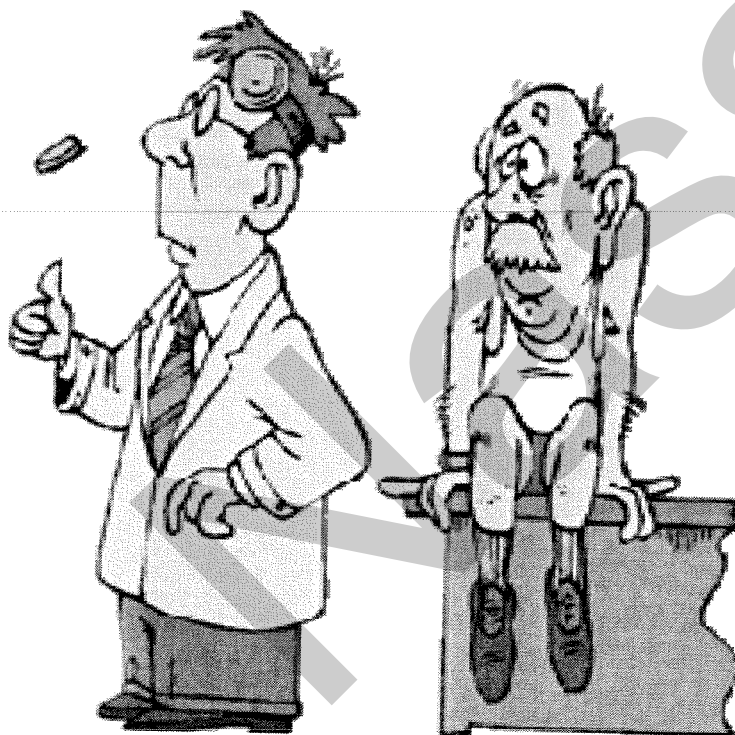


PROBABILITY

Booklet

Sec 3



Random, Event, Universal Set

Probability: Spinner, Word, Deck of Cards, Die, Coin

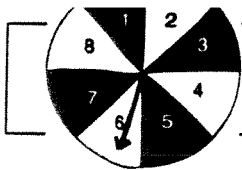
Types of Probability

Tree Diagram: With Replacement & Without Replacement

Geometric Probability

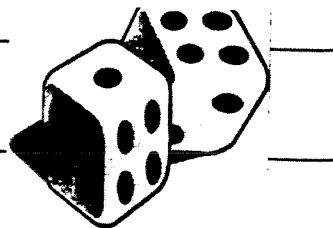
Ms. Nassif

Ms. Nassif



PROBABILITY

CHAPTER 14



An experiment is **RANDOM** when its outcome is not 100% certain.

Ex:

- Rolling a die numbered 1 to 6 is random
- Rolling a die numbered 1 is not random
- Asking a person their date of birth is not random

The **UNIVERSAL SET** or **SAMPLE SPACE** is the set of all possible outcomes, symbol **OMEGA** Ω

List the universal set for each experiment.

TOSSING A COIN $\Omega = \{ H, T \}$

TOSSING A COIN TWICE $\Omega = \{ HH, HT, TT, TH \}$

TOSSING A COIN 3 TIMES $\Omega = \{ HHH, HTT, HTH, HHT, TTT, TTH, THT, THH \}$

ROLLING A DIE $\Omega = \{ 1, 2, 3, 4, 5, 6 \}$

ROLLING A DIE AND TOSSING A COIN

$\Omega = \{ 1T, 2T, 3T, 4T, 5T, 6T, 1H, 2H, 3H, 4H, 5H, 6H \}$

ROLLING 2 DICE

	1	2	3	4	5	6
1	(1,1)	(1,2)	(1,3)	(1,4)	(1,5)	(1,6)
2	(2,1)	(2,2)	(2,3)	(2,4)	(2,5)	(2,6)
3	(3,1)	(3,2)	(3,3)	(3,4)	(3,5)	(3,6)
4	(4,1)	(4,2)	(4,3)	(4,4)	(4,5)	(4,6)
5	(5,1)	(5,2)	(5,3)	(5,4)	(5,5)	(5,6)
6	(6,1)	(6,2)	(6,3)	(6,4)	(6,5)	(6,6)

PICKING A CARD FROM A DECK (52 cards)

♣A 2 3 4 5 6 7 8 9 J Q K

♠A 2 3 4 5 6 7 8 9 J Q K

♦A 2 3 4 5 6 7 8 9 J Q K

♥A 2 3 4 5 6 7 8 9 J Q K



An EVENT is what you are observing in the experiment.

Example: Describe extensively $\Omega = \{ \quad \}$ each event in the experiment.

1. A die is rolled once.

a. Event: Rolling an even #

b. Event: Rolling an odd #

2. A die is rolled twice.

a. Event: Rolling a sum = 6

b. Event: Rolling a product = 8

c. Event: Rolling a 3 on the first roll and an even # on the second roll

Describe in words.

A die is rolled twice.

$A = \{(1, 3), (2, 2), (3, 1)\}$

$B = \{(1, 1), (2, 2), (3, 3), (4, 4), (5, 5), (6, 6)\}$

$C = \{(1, 1), (1, 2), (2, 1), (2, 2)\}$

Probability

Terms: Random and "Describe extensively" and contrary events

State whether each event is random.

1. Tossing a coin with each side being tails
2. Spinning a spinner with red, black and blue sections.
3. Spinning a spinner with all red sections.
4. Rolling a die with a 6 on each of its faces.
5. Selecting the numbers for the lottery.
6. Tossing a coin and seeing which side turns up.

Describe extensively each event.

7. Choosing a vowel and tossing a coin.
8. Choosing the first 3 months of the year and tossing a coin.
9. Choosing one of the months of the year.
10. Registering a newborn's sex.
11. Noting the time of birth.
12. Rolling a die with 7 sides.
13. Choosing a digit from the phone number 808-990-0051
14. Choosing a letter from the word SCHOOL.
15. Asking someone the name of his or her favorite season.
16. Asking someone for her favorite one-digit number.

Describe extensively the contrary event.

17. Tossing a coin twice and obtaining two different faces.
18. Rolling a die and obtaining a number less than 5.
19. Rolling a die and obtaining a number greater than 2.
20. Picking a card from a deck of 52 cards and obtaining a red card.

Probability of an Event A $P(A)$

- The probability that an impossible event occurs = 0
- The probability that a certain event occurs = 1
- Always between 0 and 1

Questions

1. Rolling a die:

What is the probability of :

- Rolling an event number
- Rolling a 4
- Rolling a number greater than 3
- Rolling a number less than or equal to 4

2. Drawing a card from a deck

- Picking a king
- Picking a face card
- Picking an ace
- Picking a black card

3. Tossing a coin 3 times

- Obtaining at least 1 head
- Obtaining heads on the last toss

Probability of contrary event

A die is rolled

A: rolling an event #

- Describe in words A'
- Describe extensively A and A'
- Calculate $P(A)$ and $P(A')$

Name _____

Period _____

Wednesday, March 30, 2011

Probability Worksheet

Use the following information for questions 1 – 4:

A spinner is divided into 8 equal parts and labeled 1 through 8.

- 1) What is the probability that the spinner stops on a multiple of 3? _____
- 2) What is the probability that the spinner stops on a multiple of 4? _____
- 3) What is the probability that the spinner does NOT stop on 1 or 2? _____
- 4) If you spun the spinner 100 times, how many times would you expect it to stop on 8?

Use the following information for questions 5 – 7:

Each letter in the word **THEORETICAL** is written on a separate slip of paper and placed in a hat. A letter is chosen at random from the hat.

- 5) What is the probability that the letter chosen is an E? _____
- 6) What is the probability that the letter chosen is a vowel? _____
- 7) What is the probability that the letter chosen is a consonant? _____
- 8) Find a word for which the probability that you choose an R when you randomly choose a letter from the word is $\frac{2}{5}$.

Use a coin to complete the problems 9 – 11.

- 9) What is the theoretical probability that the coin lands heads up when tossed? _____
- 10) Flip the coin 20 times. Record whether it lands heads up or tails up for each flip. Then find the experimental probability that the coin lands heads up when tossed.

Trial	Result	Trial	Result	Trial	Result	Trial	Result	Trial	Result
1		5		9		13		17	
2		6		10		14		18	
3		7		11		15		19	
4		8		12		16		20	

Experimental Probability: _____

- 11) Compare the theoretical probability with the experimental probability. What do you think would happen if you tossed the coin 100 times? Explain.

- 12) You plant 30 African violet seeds and 9 of them sprout. Use an experimental probability to predict how many African violet seeds will sprout if you plant 20 more seeds.



Solve the problems below using your knowledge of probability. Write fractions in lowest terms.

