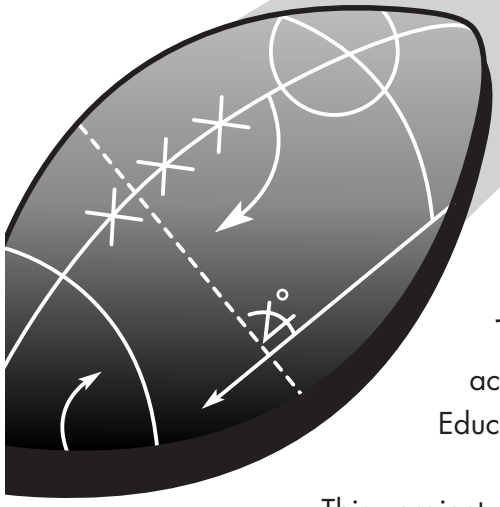
# TACKLE MATH

## WITH THE BUFFALO BILLS



## TEAM ACKNOWLEDGMENTS

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This project was made possible through the collaborative effort of the Buffalo Bills organization and the Buffalo Public School Mathematics Department. The following educators were involved in the development of these materials: Debra Sykes, Director of Mathematics, Buffalo Public Schools; Arlene Rosowski, Supervisor of Instruction, Buffalo Public Schools; Sharyn Miller, Math Support Teacher, Buffalo Public Schools; Claudette Rivera, Math Support Teacher, Buffalo Public Schools

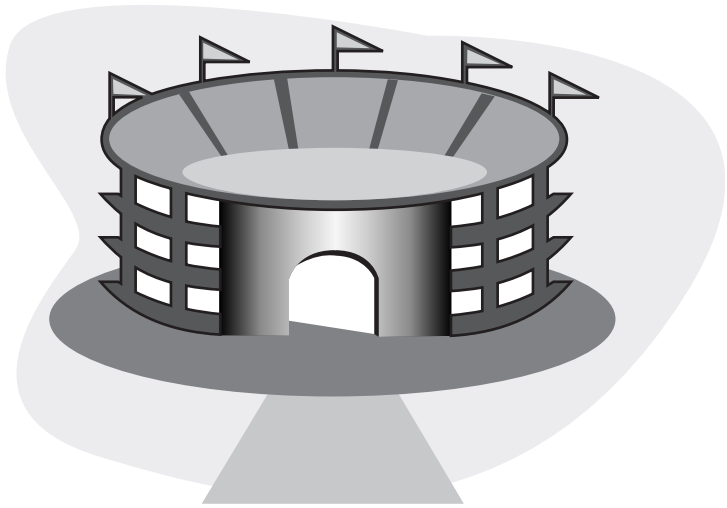
# TACKLE MATH

BILLY
BUFFALO

# TABLE OF CONTENTS

TACKLE MATH WITH THE BUFFALO BILLS





# TABLE OF CONTENTS



TACKLE MATH WITH THE BUFFALO BILLS

## WINNING STRATEGIES

| On the Field | In the Classroom |
|---|---|
| Competition | Striving to be the best |
| Cooperation | Helping others |
| Leadership | Taking the lead in a group |
| Organization | Planning the time |
| Practice | Doing exercises in class |
| Preparation | Completing assignments on time |
| Setting Goals | Working to complete team projects |
| Teamwork | Problem-solving in groups |

**Respond to one of the following writing prompts.**

- Compare and contrast being a successful athlete to being a successful student.
- Compare and contrast the qualities of a successful coach and a successful mathematics teacher.
- Choose one of the strategies from the Poster. Describe how you can use that skill to become a successful student.

**PLAN**
**WRITE**
**REVIEW**

## FIRST SERIES

**Directions**

Running Back 1 carried the ball for a 17 yard gain on the first carry, then lost 2 yards on the second carry and advanced 42 yards on the third carry. Running Back 2 carried the ball for a loss of 5 yards on the first carry, then gained 27 yards on the second carry, and another gain of 14 yards on his final carry.

In order to rate the two different running backs, complete the table to show the yardage gained or lost on each carry. Then find the average (mean) number of yards gained for each carry.

| | **Running Back 1** | **Running Back 2** |
|---|---|---|
| First carry | | |
| Second carry | | |
| Third carry | | |
| **Total Yardage** | | |
| **Average per carry** | | |

**Show Your Work.**

**1.** Based only on the results of these statistics, how would you rank these two running backs?

Running Back 1 _____ Running Back 2 _____

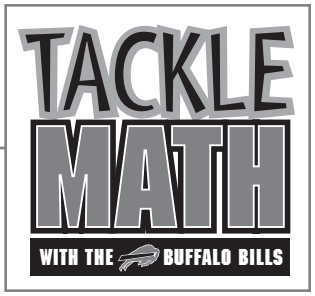
**2.** Are three carries enough by which to rate a running back? _____

_____

**3.** What else do you think a coach might include in his rating system? _____

_____

_____




## SECOND SERIES

**Directions**

You will again rate the two running backs. This time you have ten additional runs for each of them. All thirteen of their runs together are on the new table below. Calculate the new averages and see if this changes your rating order.

| | Running Back 1 | Running Back 2 |
|---|---|---|
| First carry | 17 | –5 |
| Second carry | –2 | 27 |
| Third carry | 42 | 14 |
| Fourth carry | –6 | 8 |
| Fifth carry | 22 | –17 |
| Sixth carry | 4 | 31 |
| Seventh carry | –10 | –1 |
| Eighth carry | 17 | 10 |
| Ninth carry | 3 | 39 |
| Tenth carry | –2 | 54 |
| Eleventh carry | 16 | –9 |
| Twelfth carry | –4 | 32 |
| Thirteenth carry | 20 | 25 |
| **TOTAL yardage** | | |
| **Average per carry** | | |

**1.** Based on the results of the statistics above, rank the players in the order you would draft them.

Running Back 1 _____ Running Back 2 _____

**2.** Did your opinion change after collecting data on 13 carries versus 3 carries? Explain why:

**3.** Explain why "first impressions" (or impressions based on just a few observations) most often result in poor decisions.

