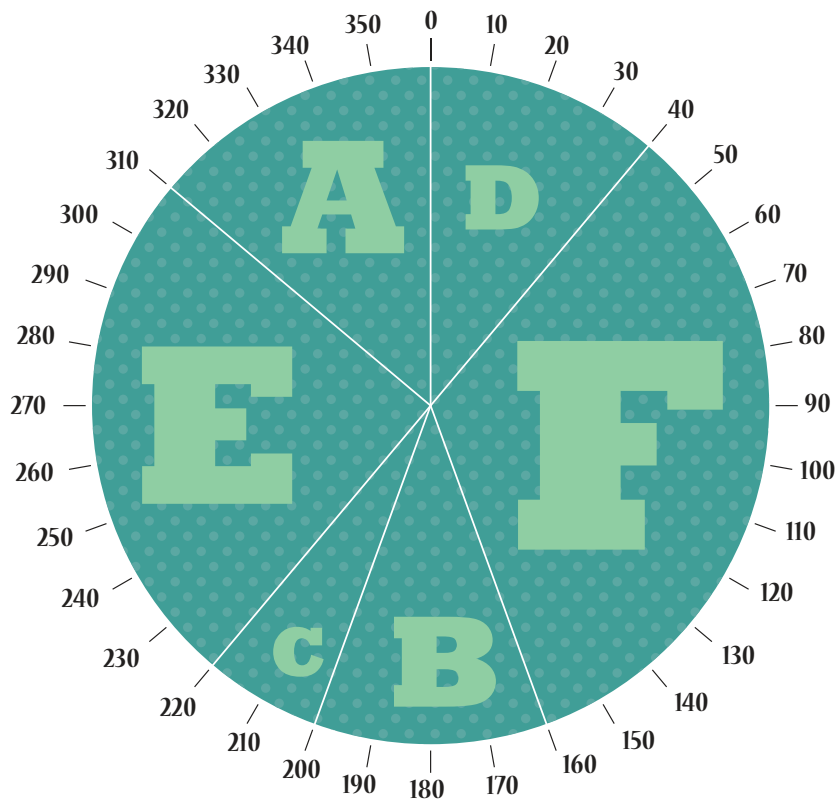
Vowel

Answer Sheet

Probability Darts

Find the portion of the dart board that each panel occupies and use your knowledge of degrees and fractions to answer the following questions about probability.

REMEMBER: Probability is the likelihood a given outcome will occur. It is expressed as a fraction.



ANSWERS

Fractions

A $\frac{1}{6}$

$60^\circ/360^\circ$

B $\frac{1}{9}$

C $\frac{1}{18}$

D $\frac{1}{9}$

E $\frac{1}{4}$

F $\frac{1}{3}$

Use the information above to answer the questions below.

- 1 Is the next dart thrown more likely to hit E or F? Why?
F - It is more like to hit panel F because $\frac{1}{3}$ is greater than $\frac{1}{4}$
- 2 What is the probability the next dart thrown hits a letter that comes before D alphabetically?
 $\frac{1}{6} + \frac{1}{9} + \frac{1}{18} = \frac{1}{3}$
- 3 What is the probability the next dart thrown hits panel A, B, or D? Is it more or less than $\frac{1}{2}$?
 $\frac{1}{6} + \frac{1}{9} + \frac{1}{9} = \frac{7}{18}$ $\frac{7}{18}$ is less than $\frac{1}{2}$

Answer Sheet

Probability Darts

Find the portion of the dart board that each panel occupies and use your knowledge of degrees and fractions to answer the following questions about probability.

REMEMBER: Probability is the likelihood a given outcome will occur. It is expressed as a fraction.