1. What is the probability of choosing a king from a standard deck of playing cards?
2. What is the probability of choosing a green marble from a jar containing 5 red, 6 green and 4 blue marbles?
3. What is the probability of choosing a marble that is not blue in problem 2?
4. What is the probability of getting an odd number when rolling a single 6-sided die?
5. What is the probability of choosing a jack or a queen from a standard deck of 52 playing cards?
6. What is the probability of landing on an odd number after spinning a spinner with 7 equal sectors numbered 1 through 7?
7. What is the probability of getting a 7 after rolling a single die numbered 1 to 6?
8. What is the probability of choosing a queen, a king or an ace from a standard deck of playing cards?
9. What is the probability of choosing the letter i from the word probability?
10. What is the sample space for choosing a letter from the word probability?

Name _____

Date _____

Worksheet A3 : Single Event Probability

One of these names is to be drawn from a hat. Determine each probability below:

Mary Jenny Bob Marilyn Bill Jack Jerry Tina Connie Joe

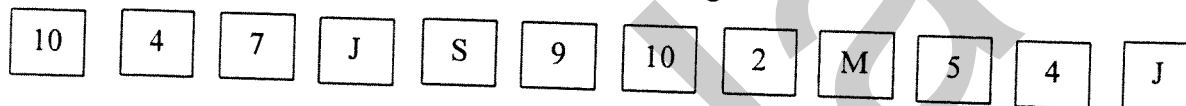
1. $P(3\text{-letter name}) = \frac{2}{10} \text{ or } \frac{1}{5}$ (What is the probability of drawing a 3-letter name?)

2. $P(4\text{-letter name}) =$ _____ 3. $P(\text{name starting with B}) =$ _____

4. $P(\text{name starting with T}) =$ _____ 5. $P(7\text{-letter name}) =$ _____

6. $P(\text{name starting with S}) =$ _____ 7. $P(\text{name ending with Y}) =$ _____

One of these cards will be drawn without looking.



8. $P(2) = \frac{1}{12}$ *number of twos*
total number of cards

9. $P(5) =$ _____

10. $P(J) =$ _____

11. $P(\text{a number}) =$ _____

12. $P(4) =$ _____

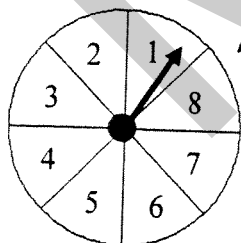
13. $P(T) =$ _____

14. $P(\text{a letter}) =$ _____

One card is drawn from a well-shuffled deck of 52 cards. What is the probability of drawing...

15. $P(\text{ace}) =$ _____ 16. $P(\text{face card - K, J, Q}) =$ _____

17. $P(\text{a red 10}) =$ _____ 18. $P(\text{NOT a diamond}) =$ _____



A spinner, numbered 1-8, is spun once. What is the probability of spinning...

19. an EVEN number? _____

20. a multiple of 3? _____

~~21.~~ a PRIME number? _____

22. 9? _____

Name _____

Date _____

Worksheet B3 : Complementary Events Inclusive vs. Mutually Exclusive Events

For any event A , $P(A) + P(A') = \underline{\hspace{2cm}}$, that is $P(A') = \underline{\hspace{2cm}} - P(A)$.

1. Suppose that an event A has probability of $\frac{3}{8}$. What is $P(A')$? _____
2. Suppose that the probability of snow is 0.58, What is the probability that it will NOT snow? _____

If A and B are mutually exclusive events, then $P(A \text{ or } B) = P(A) + P(B)$.
and

If A and B are inclusive events, then $P(A \text{ or } B) = P(A) + P(B) - P(A \cap B)$.

A card is chosen from a well-shuffled deck of 52 cards.

What is the probability that the card will be:

3. a king OR a queen? _____
4. a red jack OR a black king? _____
- ~~5.~~ a face card OR a card with ^{an ACE} ~~a prime number~~? _____
- ~~6.~~ an even card OR a red card? _____
- ~~7.~~ a spade or a jack? _____

Probability Tree Diagram

We use a tree diagram to list the outcomes that make up a sample space. Depending on the experiment, the tree diagram may have more levels of branches. There is a level of branches for each experiment.

Bag A contains 10 marbles of which 2 are red and 8 are black. Bag B contains 12 marbles of which 4 are red and 8 are black. A ball is drawn at random from each bag.

- a) Draw a probability tree diagram to show all the outcomes the experiment.
- b) Find the probability that:

Solution:

- a) A probability tree diagram that shows all the outcomes of the experiment.

- b) The probability that:
 - (i) both are red.

- (ii) both are black.

- (iii) one black and one red.

- (iv) at least one red.

Probability Tree Diagram

Example: A game consists of rolling a die and tossing a penny. Use a tree diagram to list the sample space and the probabilities.

Name: _____

Date: _____

<p>Probability Tree Diagrams Practice</p>

1. A nickel and a dime were tossed together.
 - a. Draw a tree diagram with outcomes and probabilities.
 - b. How many possible outcomes are there?
 - c. What is the probability of obtaining a head on the nickel and a head on the dime?
2. Michelle has her left hand in a bag containing one red, one blue, and one green marble. Her right hand is in a bag containing a white and black marble. She draws one marble from each bag.
 - a. Use a tree diagram to list the sample space and probabilities.
 - b. How many possible outcomes are there?
 - c. What is $P(\text{Red, White})$?
 - d. What is $P(\text{Blue, Black})$?
3. A young married couple plan to have two children.
 - a. Show all the possible outcomes using a tree.
 - b. What is $P(G, G)$?
 - c. What is $P(\text{at least one girl})$?
 - d. What is $P(\text{girl as first child})$?
4. Three coins are tossed: a nickel, a dime and a quarter.
 - a. Draw a tree diagram.
 - b. What is $P(T, H, T)$?
 - c. What is $P(T, T, T)$?
 - d. What is $P(\text{at least one tail})$?
5. A team plays three play-off games in one week.
 - a. Assuming no ties are possible, use a tree diagram to list the sample space and probabilities
 - b. What is $P(W, W, W)$?
 - c. What is $P(\text{at most 2 wins})$?
6. A die is rolled three times.
 - a. Draw a tree diagram.
 - b. How many outcomes does the sample space contain?
 - c. What is probability of at least one 6?
 - d. What is $P(1, 1, 1)$?

Counting Using Tree Diagrams

For each situation, make a tree diagram to show all the outcomes in the sample space. Give the total number of outcomes.

1. choosing chocolate or vanilla ice cream and choosing strawberry or apple pie
2. rolling a die and flipping a coin
3. choosing rolls, muffins, or fruit salad and choosing scrambled eggs, sliced ham, chicken or turkey casserole
4. choosing a red, blue, or white sweater and choosing a black, blue, or gray pair of slacks

Illustrate each question with a 'tree diagram'.

1. A cloth bag contains 8 black marbles and 4 white marbles. If two marbles are removed from the bag one after the other, what is the probability that:
 - (a) the first is black and the second white
 - (b) both are coloured black
 - (c) both are coloured white
2. Two cards are removed from a pack of cards, one after the other. What is the probability that:
 - (a) both cards are spades
 - (b) neither card is a spade
 - (c) only the second card is a spade
3. Two cards are removed from a pack of cards, one after the other. What is the probability that:
 - (a) one of the cards is an ace
 - (b) two aces are obtained
 - (c) no aces are obtained
5. A child has a bag of coloured sweets consisting of 5 red sweets, 12 orange and 9 green. If the child eats 2 of the sweets one after the other, what is the probability that:
 - (a) the first sweet eaten was orange and the second red
 - (b) no red sweets were eaten
 - (c) both the eaten sweets were green in colour

Probability Tree Diagrams With Replacement/Without Replacement

With Replacement – ball returned to jar

Suppose that a jar contains 2 black balls, 1 red ball, and 4 green balls. After the first ball is chosen and its color recorded, it is returned to the jar. Draw a probability tree with outcomes and probabilities.

Find $P(BB)$

Find $P(RR)$

Find $P(GG)$

Find $P(BB \text{ or } RR)$

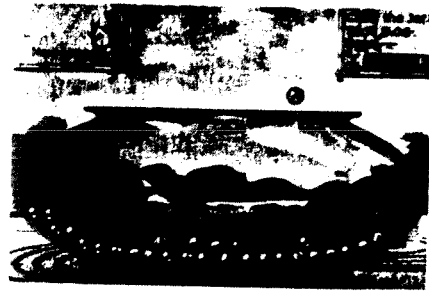
Find $P(\text{at least one black ball is drawn})$

Find $P(\text{at most one black ball is drawn})$

Find $P(\text{two different color balls})$

Find $P(\text{all outcomes except } BB)$

Find $P(\text{exactly one black ball is drawn})$



Without Replacement – ball not returned

Suppose that a jar contains 2 black balls, 1 red ball, and 4 green balls. After the first ball is chosen and its color recorded, it is not returned to the jar. Draw a probability tree with outcomes and probabilities.