**4.** When collecting data, why is it important to have a sufficient amount of data before making decisions?

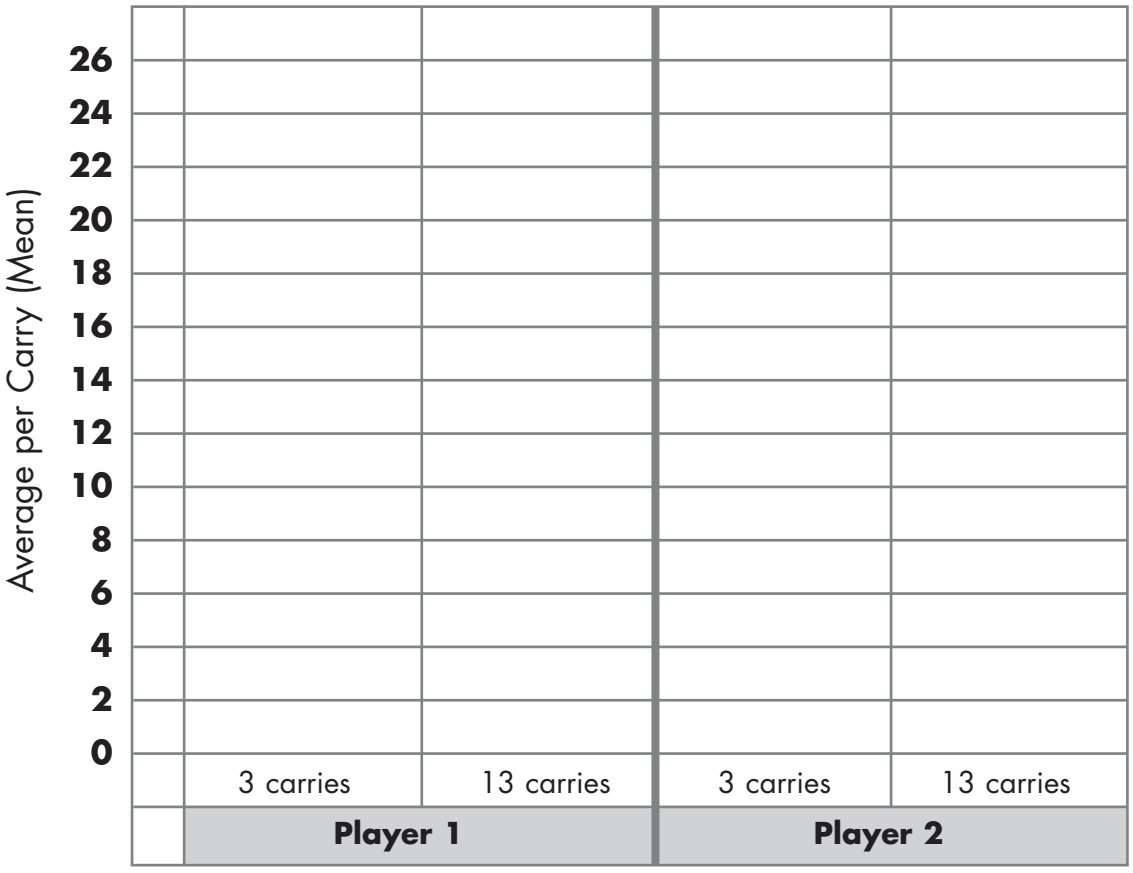
## GRAPHING

**Directions**

1. You will be drawing a double bar graph using the information from the First Series and Second Series activities.

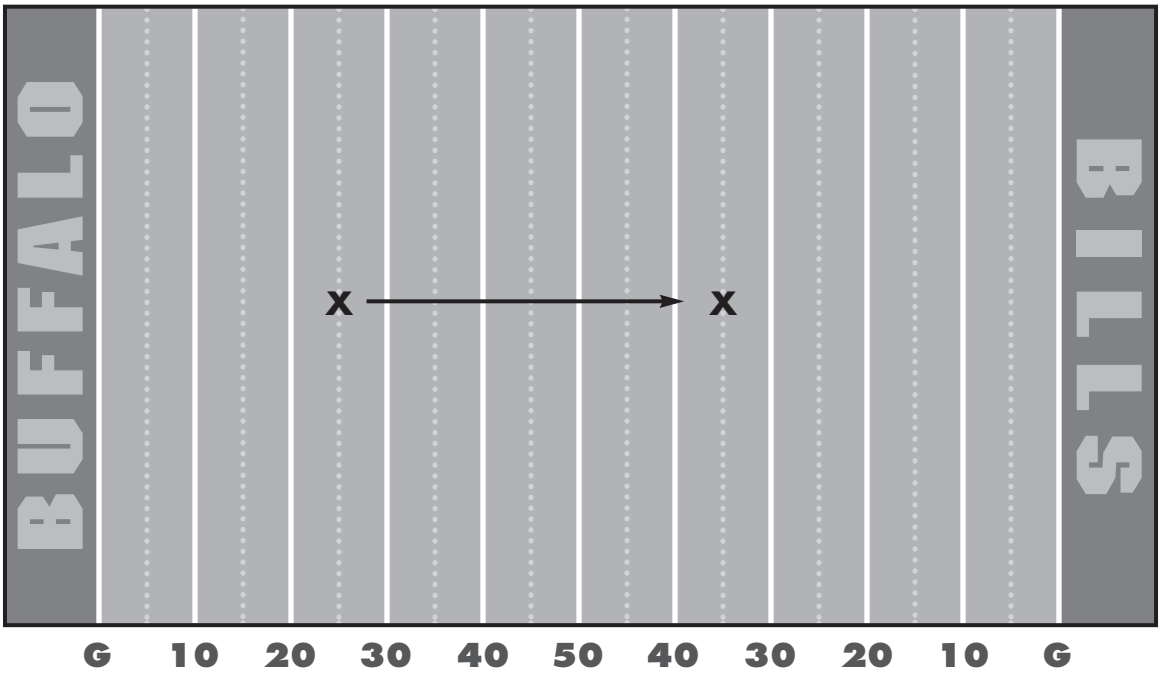
2. Construct a bar graphing the mean for each player after 3 carries.

3. Construct another bar graphing the mean of each player after 13 carries.




4. What can you learn after studying these graphs?

## BILLS FIELD




In football, you often hear talk of distances–how many yards a kick, pass, or run was. But how can we figure out these distances on our own?

It's easy. A football field is 100 yards long, and is marked every 10 yards by a line. The 50-yard line is the center, and it divides one team's side from the other. To calculate distance across the field, you simply calculate the distance on both sides of the 50–yard line. For example, if the football was kicked from the Bills 25–yard line to the Jets 35–yard line, how long was the kick?

First you find the distance from the Bills 25–yard line to the 50–yard line:
50 – 25 = 25

Then you find the distance from the 50–yard line to the Jets 35–yard line:
50 – 35 = 15

Then you add these two distances to find the total distance:
25 + 15 = 40 yards

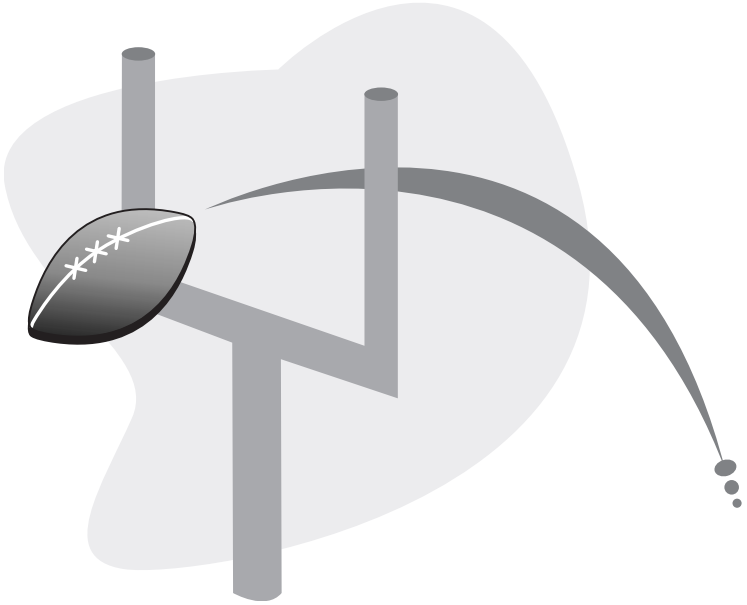
## GOING THE DISTANCE

Based on the example on the previous page, you should be able to answer the following questions:

**1.** How many yards does the football travel if you pass it from the Bills 36–yard line to the Jets 36–yard line?

**2.** How many yards does the football travel if you pass it from the Jets 28–yard line to the Bills 40–yard line?

**3.** How many yards does the football travel if you pass it from the Bills 22–yard line to the Jets goal line (G)?



## DRAFT PAPER

**Directions**

Use the equations below and write a football situation that describes each equation.

**Example:** –3 + x = 7

**Sample response:** The quarterback falls back three yards from the line of scrimmage, and makes a pass for a total gain of 7 yards. How many yards did he really throw the football?

Now you create another situation for the equation.

Solve the following equations, record your answer and write a situation for each equation.

**1.** –5 + 14 = x

**2.** 10 + –3 = x

**3.** –4 + x = 20

## KEEPING SCORE

The following are ways a football team can score points in the game.

| | |
|---|---|
| **TOUCHDOWN** | **6** points |
| **EXTRA POINT** | **1** point * |
| **CONVERSION** | **2** points * |
| **SAFETY** | **2** points |
| **FIELD GOAL** | **3** points |

**These points follow a touchdown.*

**1.** The highest scorers in the NFL are Marshall Faulk of St. Louis, a running back, with 21 touchdowns; Jason Elam of Denver, a kicker, with 31 field goals and 31 extra points, and Matt Stover of Baltimore, a kicker, with 30 field goals and 25 extra points. How many points has each player made?