ANSWERS

Fractions

A $\frac{1}{36}$

$10^\circ/360^\circ$

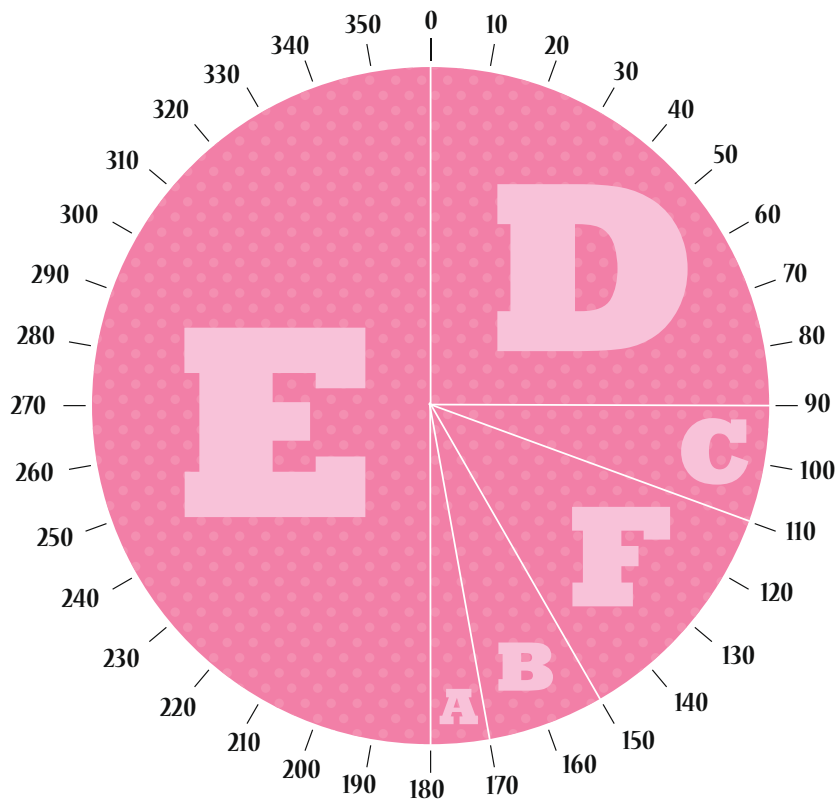
B $\frac{1}{2}$

C $\frac{1}{18}$

D $\frac{1}{4}$

E $\frac{1}{18}$

F $\frac{1}{9}$



Use the information above to answer the questions below.

1 Is the next dart thrown more likely to hit a vowel or a consonant?
Vowel

2 What is the probability that the next dart thrown hits panel C or panel B?
 $\frac{1}{18} + \frac{1}{2} = \frac{5}{9}$

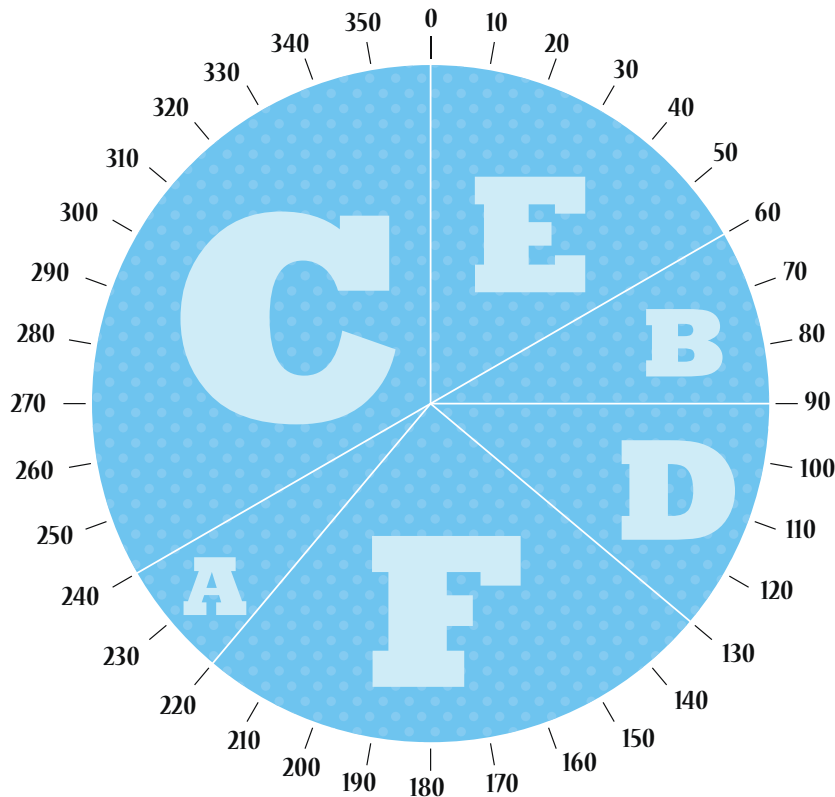
3 Which panels have a probability less than or equal to $\frac{1}{6}$ that they will be hit?
What is the probability that the next dart thrown hits one of them?
 $\frac{1}{36} + \frac{1}{8} + \frac{1}{18} + \frac{1}{9} = \frac{1}{4}$