Find $P(BB)$

Find $P(RR)$

Find $P(GG)$

Find $P(BB \text{ or } RR)$

Find $P(\text{at least one black ball is drawn})$

Find $P(\text{at most one black ball is drawn})$

Find $P(\text{two different color balls})$

Find $P(\text{all outcomes except } BB)$

Find $P(\text{exactly one black ball is drawn})$



PROBABILITY WITH REPLACEMENT

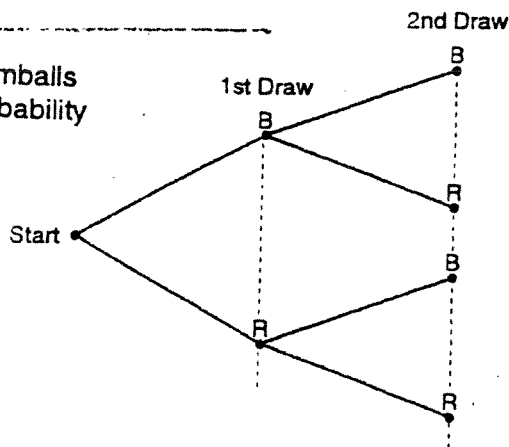
1. A box contains 6 red and 3 yellow tickets. Two tickets are drawn at random in succession with replacement. Determine the probability that:
 - a. both are red
 - b. both are yellow
 - c. the first is red and the second is yellow
 - d. one is red and the other is yellow.
2. A bag contains 5 slips of paper marked g, g, r, r and w. What is the probability, with replacement, of drawing:
 - a. g and g
 - b. g and r
 - c. g and w
 - d. w and w
3. A bag contains 5 marbles, 3 red and 2 white. Two marbles are randomly selected in succession with replacement. What is the probability of choosing
 - a. Two red marbles
 - b. At least one red marble
4. There are 3 red, 2 blue and 5 yellow cards. Peter drew the first card, replaced it back into the deck and drew the second card. Find the probability of
 - a. At least one blue
 - b. No repeating colours
 - c. Not more than one yellow.
5. A bag contains 10 identical marbles. There are 1 green, 3 brown and 6 purple. A marble is picked out at random. A second marble is then picked out at random. Calculate the probability that
 - a. both marbles are the same colour,
 - b. both marbles are different colours,
 - c. the first marble is purple,
 - d. at least one marble is brown.
6. A box contains 5 blue balls and 6 red balls. Two balls are drawn at random in succession from the box with replacement. Find the probability that
 - a. the first ball drawn is not a red ball,
 - b. the first 2 balls drawn are different in colour,
 - c. the first 2 balls are the same in colour.
7. There are 3 nickels, 2 dimes, and 5 quarters in a bag. Two coins are selected in succession at random. Find the probability;
 - a. Choosing two nickels
 - b. At least one dime
 - c. The last pick is a quarter

PROBABILITY WITHOUT REPLACEMENT

1. A gumball machine contains 150 candies. There are 100 green, 30 red and 20 purple. A gum is picked out and eaten. A second gum is then picked out at random. Calculate the probability that
 - a. both gums are the same colour,
 - b. both gums are the different colours,
 - c. the first gum is red,
 - d. at least one gum is red.
2. A contest contains 6 big prizes and 3 small prizes. Two prizes are drawn at random one after another. Determine the probability that:
 - a. Two big prizes are selected
 - b. At least one big prize is selected
 - c. At most one small prize is selected.
3. A bag contains 5 slips of paper marked g, g, r, r and w. Two slips are chosen one after another and are not replaced. What is the probability of drawing:
 - a. g and g
 - b. g and r
 - c. g and w
 - d. w and w
4. A bag contains 5 marbles: 3 red and 2 white. Two marbles are randomly selected in succession from the bag without replacement. What is the probability of obtaining:
 - a. Two reds
 - b. At least one Red
5. There are 3 red, 2 blue and 5 yellow cards. Peter drew the first card, removed it from the deck, and drew the second card. Find the probability of
 - a. At least one blue
 - b. No repeating colours
 - c. Not more than one yellow.
6. A box contains 5 blue cubes and 6 red cubes. Two cubes are drawn at random in succession from the box and are not replaced. Find the probability that
 - a. the first cube drawn is not a red cube,
 - b. the first 2 cubes drawn are different in colour,
 - c. the first 2 cubes are the same in colour.
7. In a class of 25 students, 14 are girls and 11 are boys. A teacher selects two students at random in succession from the class to be president and vice president. Determine the probability that
 - a. The students are both girls
 - b. The first student is a boy
 - c. The last student is a boy

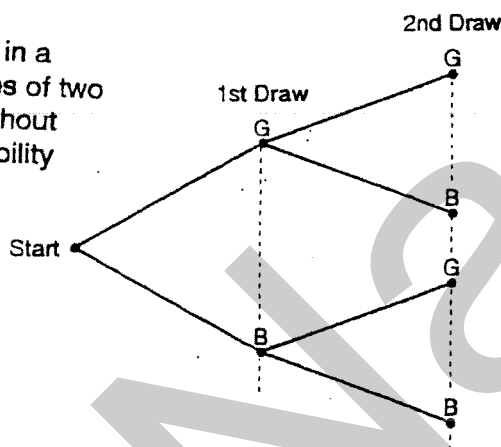
NAME _____

1. A gum machine has 10 blue gumballs and 8 red ones. What is the probability of drawing two blue gumballs in a row?



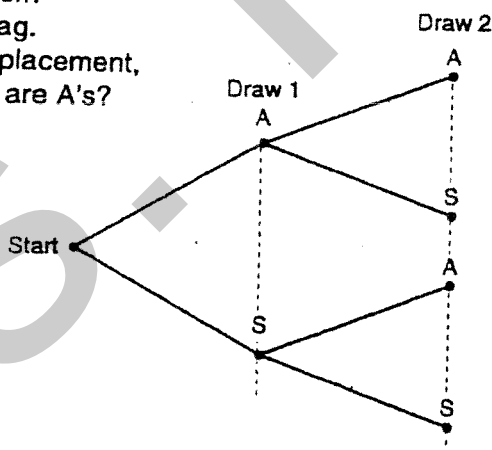
Outcome Probability

2. There are 18 girls and 10 boys in a Secondary V class. If the names of two students are drawn in a row without replacement, what is the probability that they are both girls?



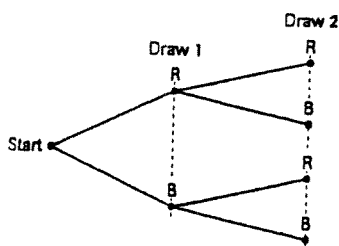
Outcome Probability

3. Six "S" tiles and nine "A" tiles from a Scrabble game are put in a bag. If two tiles are drawn without replacement, what is the probability that both are A's?



Outcome Probability

4. A dryer contains four red socks and two black socks. If two socks are drawn without putting any back, what is the probability of both socks being red?