**Faulk:**

**Elam:**

**Stover:**

**2.** List at least 5 ways that the Buffalo Bills can score 35 points.

1. _____
2. _____
3. _____
4. _____
5. _____

**3.** **Extension:** Create your own score.
Find at least 5 ways the Bills can score _____ points.

1. _____
2. _____
3. _____
4. _____
5. _____

# CROWD COUNT

SECTION 4

SECTION 3

SECTION 2

SECTION 1

## RALPH WILSON STADIUM–SAMPLER I

**Directions**

1. In the table below, enter the number of hats and the number of fans that you count in each section on the sample picture on p.10.

2. Write the fraction for the ratios of the number of hats to the number of fans.

3. Use a calculator to find decimals for each ratio. Express each decimal to the nearest hundredth to find the percent.

| Stadium Section | Number of hats | Number of fans | Fraction | Decimal | Percent |
|---|---|---|---|---|---|
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| **Sample Totals** | | | | | |

Complete and solve the following proportion to determine the approximate number of hats in a sell out crowd of 74,000.

Number of hats in sample _____ _____ Number of fans in sample

=

Number of hats in crowd _____ **74,000** Number of fans in a sellout.

# CROWD COUNT

SECTION 4

SECTION 3

SECTION 2

SECTION 1

## RALPH WILSON STADIUM–SAMPLER II

**Directions**

1. Choose a fan characteristic to sample. Write the characteristic at the top of the second column of the table below.

2. Complete the table as you did for the Sampler I activity.

3. Use the proportion display at the bottom of the page. Solve the proportion to estimate the number of fans in the game crowd with the chosen characteristics.

| Stadium Section | Number of _____ | Number of fans | Fraction | Decimal | Percent |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| **Sample Totals** | | | | | |

Complete and solve the followiing proportion to determine the approximate number of _____ in a sell out crowd.

Number of _____ in a sample _____ _____ Number of fans in sample

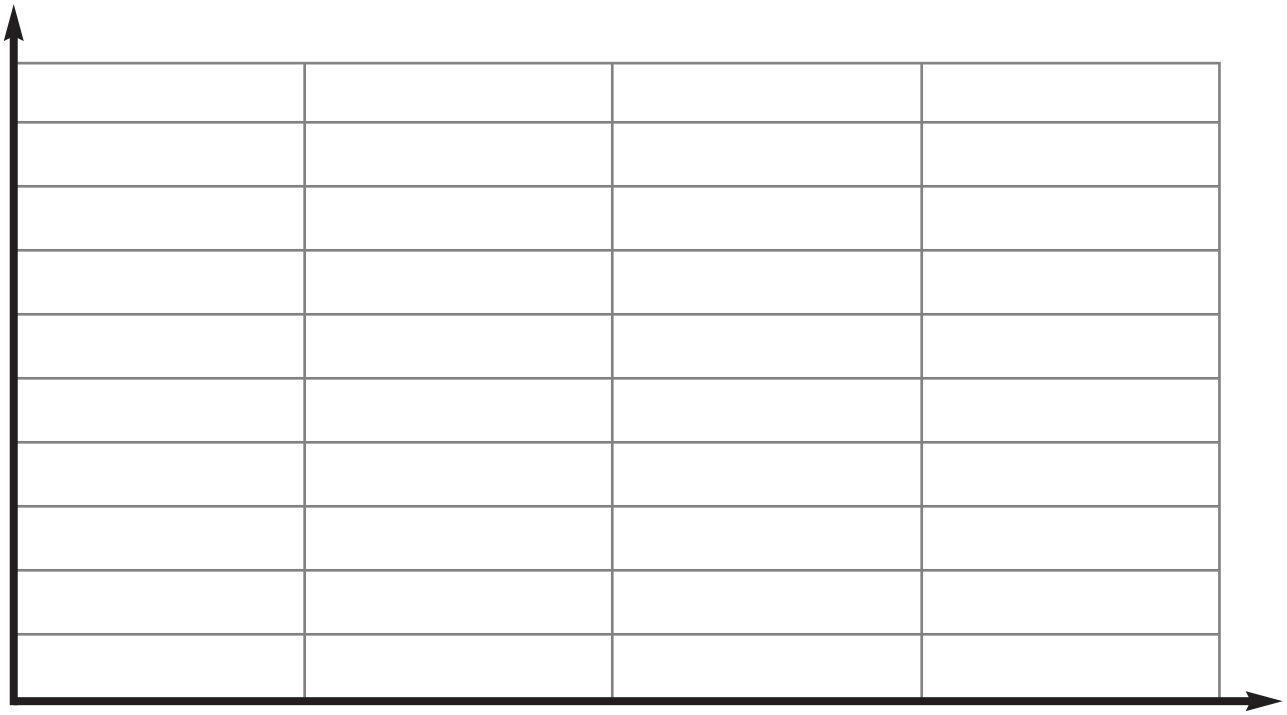
=

Number of _____ in a crowd _____ **74,000** Number of fans in sell out

## GRAPH TYPES

**Directions**

1. Use the data from Sampler II page in your Playbook. Construct a bar graph showing the chosen fan characteristic for each of the 4 samplings.



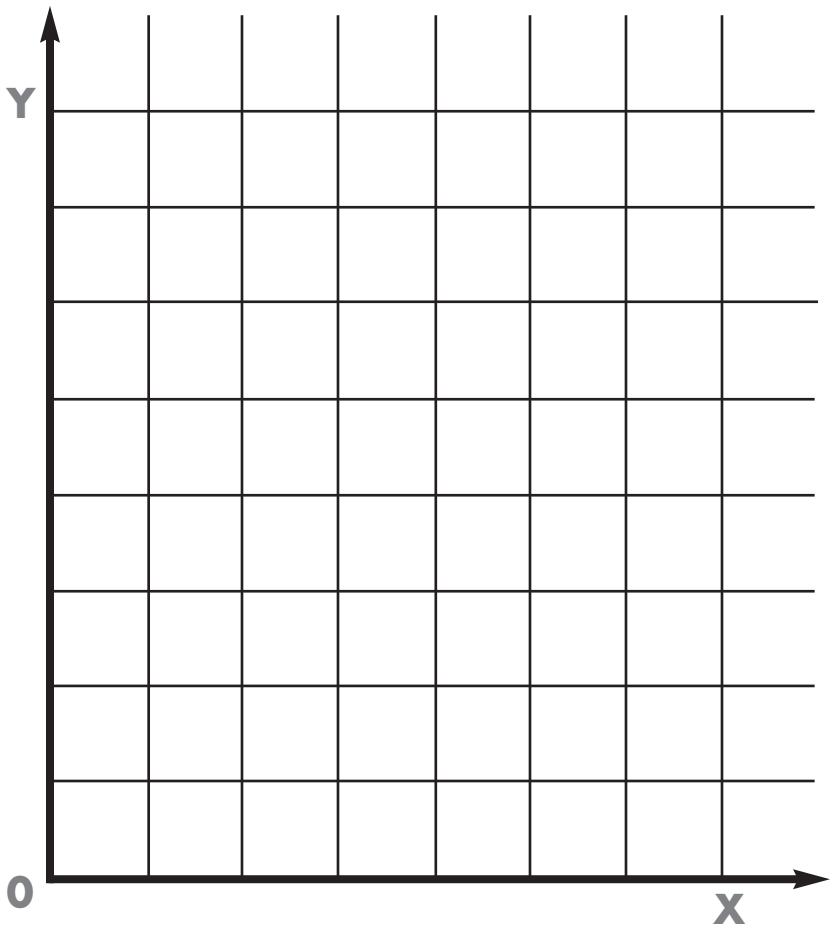
**BE SURE TO:**

- **Title the graph**
- **Label the axes**
- **Use an appropriate and consistent scale**

## GRAPH TYPES

**Directions**

**2.** Use the data from Sampler II page in your Playbook. Construct a line graph using the percent for the chosen fan characteristic.