Answer Sheet

Probability Darts

Find the portion of the dart board that each panel occupies and use your knowledge of degrees and fractions to answer the following questions about probability.

REMEMBER: Probability is the likelihood a given outcome will occur. It is expressed as a fraction.



ANSWERS

Fractions

A $\frac{1}{18}$

$20^\circ/360^\circ$

B $\frac{1}{12}$

C $\frac{1}{3}$

D $\frac{1}{9}$

E $\frac{1}{6}$

F $\frac{1}{4}$

Use the information above to answer the questions below.

- 1 Is the next dart more likely to hit panel C, E, or F? Why?
C - It is more like to hit panel C because $\frac{1}{3}$ is greater than $\frac{1}{6}$ and $\frac{1}{4}$
- 2 What is the probability that the next dart thrown hits a panel with a letter that comes after C alphabetically?
 $\frac{1}{9} + \frac{1}{6} + \frac{1}{4} = \frac{29}{36}$
- 3 Write the letters of the panel in the order of most to least probable of being hit.
C F E D B A

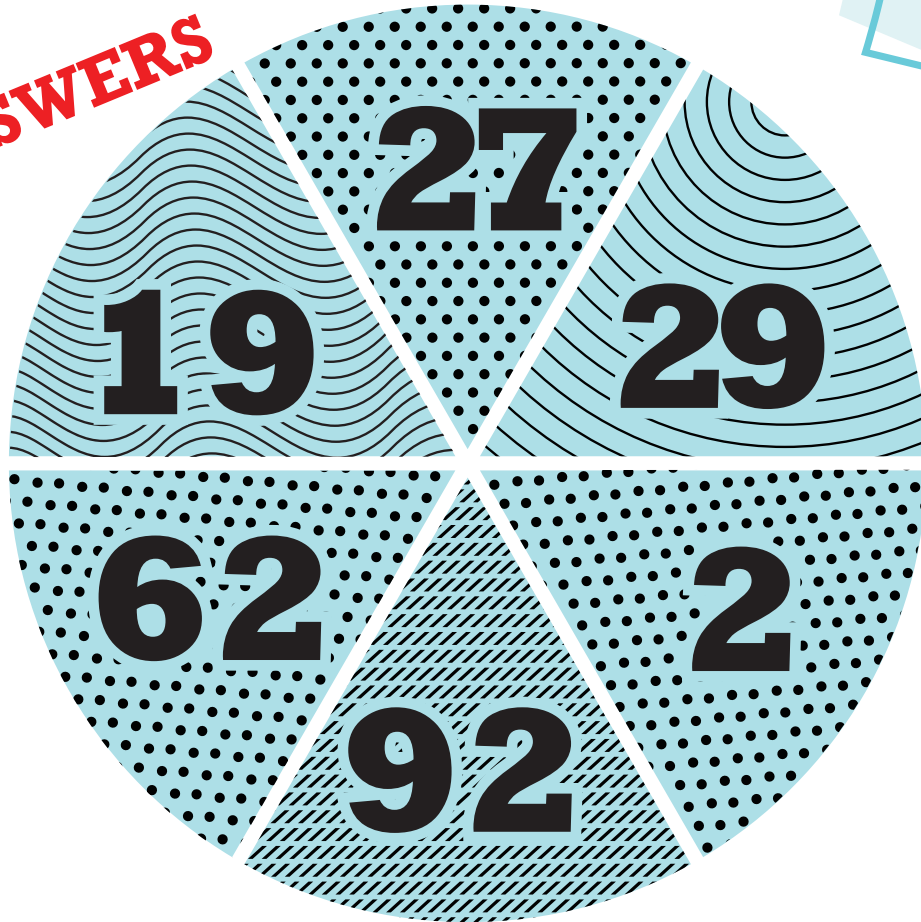
Answer Sheet

PROBABILITY TOSS

Use fractions to express the probabilities of each outcome when a dart is thrown.