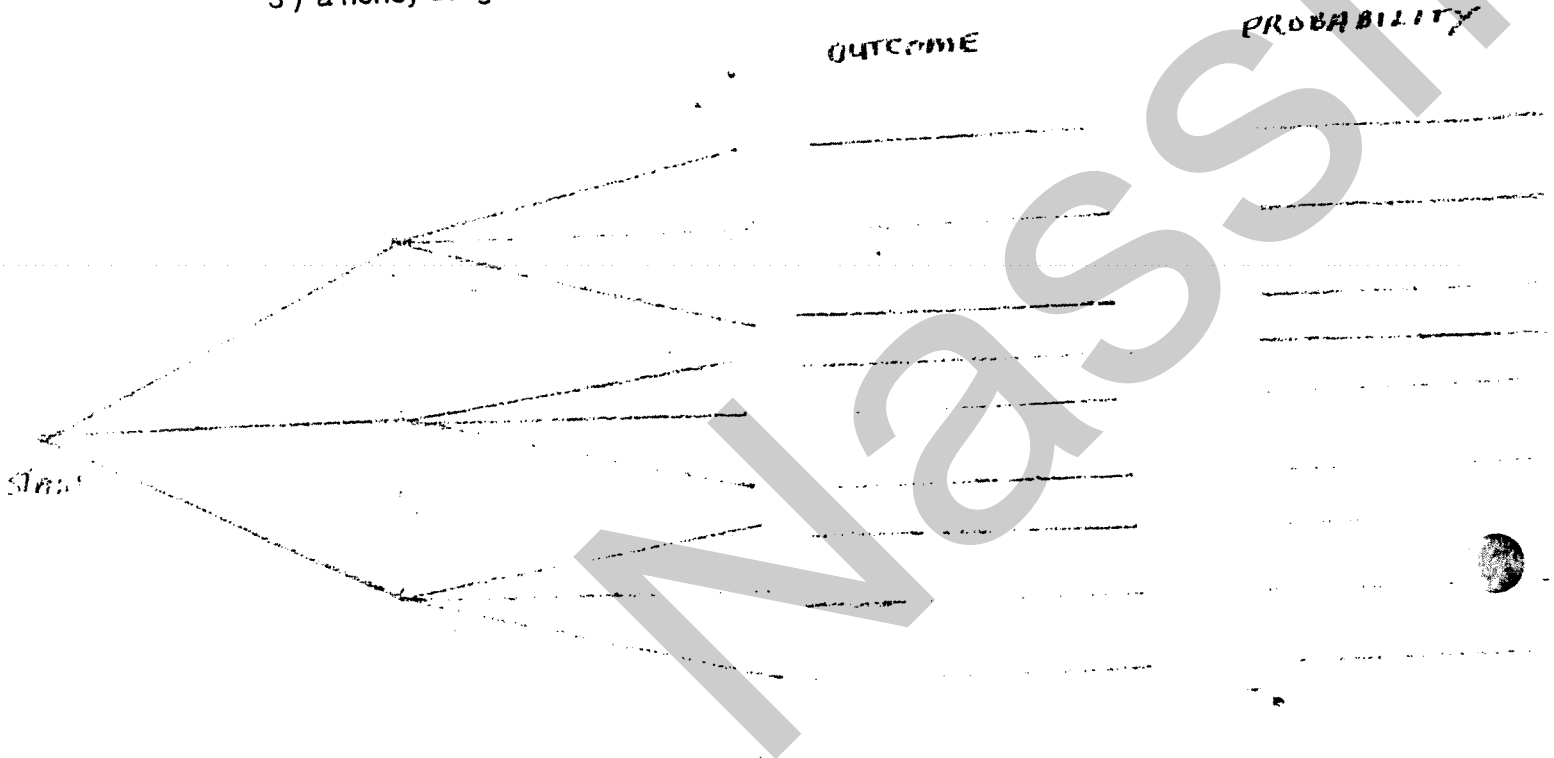
Outcome Probability

- Cathy works behind the counter at Doughnut World. The store sells chocolate, maple and honey doughnuts. She notices that 55% of the customers buy chocolate doughnuts and 30% buy maple doughnuts. As well, 70% of customers order coffee, 20% order fruit juice, and the rest drink milk.

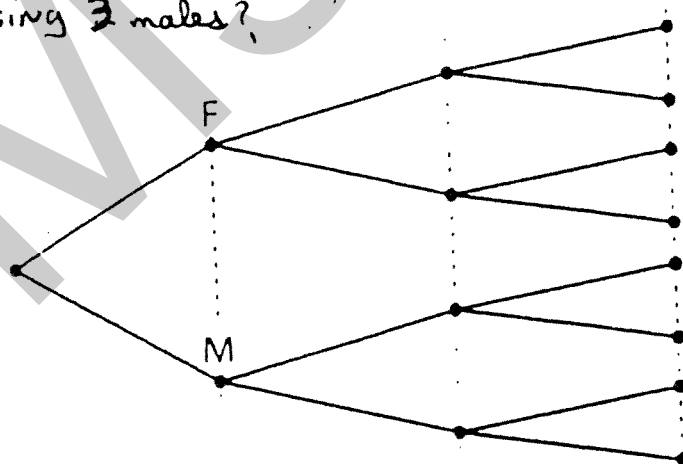
a) Construct the probability tree diagram for this situation.

b) What is the probability that the next customer orders:

- 1) a chocolate doughnut and fruit juice?
- 2) a maple doughnut and a glass of milk?
- 3) a honey doughnut and coffee?



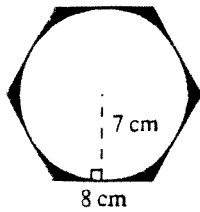
Mark needs to hire three people to work on a project. The three female and five male students who applied to his company are all equally skilled. To avoid any form of favouritism, Mark decides to select the employees at random in the presence of all the candidates. What is probability of choosing 3 males?



GEOMETRIC PROBABILITY

Sec 3

When calculating the area of a **shaded region**, we calculate the area of the entire figure first, and then subtract the area of the figure that is unshaded as shown in the example below.



$$A = 0.5as$$

$$A = (0.5)(7)(6)(8)$$

$$A = 168 \text{ cm}^2$$

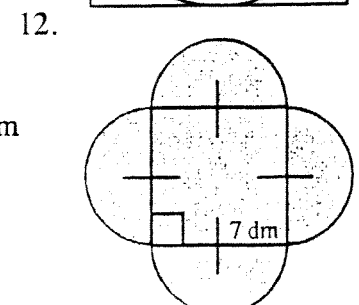
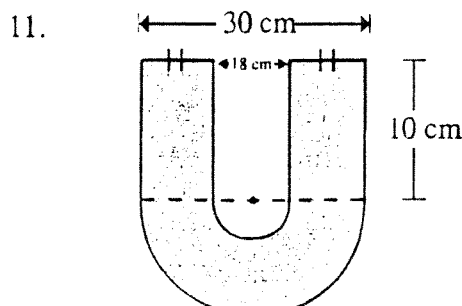
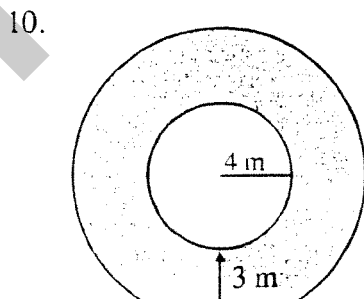
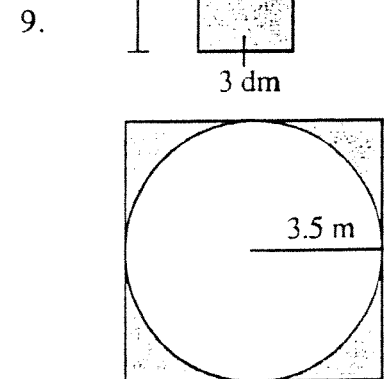
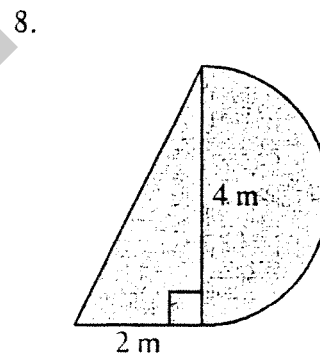
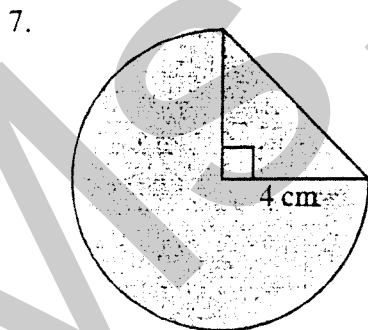
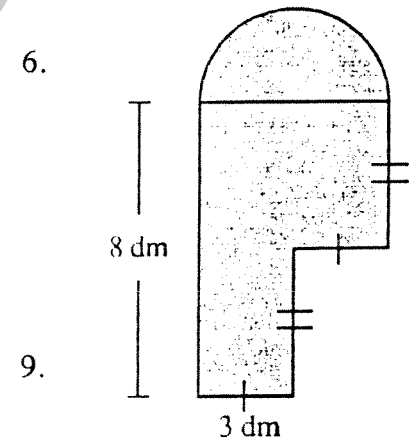
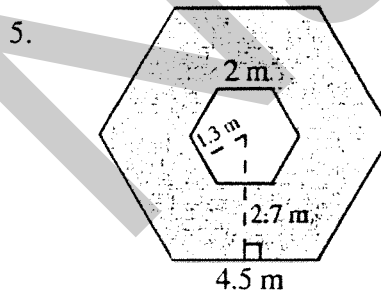
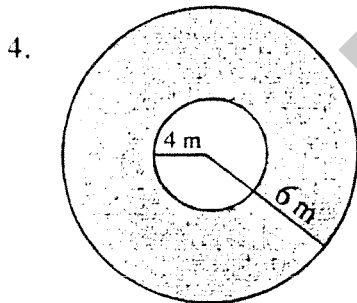
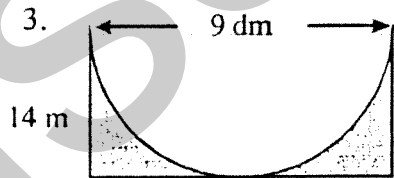
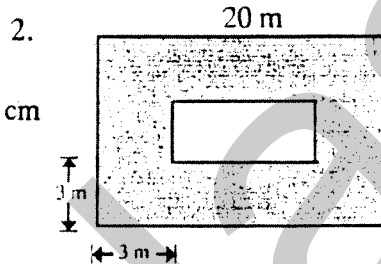
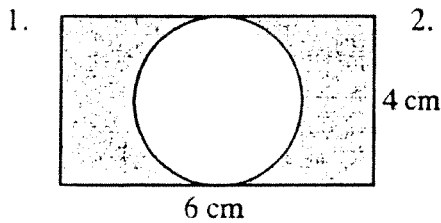
$$A = \pi r^2$$