**BE SURE TO:**

- Title the graph
- Use an appropriate and consistent scale

## BILLS CAREER CONNECTIONS

**Marketing**

> *"As the Vice President of Business Development and Marketing, I work with our local sponsors to maximize their relationship with the Bills. I oversee the marketing programs and promotions that our sponsors do involving the Bills both inside the stadium and out in the marketplace."*

In broadcast terms, "Share" means the percentage of all televisions in an area that are tuned into a program. The Bills Marketing Department keeps track of the average "Share" for each game broadcast on TV for the purpose of encouraging sponsor participation. For each game televised during the 2001 season, the Bills received the following "Share."

**61, 58, 57, 65, 61, 62, 67, 61, 62, 62, 62, 58, 61, 51, 49**

1. What was the average (mean) "Share" for the entire broadcast? _____

2. What is the median and mode for the same data?

   Median _____

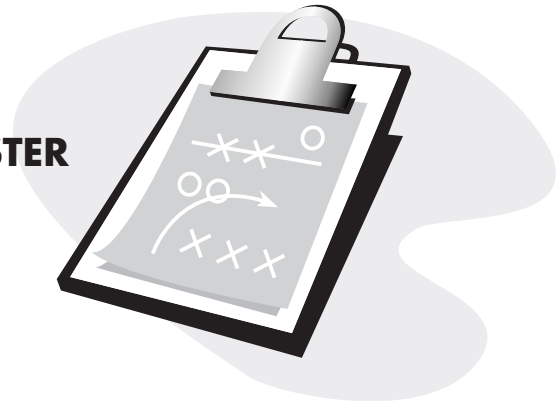
   Mode _____

## BUFFALO BILLS STATISTICS CONNECTIONS

The Bills organization uses probability and statistics behind the scenes, as well as on the playing field. Their Internet Department utilizes statistics – from the average number of site visitors per month (509,765) to the average time spent on site (6minutes, 8 seconds) to compile information that will assist the department and benefit the Bills organization.

Consider your world. Describe a minimum of three ways statistics are used in your life or the world around you. Your examples may include information from such sources as the internet, newspapers, television, or interviews of family and friends.

## BILLS TEAM ROSTER



| HEIGHT | WEIGHT | POSITION |
|---|---|---|
| 6-4 | 295 | DT |
| 6-2 | 245 | C |
| 6-2 | 265 | DT |
| 6-1 | 195 | WR |
| 6-3 | 268 | TE |
| 6-2 | 258 | TE |
| 6-0 | 180 | P |
| 6-0 | 225 | RB |
| 6-2 | 204 | WR |
| 6-2 | 245 | LB |
| 6-3 | 252 | TE |
| 6-5 | 250 | DE |
| 6-4 | 276 | TE |
| 6-3 | 327 | G |
| 6-2 | 275 | DT |
| 6-2 | 235 | LB |
| 6-6 | 321 | OT |
| 5-11 | 190 | WR |
| 6-4 | 210 | QB |
| 5-10 | 191 | S |
| 6-0 | 207 | S |
| 6-3 | 315 | G |

| HEIGHT | WEIGHT | POSITION |
|---|---|---|
| 5-10 | 210 | WR |
| 6-5 | 252 | TE |
| 6-4 | 285 | DT |
| 6-1 | 243 | LB |
| 6-2 | 250 | LB |
| 5-9 | 177 | WR |
| 5-10 | 180 | WR |
| 5-10 | 175 | PK |
| 6-4 | 290 | C |
| 6-4 | 265 | DE |
| 6-2 | 244 | LB |
| 6-0 | 232 | LB |
| 6-5 | 323 | OT |
| 6-5 | 292 | OT |
| 5-10 | 180 | CB |
| 6-1 | 190 | S |
| 6-1 | 218 | QB |
| 6-1 | 188 | CB |
| 6-5 | 375 | OT |
| 6-3 | 310 | DT |
| 5-9 | 180 | CB |
| 5-11 | 209 | S |
| 5-8 | 185 | WR |

## 3 Ms

1. Use the player statistics from the Bills roster, or create your own by visiting the www.buffalobills.com internet site. Work with the other members of your group to choose 11 players for the offensive team and 11 players for the defensive team. Enter the data for these players in the Bills Offensive and Defensive Team Tables.

2. Find the mean, median, and mode heights and weights of the players. Enter these in the spaces provided in the chart below.

### BILLS OFFENSIVE TEAM

| POSITION | | HEIGHT | WEIGHT |
|---|---|---|---|
| Quarterback (QB) | | | |
| Running Back (RB) | | | |
| Running Back (RB) | | | |
| Wide Receiver (WR) | | | |
| Wide Receiver (WR) | | | |
| Center (C) | | | |
| Guard (G) | | | |
| Guard (G) | | | |
| Offensive Tackle (OT) | | | |
| Offensive Tackle (OT) | | | |
| Tight End (TE) | | | |
| | **MEAN** | | |
| | **MEDIAN** | | |
| | **MODE** | | |

OFFENSE

## BILLS DEFENSIVE TEAM

| POSITION | | HEIGHT | WEIGHT |
|---|---|---|---|
| Defensive End (DE) | | | |
| Defensive End (DE) | | | |
| Defensive Tackle (DT) | | | |
| Defensive Tackle (DT) | | | |
| Linebacker (LB) | | | |
| Linebacker (LB) | | | |
| Linebacker (LB) | | | |
| Cornerback (CB) | | | |
| Cornerback (CB) | | | |
| Safety (S) | | | |
| Safety (S) | | | |
| | **MEAN** | | |
| | **MEDIAN** | | |
| | **MODE** | | |

DEFENSE

**3.** The range of a set of data is the difference between the largest and the smallest numbers in the set of data. What is the range of each of the following for the players listed in your charts?

**BILLS OFFENSIVE TEAM**

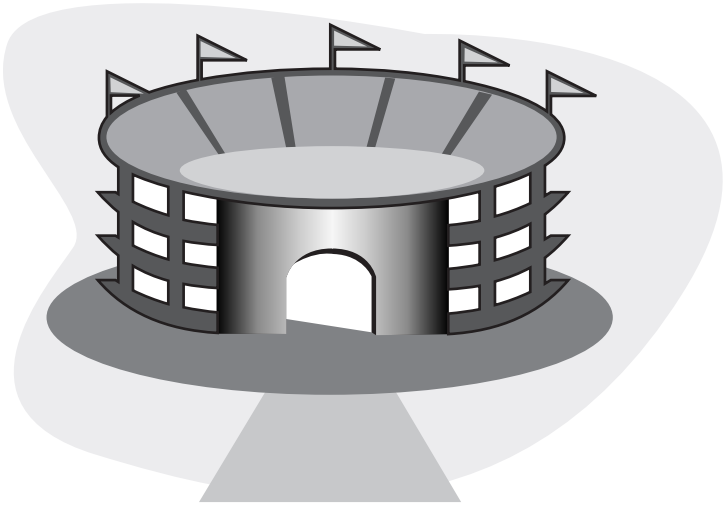
Height _____

Weight _____

**BILLS DEFENSIVE TEAM**

Height _____

Weight _____



**4.** Compare the ranges of the Bills Offensive and Defensive Teams. Are they similar? Explain your answer.

_____

_____

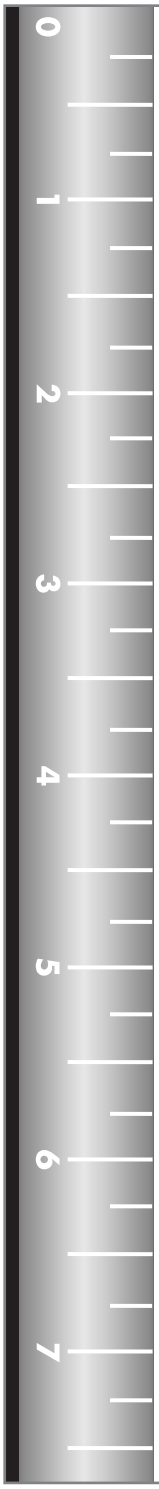
_____

_____

_____

_____

## MEASUREMENT MENU




- Hat Size
- Neck Size
- Wrist Size
- Ankle Size
- Hand Span
- Forearm Length
- Upper Arm Length
- Arm Length
- Horizontal Reach (fingertip to fingertip)
- Shoulder to Shoulder Width
- Foot Length
- Shoe Length
- Stride or Pace
- Heartbeats per Minute
- Length of Finger or Thumb
- Length of Hair
- Blinks per Minute