REMEMBER: Probability is the likelihood a given outcome will occur. It is expressed as a fraction.

ANSWERS



What is the probability that the next dart thrown hits a number that....

is greater than 15?

5/6

is an even number?

3/6

is less than 61?

4/6

has a  pattern?

3/6

has 9 in the one's digit?

2/6

has a 2 in any digit?

5/6

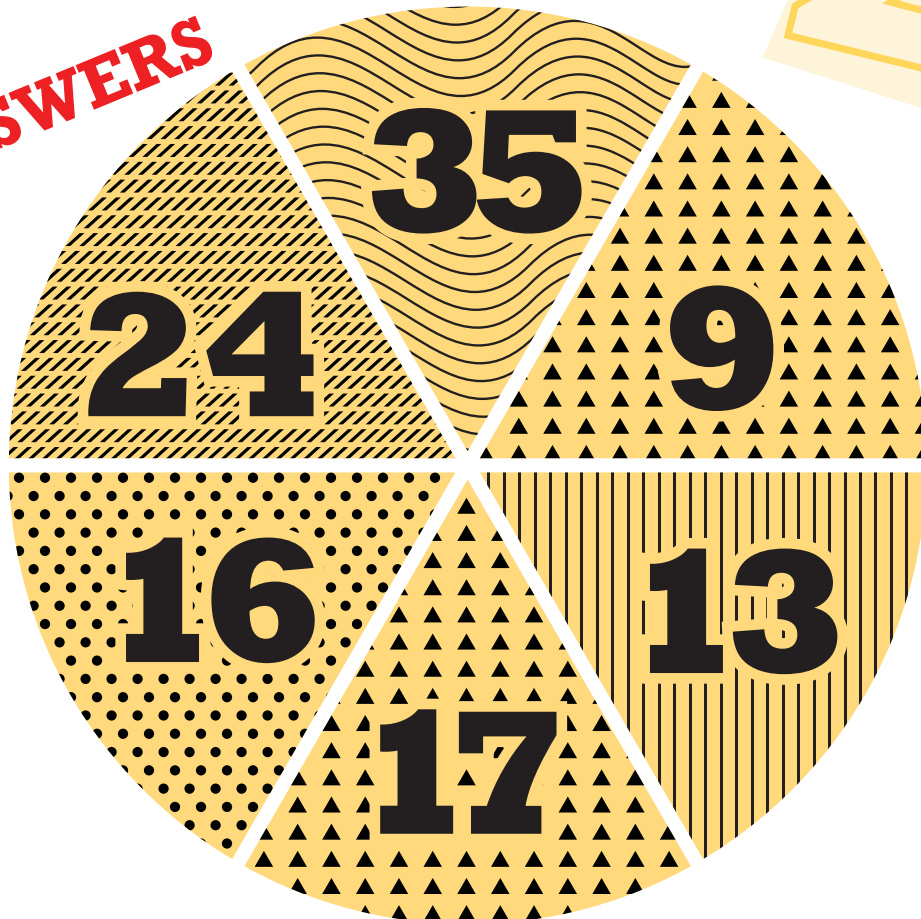
Answer Sheet

PROBABILITY TOSS

Use fractions to express the probabilities of each outcome when a dart is thrown.

REMEMBER: Probability is the likelihood a given outcome will occur. It is expressed as a fraction.

ANSWERS



What is the probability that the next dart thrown hits a number that....

is an odd number?

4/6

has a 3 in any digit?

2/6

has a  pattern?

2/6

is less than 20 ?

4/6

is in the teens ?

3/6

has a  pattern?