$$A = (3.14)(7)(7)$$

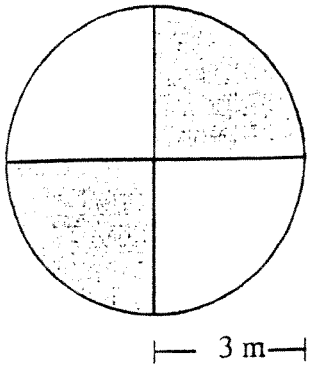
$$A = 153.86 \text{ cm}^2$$

\therefore the area of the shaded region is $168 \text{ cm}^2 - 153.86 \text{ cm}^2 = 14.14 \text{ cm}^2$.

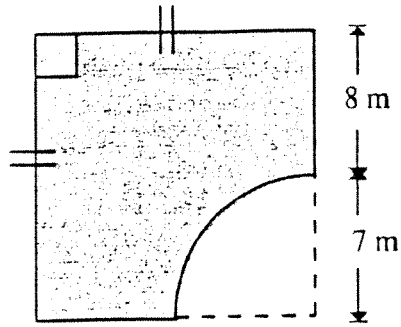
A. Find the area of the shaded region in each of the figures below.



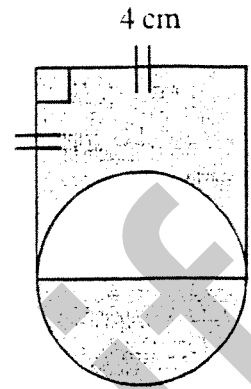
13.



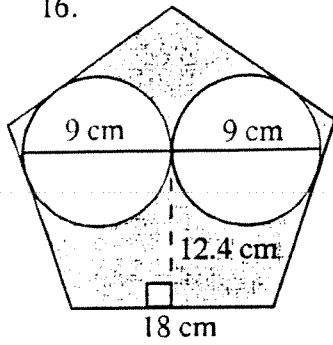
14.



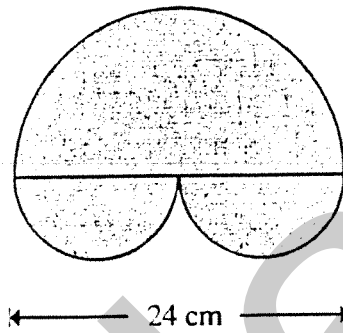
15.



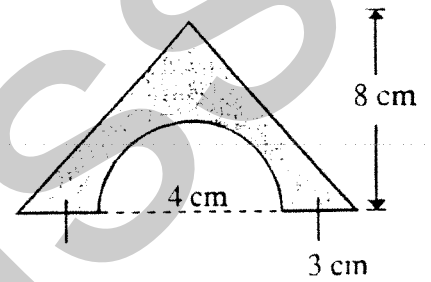
16.



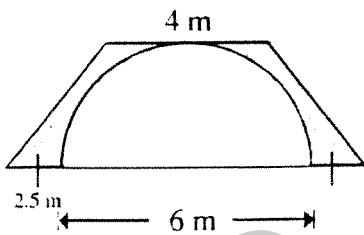
17.



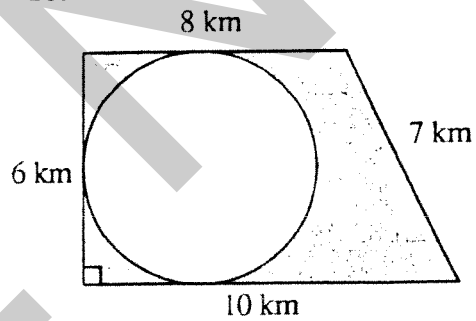
18.



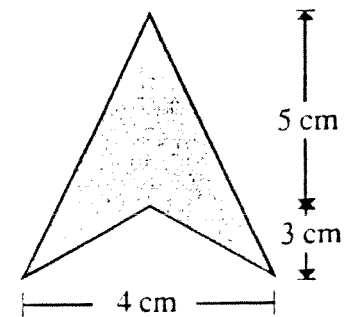
19.



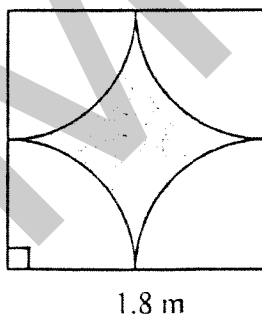
20.



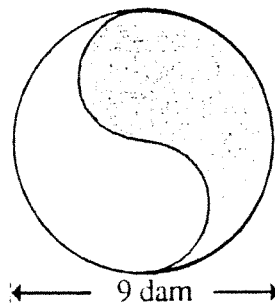
21.



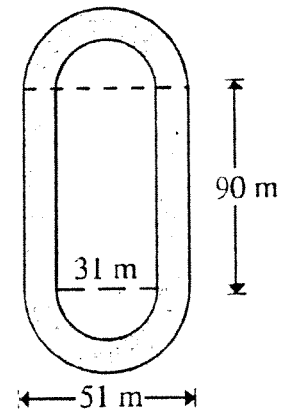
22.



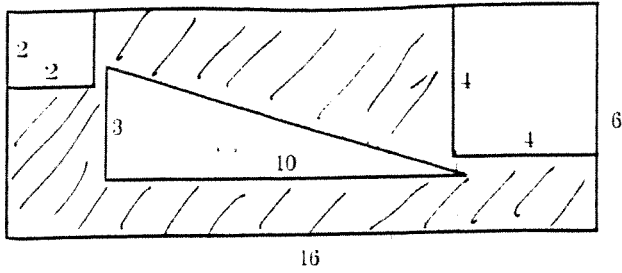
23.



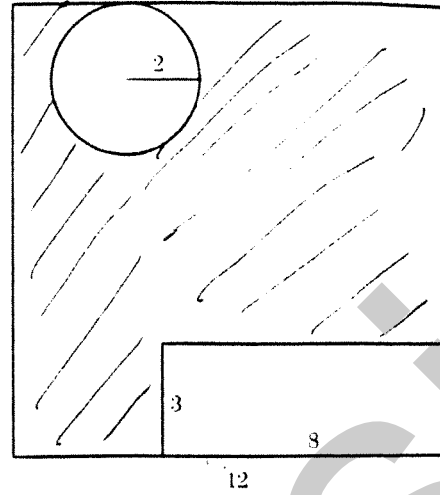
24.



The two figures below include white regions and a green region. We randomly choose a point in each figure.



Which figure offers the greatest probability of choosing a point in the green region? Explain your answer using calculations.

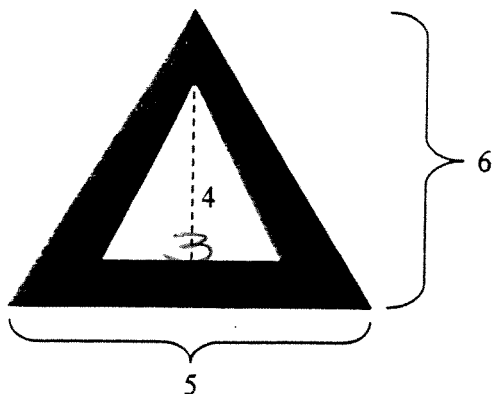


Probability Worksheet

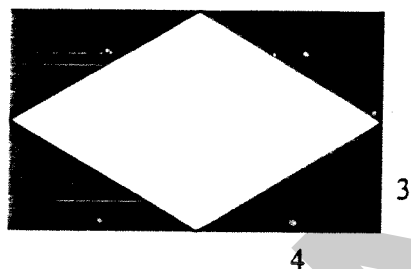
Name: _____

Directions: Consider the targets below. Find the probability that an arrow will land in the shaded region. Make sure to show all work. Note: figures are not drawn to scale.

1.



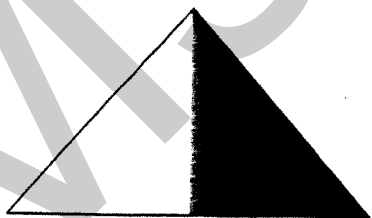
2.