## BODY RATIOS

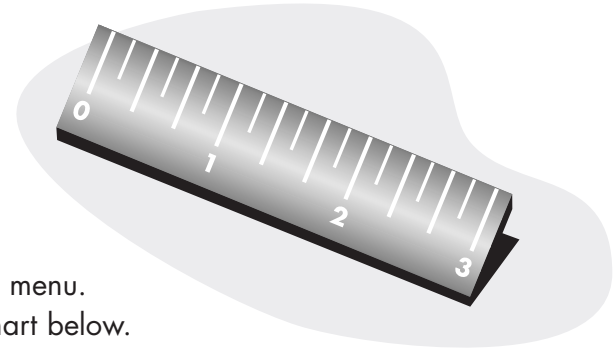
Choose 5 attributes from the measurement menu. Write your choices in the Attribute column of the chart below. With the help of your partner, using your height string, measure and complete the remaining columns.

| Attribute | Estimation Times | Actual Times | Ratio to Height | Ratio as a Fraction |
|---|---|---|---|---|
| HEAD | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

**Are You a Square?**

1. Compare your height to your reach. To find your reach, hold your height string with your fingers and stretch your arms out as far as possible. If your string is exactly the same size as your reach, then you are a "square." If the string is shorter than your reach, then you are a "tall rectangle." If the string is longer than your reach, then you are a "wide rectangle."

2. Draw what you are.




## MEASURING UP

1. Choose 10 student attributes from the measurement menu. Write your choices in the Attribute column of the chart below.

2. Measure to the nearest centimeter and record your own measurements in the chart.

| Attribute | Estimation | Actual Measurement | Difference |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

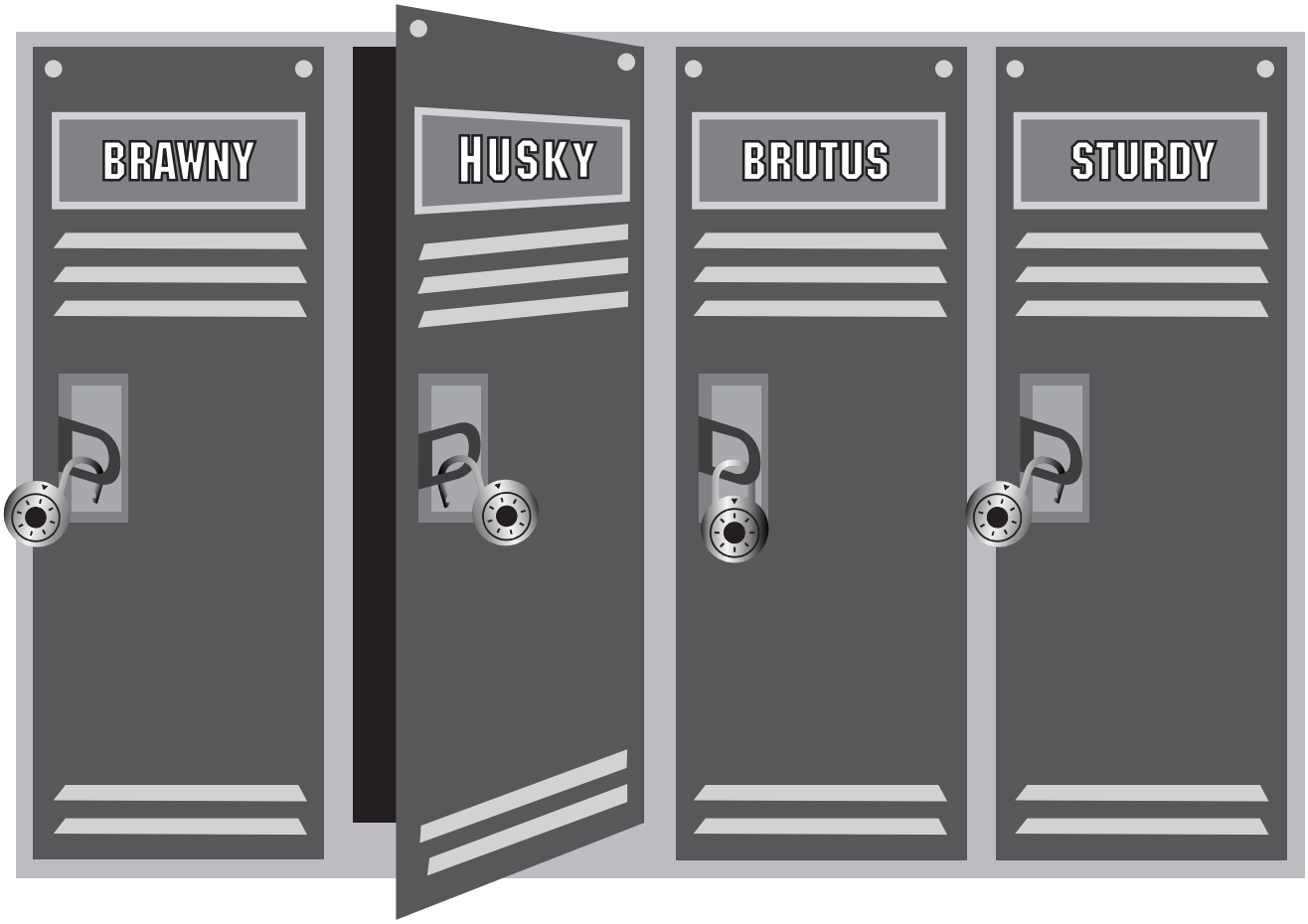
## LOCKER ROOM SCRAMBLE

Four players – a quarterback, running back, receiver, and kicker were on the practice field. Their shirts were mixed up in the locker room. The names on the shirts were Brawny, Husky, Brutus, and Sturdy. Your job is the help them get their shirts right.

**CLUES:**

- Brutus is friends with the quarterback and receiver.
- Sturdy is friends with the running back who dislikes Brawny and Brutus.
- The shirt for the receiver does not belong to Sturdy.

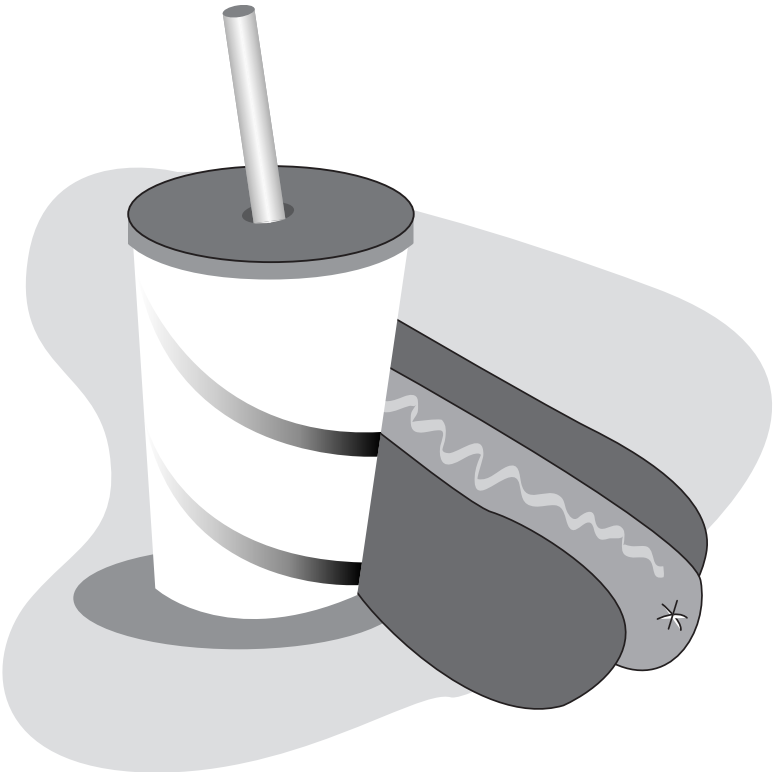
**WHO PLAYS WHICH POSITION?**

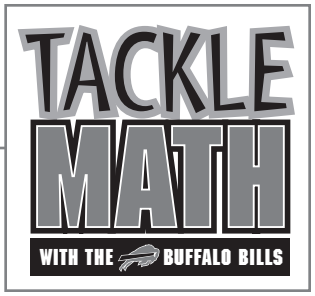


## CONCESSION STAND

| MENU | |
|---|---|
| Hot Dog | $3.00 |
| Hamburger | $4.00 |
| French Fries | $3.25 |
| Soft Drink | $2.75 |
| Popcorn | $2.25 |