1/6

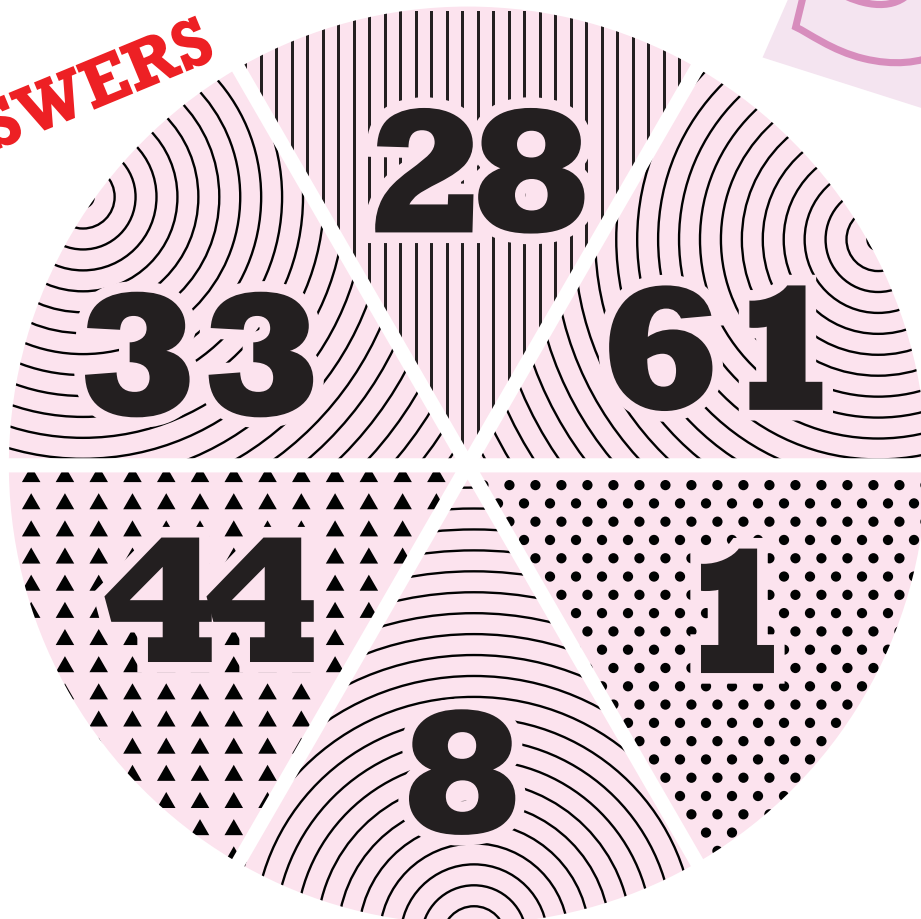
Answer Sheet

PROBABILITY TOSS

Use fractions to express the probabilities of each outcome when a dart is thrown.

REMEMBER: Probability is the likelihood a given outcome will occur. It is expressed as a fraction.

ANSWERS



What is the probability that the next dart thrown hits a number that....

is a multiple of 11 ?

2/6

is an odd number?

3/6

is less than 10 ?

2/6

is more than 50 ?

1/6

has a  pattern?

3/6

has a 1 in the one's digit?