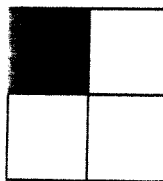
3.

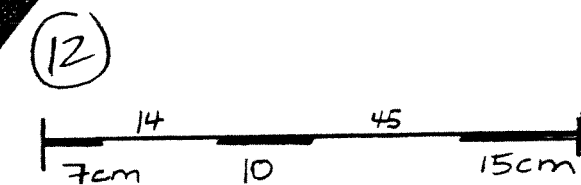
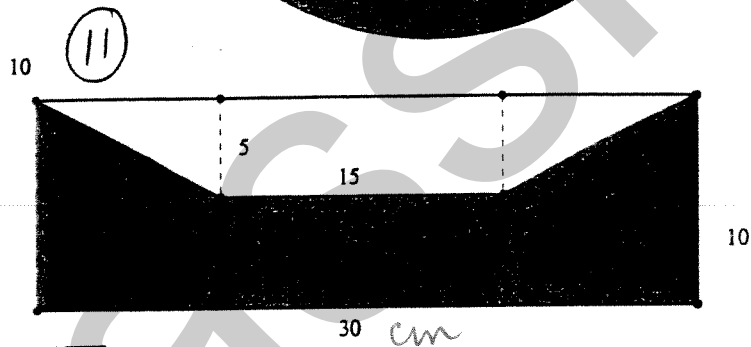
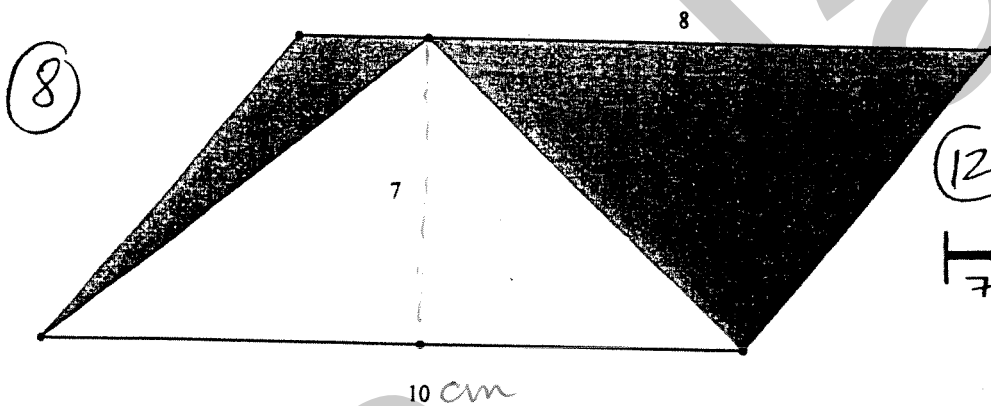
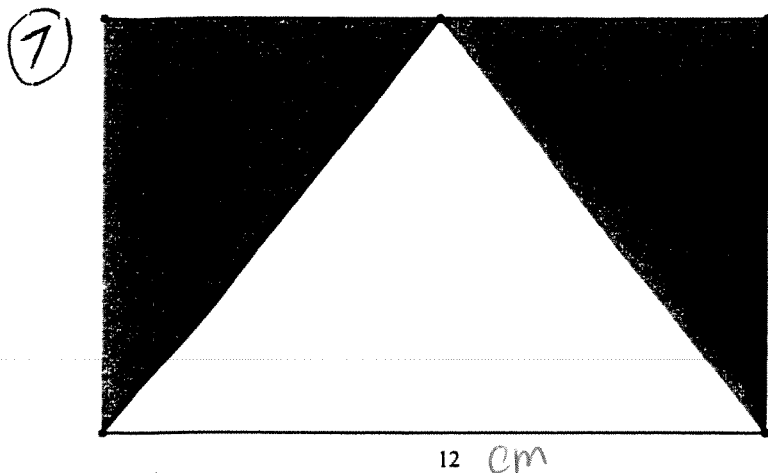
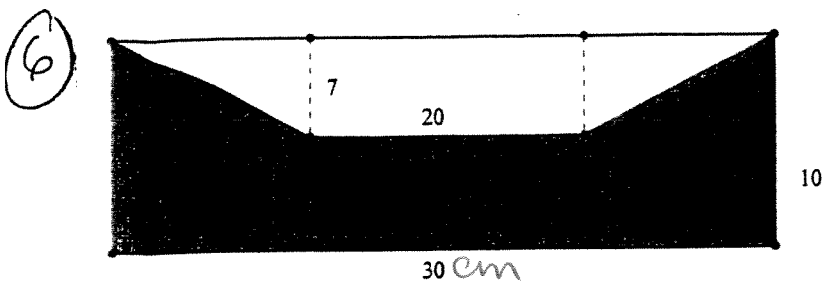


4.

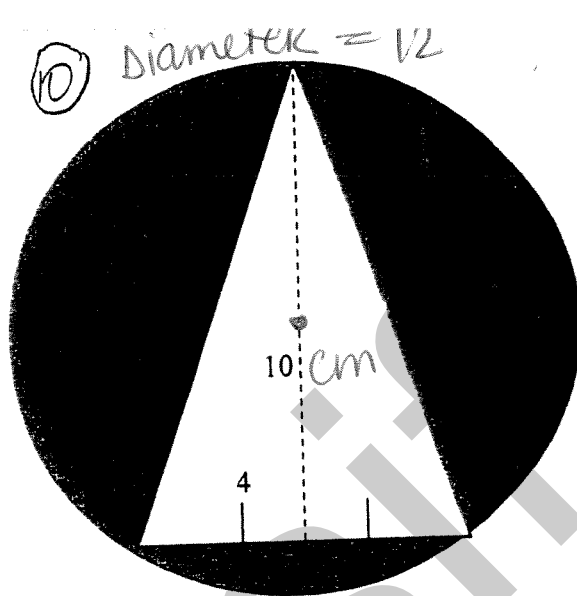
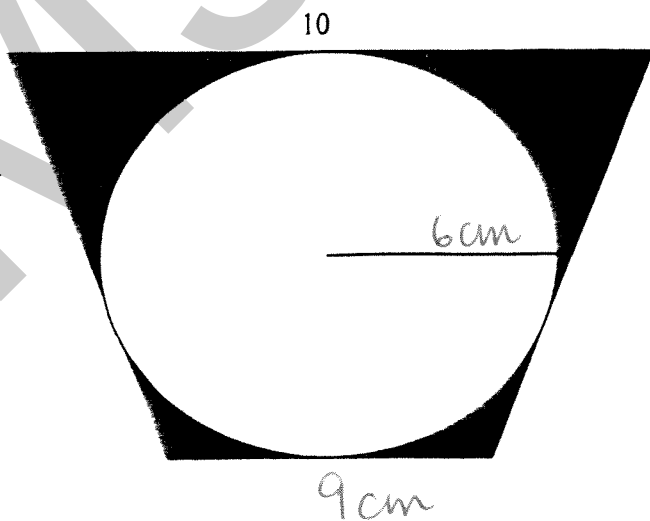


5.





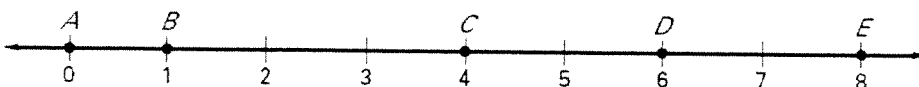
9 A game involves players trying to hit the shaded sections of a board to win a prize. Determine the probability of a dart landing in the shaded region and a prize being won. You may express your answers as a fraction, decimal or percent.



Name _____
Date _____

Probability

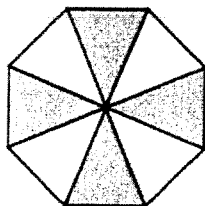
Find the probability that a point selected randomly on \overline{AE} , is on the given segment.



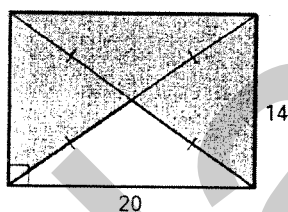
1. \overline{AC} $= \frac{4}{8} = \frac{1}{2}$ 2. \overline{BC} 3. \overline{CD} 4. \overline{AD} 5. \overline{DE}

Find the probability that a randomly chosen point in the figure lies in the shaded region.

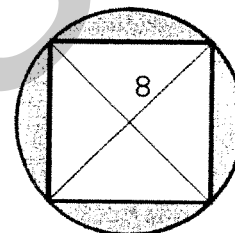
6.



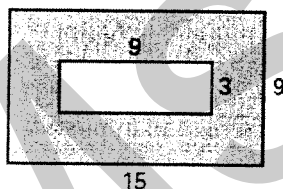
7.