**Prices include sales tax**






## SNACK TIME

**1.** 73,097 people attended the Buffalo Bills game last week. If about half of them had a hot dog and about half of those had two hot dogs, about how many hot dogs were eaten?

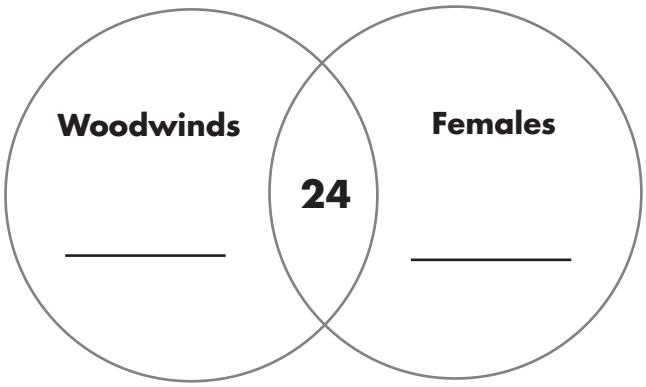
**2.** How much did the vendors at Ralph Wilson Stadium make on the sale of hot dogs for that day?

**3.** Mr. Martin gave his two children $18.00 to buy lunch. They divided the money equally and each purchased two different lunch combinations. If they spend all their money, what could be two of their possible lunch choices?

| CALVIN'S LUNCH | MONIQUE'S LUNCH |
| --- | --- |
| | |

## MARCHING BAND

During half time, a 100-member marching band performed at the stadium. Forty three of the members of the band played a woodwind instrument. Fifty-eight of the members were females. Twenty-four of the females played a woodwind instrument.




1. Complete the Venn diagram

2. How many females do NOT play a woodwind instrument?

3. What is the total number of members that are not female and play a woodwind instrument?

## PICK THE PLAY

**1.** The estimated probability for the A Team's success in running each of four plays is:

**PLAY 1** $\frac{11}{20}$ **PLAY 2** $\frac{17}{20}$ **PLAY 3** $\frac{15}{20}$ **PLAY 4** $\frac{13}{20}$

Which play should the team use? Why?

_____

_____

_____

**2.** The team's estimated probabilities for success of each of four plays is:

**PLAY 1** $\frac{13}{20}$ **PLAY 2** $\frac{3}{5}$ **PLAY 3** $\frac{7}{8}$ **PLAY 4** $\frac{27}{40}$

Which play do you think the team should run? Why?

_____

_____

_____

**3.** Probabilities are easy to compare when they are expressed with the same denominator. Find the least common denominator for the fractions that express the team's probabilities.

$\frac{13}{20} = \frac{\quad}{\quad}$ $\frac{3}{5} = \frac{\quad}{\quad}$ $\frac{7}{8} = \frac{\quad}{\quad}$ $\frac{27}{40} = \frac{\quad}{\quad}$

If you need to correct your answers for question 2, do so now.

**4.** Another way to compare probabilities that are expressed by fractions is to change them to decimals. Comparing is easier if the decimals all have the same number of decimal places. Use your calculator to find each decimal by dividing numerators by denominators.

$\frac{13}{20}$ = ___ $\frac{3}{5}$ = ___ $\frac{7}{8}$ = ___ $\frac{27}{40}$ = .675

**5.** Express each of the probabilities as a percent.

$\frac{13}{20}$ = ___% $\frac{3}{5}$ = ___% $\frac{7}{8}$ = ___% $\frac{27}{40}$ = 67.5%

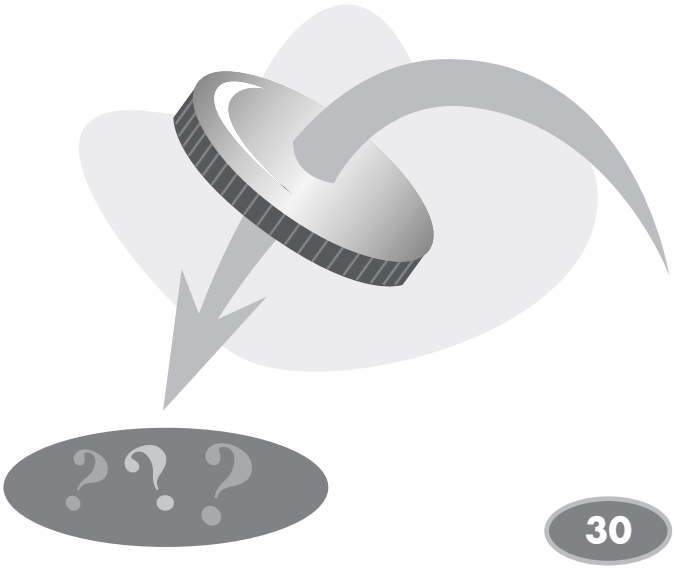
**THE COIN TOSS**

To start a game, a coin is tossed to see who will receive the football. The probability of receiving the football is 1 out of 2 (1:2). What if two coins are tossed?

Toss two coins together 25 times. After each toss, record what comes up – two heads, two tails, or one head and one tail. What do you think will result?

**Prediction:** two heads _____ two tails _____ one head/one tail _____

**Outcome:** two heads _____ two tails _____ one head/one tail _____



## BEHIND THE SCENES

Answer the following questions. The questions are actual statistics supplied by the Buffalo Bills.

**For 1–5, circle True or False.**

**1.** The total cost of postage for one year by the Bills is $73,179.12.
True or False

**2.** Number of buckets used daily to sort mail is 10.
True or False

**3.** Number of overnight deliveries for an average day is 7.
True or False

**4.** The total number of office supply orders placed by the entire organization is 480.
True or False

**5.** The total amount of money spent on office supplies for one year is $50,000.
True or False

**For 6-10, choose the correct answer by circling A, B, C, or D.**

**6.** Total pieces of mail sent by the Bills each year.
A. 9,600 B. 12,970 C. 46,500 D. 130,000

**7.** The number of business cards that are printed each year is
A. 16,000 B. 180,000 C. 500,000 D. 1,000,000

**8.** The amount of money spent on birthday cakes for the staff per year is
A. $38.00 B. $825.00 C. $368.00 D. $465.00

**9.** The amount of cases of paper used per year is
A. 26 B. 356 C. 512 D. 684

**10.** The average number of resumes received per day is
A. 5 B. 9 C. 12 D. 25

# BEST GUESS

Carefully correct your paper. The teacher will give you the correct answers.
Then answer the following questions.

**1.** Your number of correct answers is _____ out of 10 questions.

**2.** What fraction of the total number did you guess correct? _____

**3.** Change your fraction to a decimal. _____

**4.** Change your decimal to a percent. _____

**5.** Compare your percentage correct with at least 4 other members of the class. Summarize how your percentage correct compares to others.