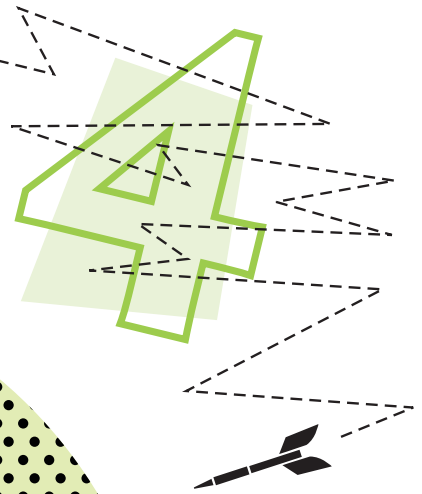
2/6

Answer Sheet

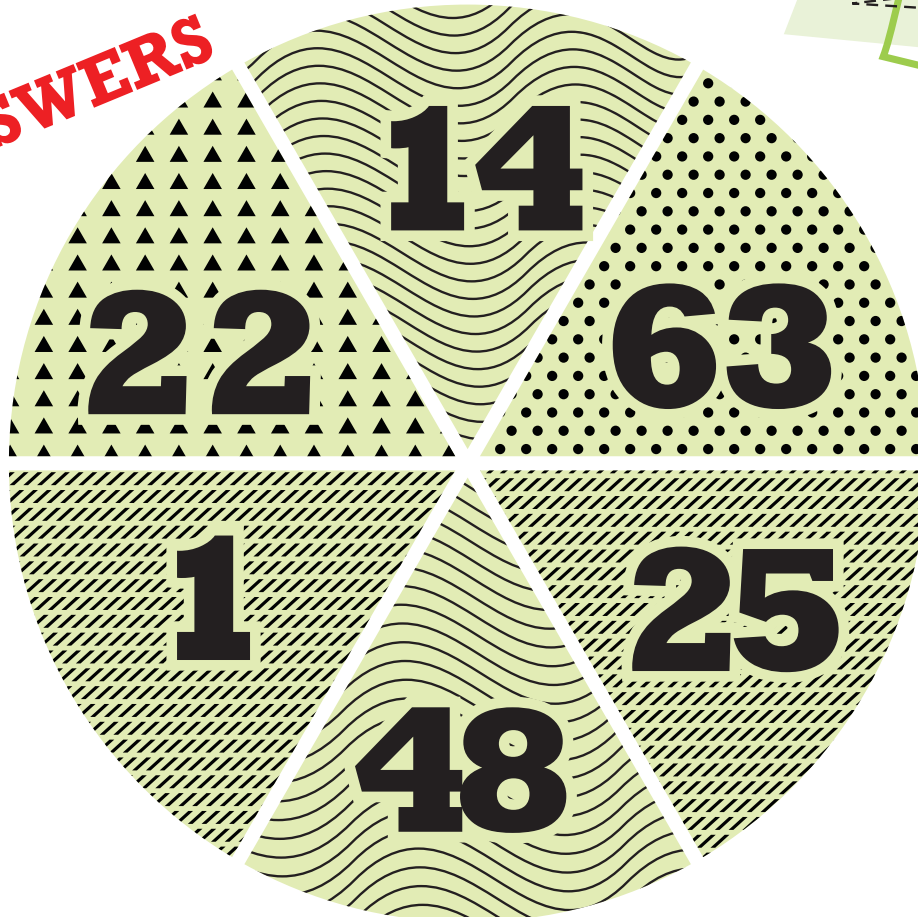
PROBABILITY TOSS

Use fractions to express the probabilities of each outcome when a dart is thrown.

REMEMBER: Probability is the likelihood a given outcome will occur. It is expressed as a fraction.



ANSWERS



What is the probability that the next dart thrown hits a number that....

has a **1** in the **ten's** digit? is a multiple of **4** ?

1/6

1/6

has a  pattern?

has a  pattern?

2/6

1/6

is less than **34** ?

has a **2** in the **ten's** digit?