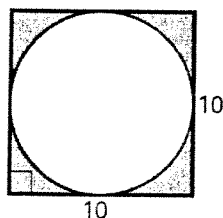
8. Diagonal = 8



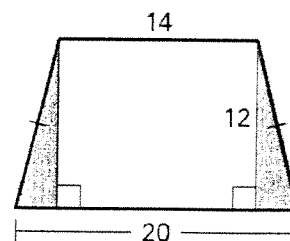
9.



10.

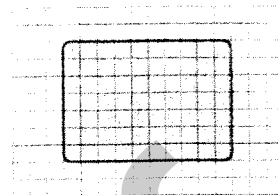


11.



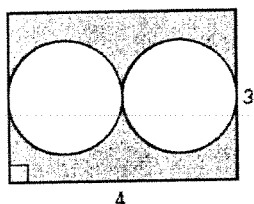
Use the scale drawing.

12. What is the approximate area of the shaded figure in the scale drawing?
13. Find the probability that a randomly chosen point lies in the shaded region.
14. Find the probability that a randomly chosen point lies outside of the shaded region.

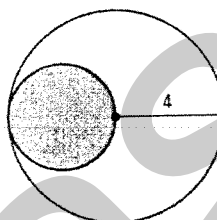


Find the probability that a randomly chosen point in the figure lies in the shaded region.

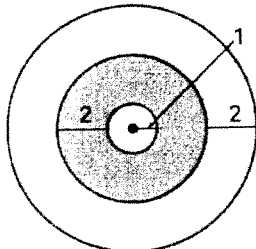
15.



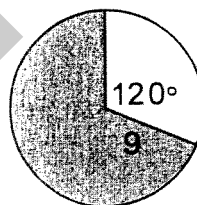
16.



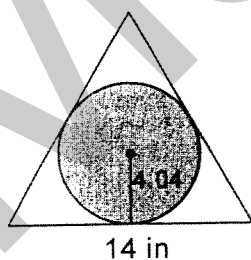
17.



18.



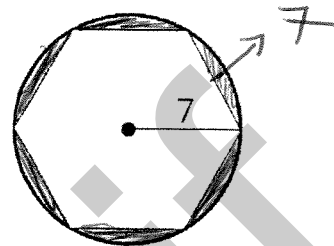
19.



Find height by pythagoras!

20. Follow the steps to find the probability that a point chosen at random in the figure lies in the shaded region.

Step 1: Find the area of the hexagon.



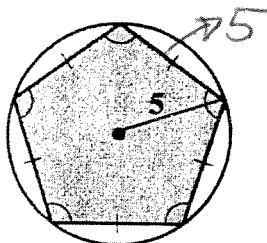
Step 2: Find the area of the circle.

Step 3: Find the shaded area.

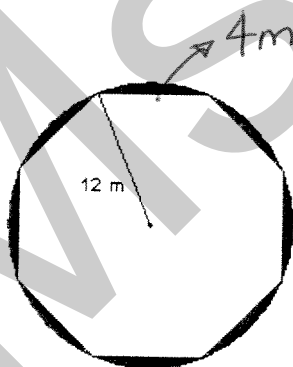
Step 4: Find the probability.

Find the probability that a point chosen at random in the figure lies in the shaded region.
(Use the steps from the previous problem if you need to).

21.



22.



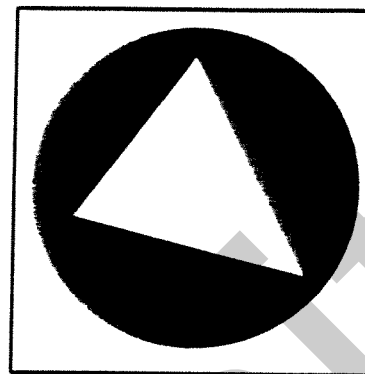
Ms. Nassif

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Geometric Probability JUNE Questions Secondary 3

1

A game consists of randomly throwing a dart at a square target containing a circle and a triangle. Any participant who hits the black area is a winner.

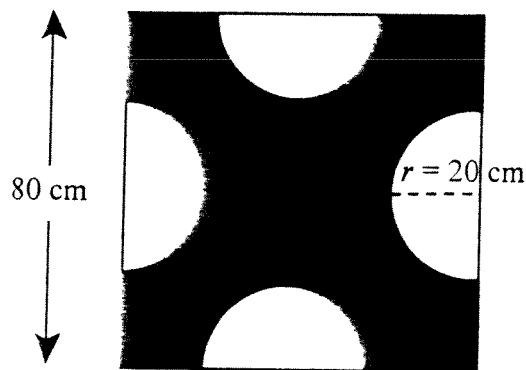


Which of the expressions below can be used to calculate the probability of winning in this game?

- A) $\frac{\text{Area of circle}}{\text{Area of square}}$
- B) $\frac{\text{Area of circle} - \text{Area of triangle}}{\text{Area of square} - \text{Area of circle} + \text{Area of triangle}}$
- C) $\frac{\text{Area of circle} - \text{Area of triangle}}{\text{Area of square}}$
- D) $\frac{\text{Area of circle}}{\text{Area of square} - \text{Area of circle} + \text{Area of triangle}}$

2

Four white half-circles of radius 20 cm each were painted on a black square target measuring 80 cm a side.



What is the probability that a randomly thrown dart hits the black section of the target?

Note All darts thrown reach the target.

The probability is _____

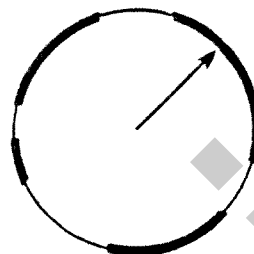
NAME: _____

Geometric Probability JUNE Questions Secondary 3

3

A pointer is fastened to the centre of a circular disk.

A person spins the pointer.



Which of the following expressions should be used to calculate the probability that the pointer will stop somewhere along a shaded arc?

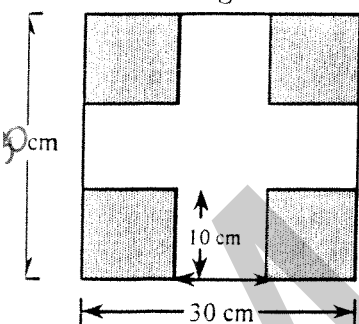
- A) $\frac{\text{number of shaded arcs}}{\text{total number of arcs}}$
- B) $\frac{\text{number of shaded arcs}}{\text{number of unshaded arcs}}$
- C) $\frac{\text{number of shaded arcs}}{\text{circumference of the circle}}$
- D) $\frac{\text{total length of the shaded arcs}}{\text{circumference of the circle}}$

4

A game involves throwing a dart at a target. You can win a prize if your dart lands in one of the shaded. Players can choose from among the four targets illustrated below.

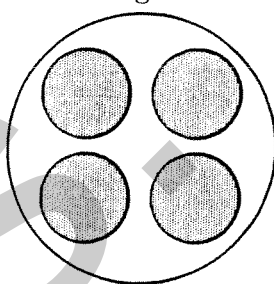
Which target should players choose to have the best chance of winning?

Target A



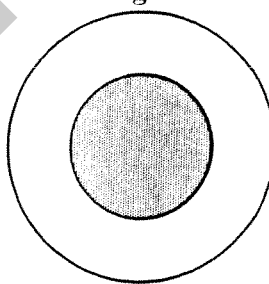
The four shaded areas are congruent squares.

Target C



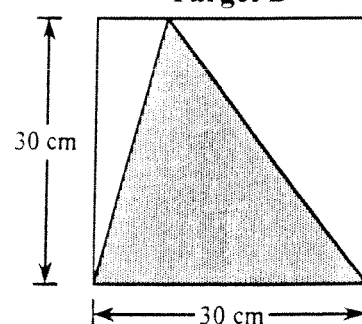
The four shaded areas are congruent circles, each with a radius of 5 cm. The radius of the target is 15 cm.

Target B



The radius of the smaller circle is 8 cm. The radius of the larger circle is 15 cm.

Target D



The target is a square.

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Geometric Probability JUNE Questions Secondary 3

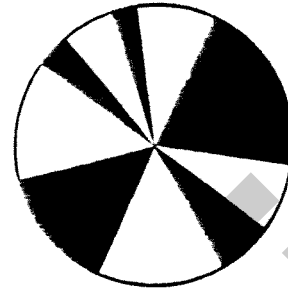
5

The circular target shown on the right is divided into sectors. Some sectors are black, and others are white.

A game involves throwing a dart at this target while it is spinning.

The dart hits the target.

Which of the following expressions should be used to calculate the probability that the dart will land on a black sector?