_____

_____

_____

**6.** Record each student's percentage correct. (Teacher records on overhead or board.)

_____

_____

_____

Find the average percentage correct for the entire class.

**7.** How does your percentage correct compare with the average percentage correct for the entire class? _____

**8.** In this activity, did guessing the answers to the questions result in a high score?

_____

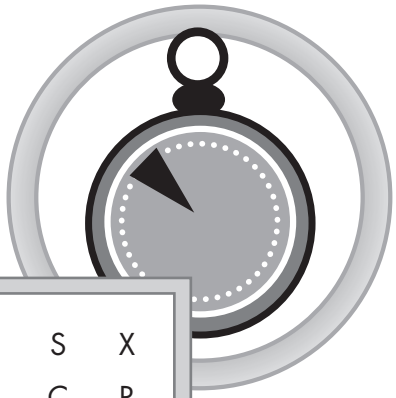
9. When taking a multiple choice test or a true/false test, is it a wise decision to rely on guessing all the answers to achieve high grades? _____
Explain your answer.

_____

_____

**Directions**

You have just received the two–minute warning. See how many words you can find in the puzzle below. On your mark, get set, GO!

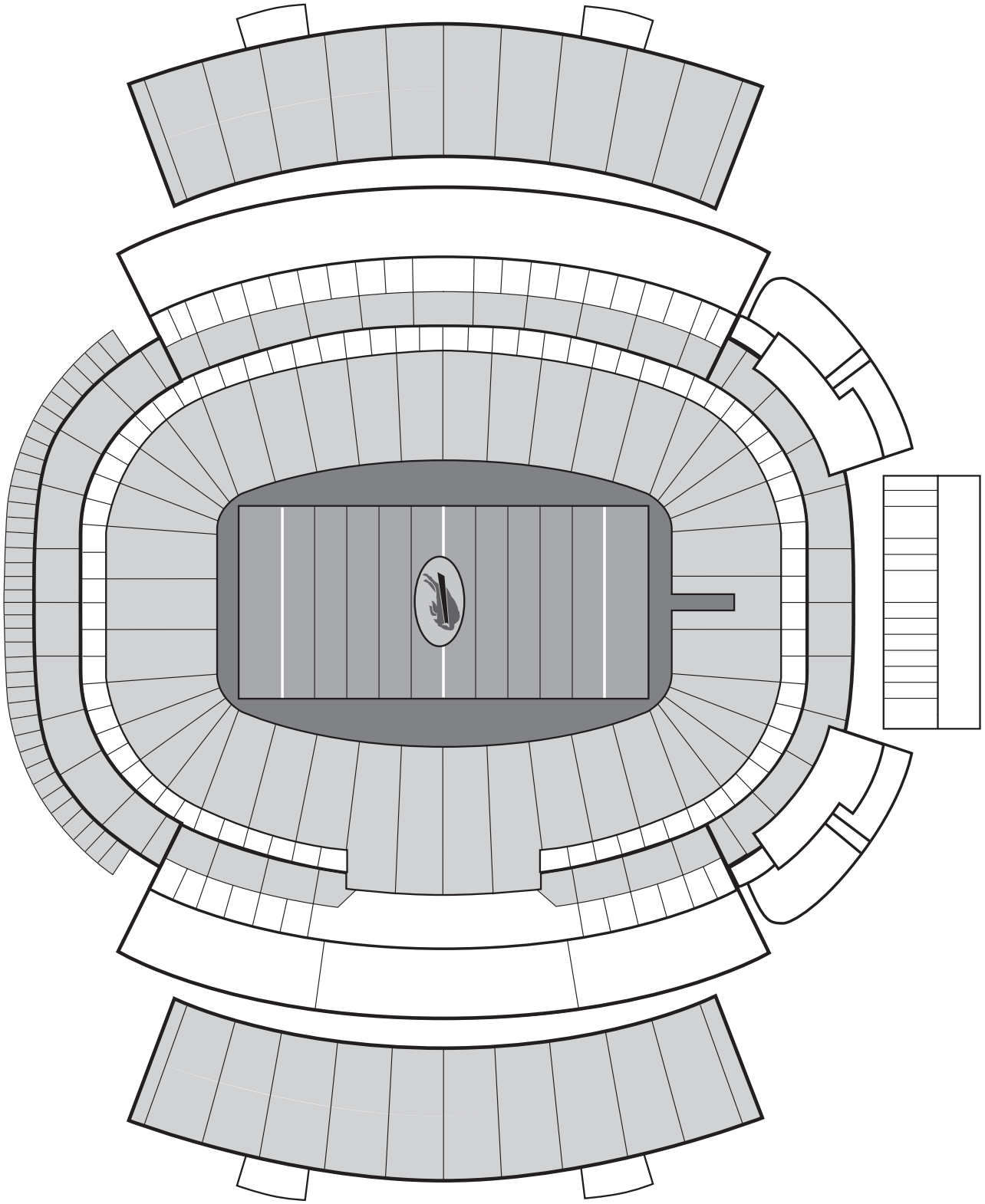


## TWO MINUTE DRILL

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N | Y | T | R | O | X | R | X | V | A | P | P | R | S | X |
| W | U | D | W | M | A | E | E | M | S | K | A | I | C | R |
| E | E | E | D | Y | E | R | T | K | D | L | R | E | K | U |
| V | Y | T | Z | H | T | V | G | R | U | F | A | Y | I | B |
| B | L | Y | D | I | O | E | Q | C | E | U | L | T | S | K |
| U | R | I | C | T | L | R | I | P | J | V | L | N | K | T |
| M | T | A | N | G | Y | D | I | Z | W | J | E | I | E | W |
| P | L | A | N | E | N | D | E | Z | V | V | L | O | W | O |
| I | F | A | L | E | Y | U | G | B | O | U | H | P | Z | T |
| M | Y | X | P | O | N | T | D | B | T | N | E | J | Z | L |
| C | D | R | I | N | T | E | R | S | E | C | T | I | N | G |
| K | E | W | T | O | A | S | L | Z | M | N | Y | A | E | G |
| P | H | K | Q | S | P | O | D | J | P | F | P | F | L | Q |
| P | D | T | X | O | K | V | H | N | D | Z | V | X | B | Z |
| T | N | E | M | G | E | S | X | X | W | M | A | D | P | B |

**ANGLE**
**HORIZONTAL**
**INTERSECTING**
**LINE**
**PARALLEL**
**PERPENDICULAR**
**PLANE**
**POINT**
**RAY**
**SEGMENT**
**SKEW**
**VERTEX**
**VERTICAL**

## RALPH WILSON STADIUM SEATING DIAGRAM



## CHALK TALK

| TERM | DRAW A GEOMETRIC PICTURE | FOOTBALL STADIUM EXAMPLE | DEFINE IN YOUR OWN WORDS |
|---|---|---|---|
| Point | | | |
| Plane | | | |
| Line | | | |
| Line Segment | | | |
| Vertical Line | | | |
| Ray | | | |
| Vertex | | | |

## CHALK TALK

| TERM | DRAW A GEOMETRIC PICTURE | FOOTBALL STADIUM EXAMPLE | DEFINE IN YOUR OWN WORDS |
|---|---|---|---|
| Horizontal Line | | | |
| Angle | | | |
| Intersecting Lines | | | |
| Parallel Lines | | | |
| Perpendicular Lines | | | |