4/6

2/6

Answer Sheet

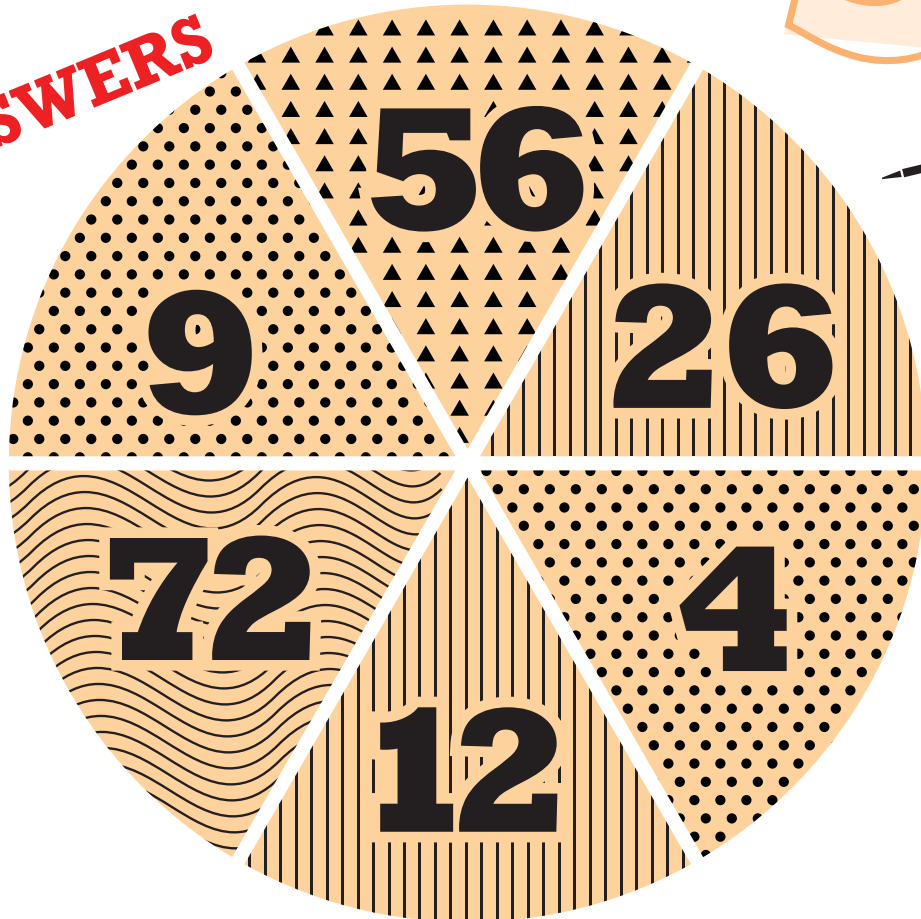
PROBABILITY TOSS

Use fractions to express the probabilities of each outcome when a dart is thrown.

REMEMBER: Probability is the likelihood a given outcome will occur. It is expressed as a fraction.



ANSWERS



What is the probability that the next dart thrown hits a number that....

is an **even** number?

5/6

is a multiple of **9** ?

2/6

has a  pattern?

2/6

is a multiple of **3** ?

3/6

has a **2** in any digit?

3/6

is greater than **50** ?

2/6

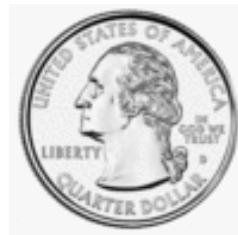
Answer Sheet

Probability Coin Toss

Answers

Find the probability of a coin toss.
Answer the questions about tossing a quarter.

What is probability? Probability is the chance that a particular outcome will occur.



If you toss a quarter...

1.) What is the probability you get tails?

1 out of 2 or $1/2$

2.) What is the probability you get heads?

1 out of 2 or $1/2$

3.) You toss the quarter and get heads. What is the probability you get heads again on a second toss?

1 out of 2 or $1/2$

4.) You toss the quarter three times and get tails each time. What is the probability you get heads the fourth time you toss it?

1 out of 2 or $1/2$

No matter how many times you toss a coin, the probability is $1/2$.

Answer Sheet

Probability

Dice Roll



ANSWERS

Reminder: Probability is the chance that something will happen.

ANSWERS

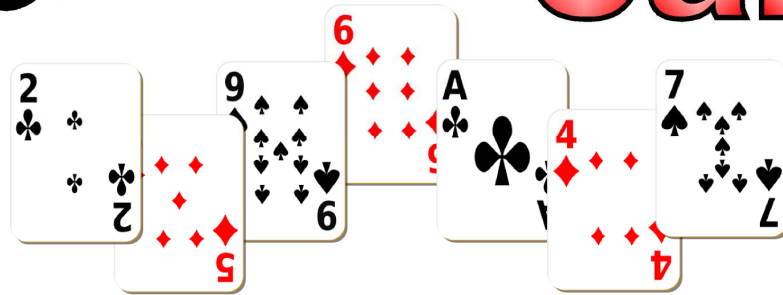


What is the probability of...