A) $\frac{\text{number of black sectors}}{\text{number of white sectors}}$

C) $\frac{\text{total area of the black sectors}}{\text{total area of the white sectors}}$

B) $\frac{\text{number of black sectors}}{\text{total number of sectors}}$

D) $\frac{\text{total area of the black sectors}}{\text{area of the target}}$

6

A cursor moves back and forth above segment \overline{AF} . Points B, C, D and E divide segment \overline{AF} into five smaller segments.

$m \overline{AF} = 70 \text{ cm}$

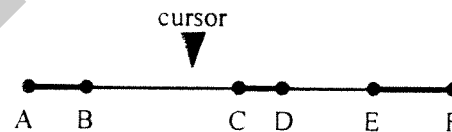
$m \overline{AB} = 10 \text{ cm}$

$m \overline{CD} = 5 \text{ cm}$

$m \overline{DE} = 15 \text{ cm}$

Point C is the midpoint of \overline{AF} .

Segments AB, CD and EF appear as thick black lines.



A computerized system randomly stops the cursor.

What is the probability that the cursor will stop above a segment that appears as a thick black line?

A) $\frac{3}{7}$

C) $\frac{4}{7}$

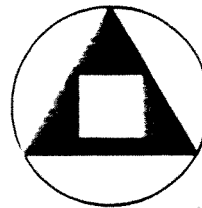
B) $\frac{1}{2}$

D) $\frac{3}{5}$

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Geometric Probability JUNE Questions Secondary 3

7

A game involves throwing a dart at a circular target on which a triangle and a square are drawn. You win a prize if your dart lands in the shaded area.

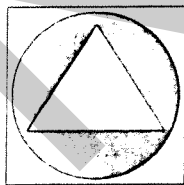


Which of the following expressions should be used to calculate the probability of winning a prize?

- A) $\frac{\text{Area of the triangle}}{\text{Area of the circle}}$
- B) $\frac{\text{Area of the triangle} - \text{Area of the square}}{\text{Area of the circle}}$
- C) $\frac{\text{Area of the triangle} - \text{Area of the square}}{\text{Area of the circle} - \text{Area of the triangle} + \text{Area of the square}}$
- D) $\frac{\text{Area of the triangle}}{\text{Area of the circle} - \text{Area of the triangle} + \text{Area of the square}}$

8

A game involves throwing a dart that will hit a square target on which a circle and a triangle are drawn. You win a prize if your dart lands in the shaded area.



Which one of the following expressions should be used to calculate the probability of winning a prize in this game?

- A) $\frac{\text{Area of the circle}}{\text{Area of the square}}$
- B) $\frac{\text{Area of the square} - \text{Area of the triangle}}{\text{Area of the square}}$
- C) $\frac{\text{Area of the circle} - \text{Area of the triangle}}{\text{Area of the square}}$
- D) _____

NAME: _____

Geometric Probability JUNE Questions Secondary 3

Area of the circle

Area of the square – Area of the circle + Area of the triangle

9

A wheel of fortune is divided into four different-coloured sectors.

In the green sector, the central angle measures 61° .

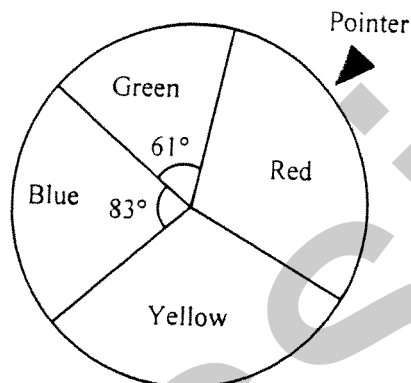
In the blue sector, the central angle measures 83° .

The area of the yellow sector is equal to the area of the red sector.

Someone spins the wheel.

What is the probability that the pointer will be pointing at the red sector when the wheel stops spinning?

The probability that the pointer will be pointing at the red sector when the wheel stops spinning is _____.



10

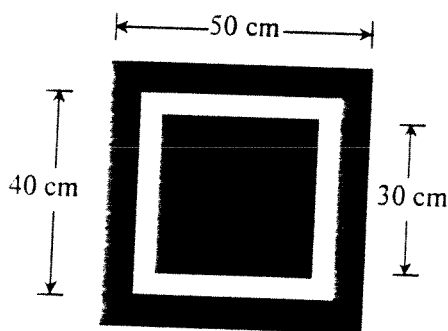
The diagram on the right shows a square target. Its sides measure 50 cm each.

The design used on this target was created by drawing two squares whose sides measure 40 cm and 30 cm respectively.

A section of this target is white.

Someone throws a dart at this target.

What is the probability that the dart will land in the white section of the target?



A) $\frac{1}{6}$

B) $\frac{7}{25}$

C) $\frac{1}{3}$

D) $\frac{16}{25}$

NAME: _____

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11

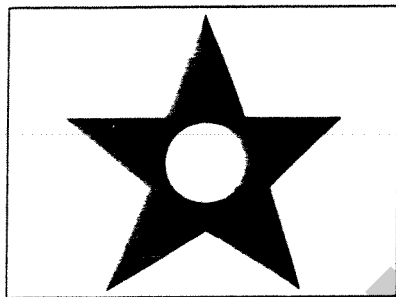
A dart is thrown at a rectangular target. A circle and a star are drawn on this target. The target is black and white.

The probability that the dart will land in a black area is represented by the following expression:

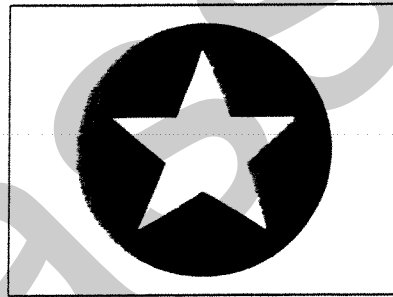
$$\frac{\text{area of the rectangle} - \text{area of the circle} + \text{area of the star}}{\text{area of the rectangle}}$$

Which of the targets below is used in this case?

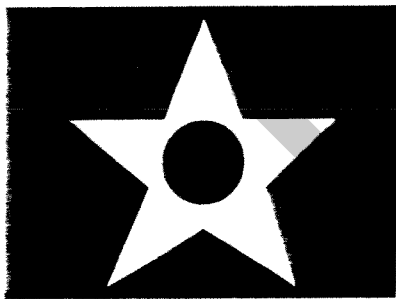
A)



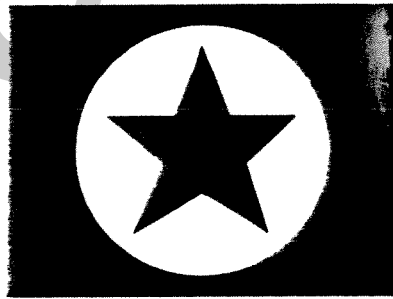
C)



B)



D)



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12

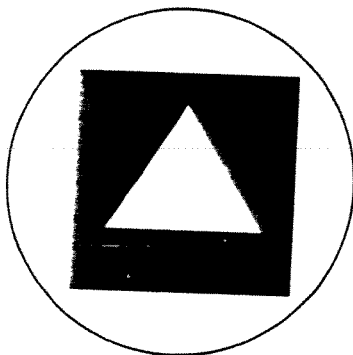
A game of chance involves throwing a dart at a black and white circular target. A square and a triangle are drawn on this target.

The probability that the dart will land in a black area of the target is represented by the following expression:

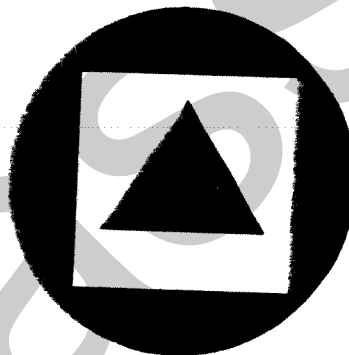
$$\frac{\text{Area of the circle} - \text{Area of the triangle} + \text{Area of the square}}{\text{Area of the circle}}$$

Which of the four targets below is used in this game?

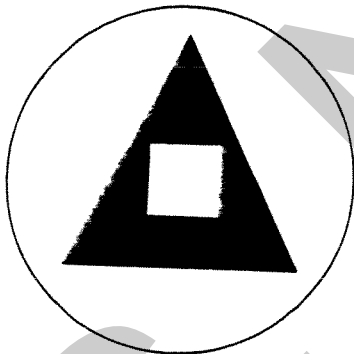
A)



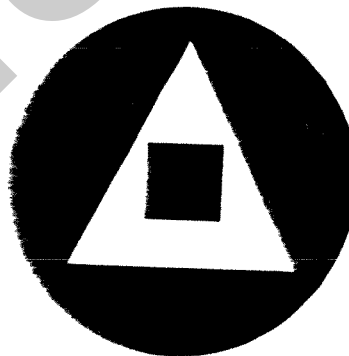
C)



B)



D)



Ms. Nassif