- 1.) Rolling a six-sided die and getting a 2?
1 out of 6 or $1/6$
- 2.) Rolling a six-sided die and getting a number less than 4?
3 out of 6 or $3/6=1/2$
- 3.) Rolling a six-sided die and getting a number over 2?
4 out of 6 or $4/6=2/3$
- 4.) Rolling a six-sided die and getting a 1 or a 5?
2 out of 6 or $2/6=1/3$
- 5.) Rolling two six-sided dice and getting a 5?
rolling 2 dice can result in 36 combinations (6×6)
figure out how many times a 5 will NOT appear = 5
multiply 5 by 5 (for each die) = 25 and then
subtract 25 from 36 (the number of combinations) = 11
answer = 11 out of 36 or $11/36$
- 6.) Rolling two six-sided dice and getting a 3 and a 6?
rolling 2 dice can result in 36 combinations (6×6)
a 3 and a 6 will appear twice
answer = 2 out of 36 or $2/36=1/18$

Answer Sheet

Probability Cards



PROBABILITY: The chance that an event will occur.

Tip: There are 52 cards in a deck. Ace is high.

(Answers)

What is the probability of picking...

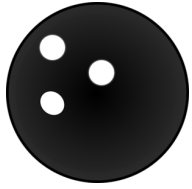
1. an ace from a deck of cards?
4 aces in a deck of 52 cards = $4/52 = 1/13$
2. a number less than 4 from a deck of cards?
4 twos and 4 threes in a deck of 52 cards = $8/52 = 2/13$
3. a face card from a deck of cards?
4 jacks, 4 queens and 4 kings in a deck of 52 cards = $12/52 = 3/13$
4. a spade from a deck of cards?
13 spades in a deck of cards = $13/52 = 1/4$
5. an 8 or a 9 from a deck of cards?
4 eights and 4 nines in a deck of 52 cards = $8/52 = 2/13$

Bonus: If two jokers are present in a deck of cards, what is the probability of picking one joker?

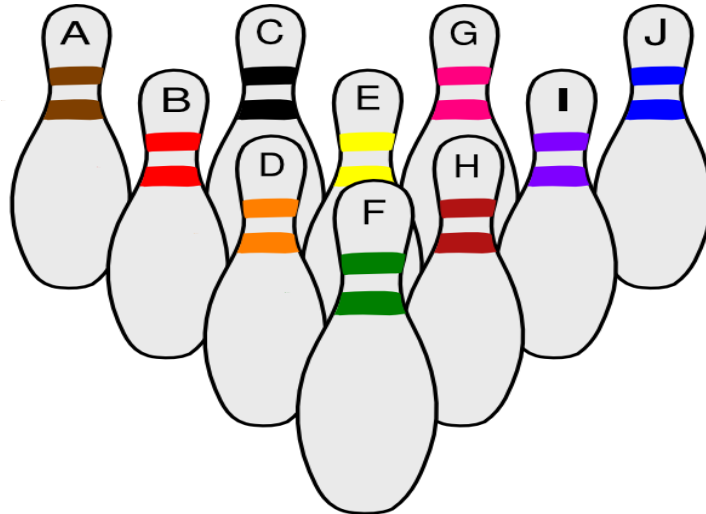
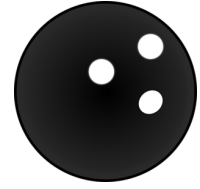


Jokers are in addition to the normal 52 cards, making 54 cards = $2/54 = 1/27$

Answer Sheet



Probability Bowling



ANSWERS

ANSWERS

Probability is the likelihood that a particular event will occur.

Todd is a beginning bowler! If he were to knock down only one pin on his first try, what is the probability that he knocks down...

1. a blue or green pin?

$$2/10 = 1/5$$

2. an orange pin?

$$1/10$$

3. a yellow, brown or pink pin?

$$3/10$$

4. a black or purple pin?

$$2/10 = 1/5$$

5. a pin with a letter between B and F?

$$3/10$$

6. a pin with a letter before E?

$$4/10 = 2/5$$

7. a pin with the letter J or C?

$$2/10 = 1/5$$

8. a pin with the letter I?

$$1/10$$

9. a green or brown pin, or a pin with a letter after D?

$$7/10 \text{ (the green pin has the letter F and is only counted once)}$$