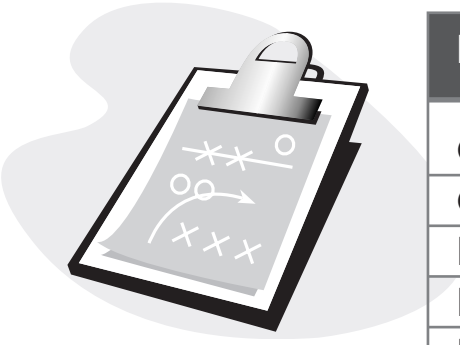
## GEOMETRY CONNECTIONS

1. State and support your viewpoint to the statement, "There are connections between geometry and real life."

2. List examples of geometric figures in a sport, hobby, or game that you participate in or watch.

**PLAN**
**WRITE**
**REVIEW**

## BILLS PRO SHAPES



| Position | Height | Arm Span |
|---|---|---|
| Quarterback | 6′5″ | 6′4″ |
| Quarterback | 6′3″ | 6′5″ |
| Linebacker | 6′1″ | 5′11″ |
| Linebacker | 5′9″ | 5′11″ |
| Fullback | 6′0″ | 6′0″ |
| Fullback | 6′0″ | 6′1″ |
| Wide Receiver | 6′0″ | 6′2″ |
| Wide Receiver | 5′11″ | 6′1″ |
| Center | 6′4″ | 6′1″ |
| Center | 6′2″ | 6′2″ |
| Tackle | 6′7″ | 6′6″ |
| Tackle | 6′8″ | 6′7″ |
| Cornerback | 6′0″ | 5′10″ |
| Cornerback | 5′11″ | 6′0″ |
| Running Back | 5′11″ | 6′0″ |
| Running Back | 5′9″ | 5′10″ |
| Guard | 6′5″ | 6′5″ |
| Guard | 6′3″ | 6′2″ |
| Tight End | 6′2″ | 6′4″ |
| Tight End | 6′5″ | 6′2″ |
| Defensive Tackle | 6′2″ | 6′1″ |
| Defensive Tackle | 6′4″ | 6′2″ |
| Defensive End | 6′7″ | 6′6″ |
| Defensive End | 6′2″ | 6′0″ |
| Safety | 5′11″ | 6′0″ |
| Safety | 6′0″ | 6′1″ |
| Kicker | 5′7″ | 5′9″ |
| Punter | 6′0″ | 6′2″ |

## BILLS PRO SHAPES

1. Choose 6 of the players from the Bills Pro Shapes table. Record their position, height, and arm span in inches. You will need to convert feet into inches before recording data in the chart.

2. Determine their rectangular shape. Check one of the three boxes for each player.

3. Calculate each player's perimeter and area and then record your answers in the chart.

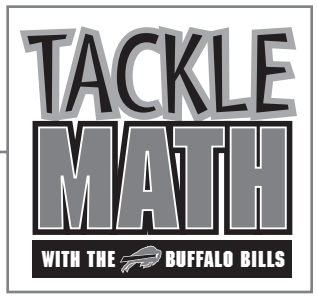
| Position | Height | Arm Span | Type of Rectangle | | | Perimeter | Area |
|---|---|---|---|---|---|---|---|
| | Inches | Inches | Tall | Just Right | Short | Inches | Inches$^2$ |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

4. Do any of your rectangles have the same perimeter (within an inch or two)? If so, are their areas about the same or are they quite a bit different?

5. Do you think that two rectangles with the same perimeter could have the same area? Why or why not?

**6.** What conclusions can you make based on your rectangles?

**THINK**
**SOLVE**
**EXPLAIN**




## FIELDS AND OTHER FIGURES

**1.** A football field is 100 yards between the goal lines and 160 feet between the sidelines. Determine the following:

The perimeter of a football field is _____ feet.
The area of a football field is _____ square feet.

**2.** Complete the graph below using the given data. Create rectangles whose perimeter equals 920 feet. Enter you data in the chart below. Use the Lotsadots page to help you visualize your rectangles. You will have to select a scale. **Example:** 1 unit = 20 feet

**Rectangles with Constant Perimeter**

| | Rectangle One | Rectangle Two | Rectangle Three | Rectangle Four | Rectangle Five |
|---|---|---|---|---|---|
| Width | 100 | | 280 | | |
| Length | | 175 | | 230 | |
| Perimeter | 920 | 920 | 920 | 920 | 920 |
| Area | | | | | |

**3.** What are the measurements of the rectangle with the largest area?
Length _____ feet Width _____ feet
Perimeter 920 feet Area _____ square feet

**4.** Is there anything special about this rectangle? Explain.

_____

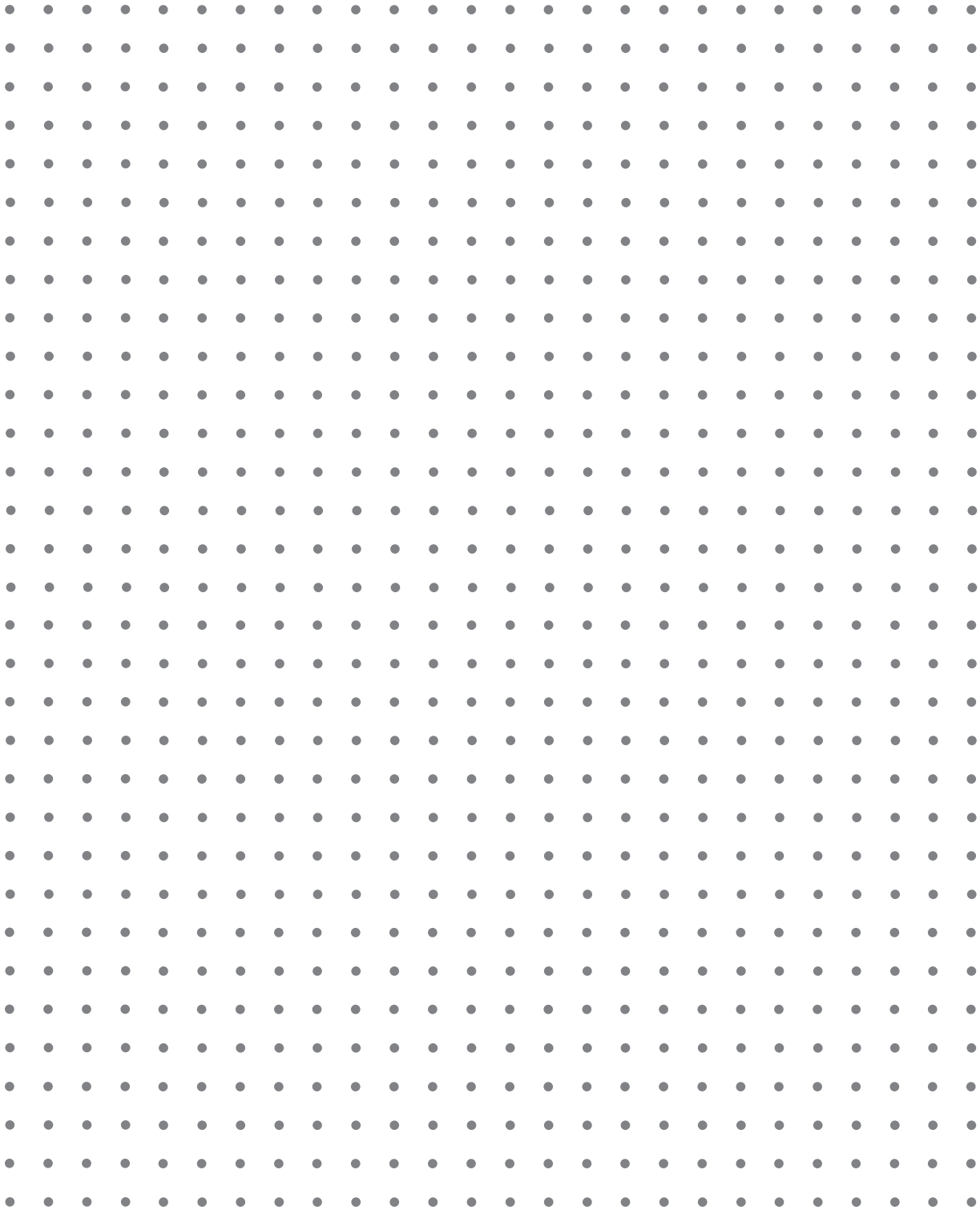
_____

**5.** Complete the following table by creating 5 different rectangles with an area of 36 square feet. Again, you can use the Lotsadota page to help you,

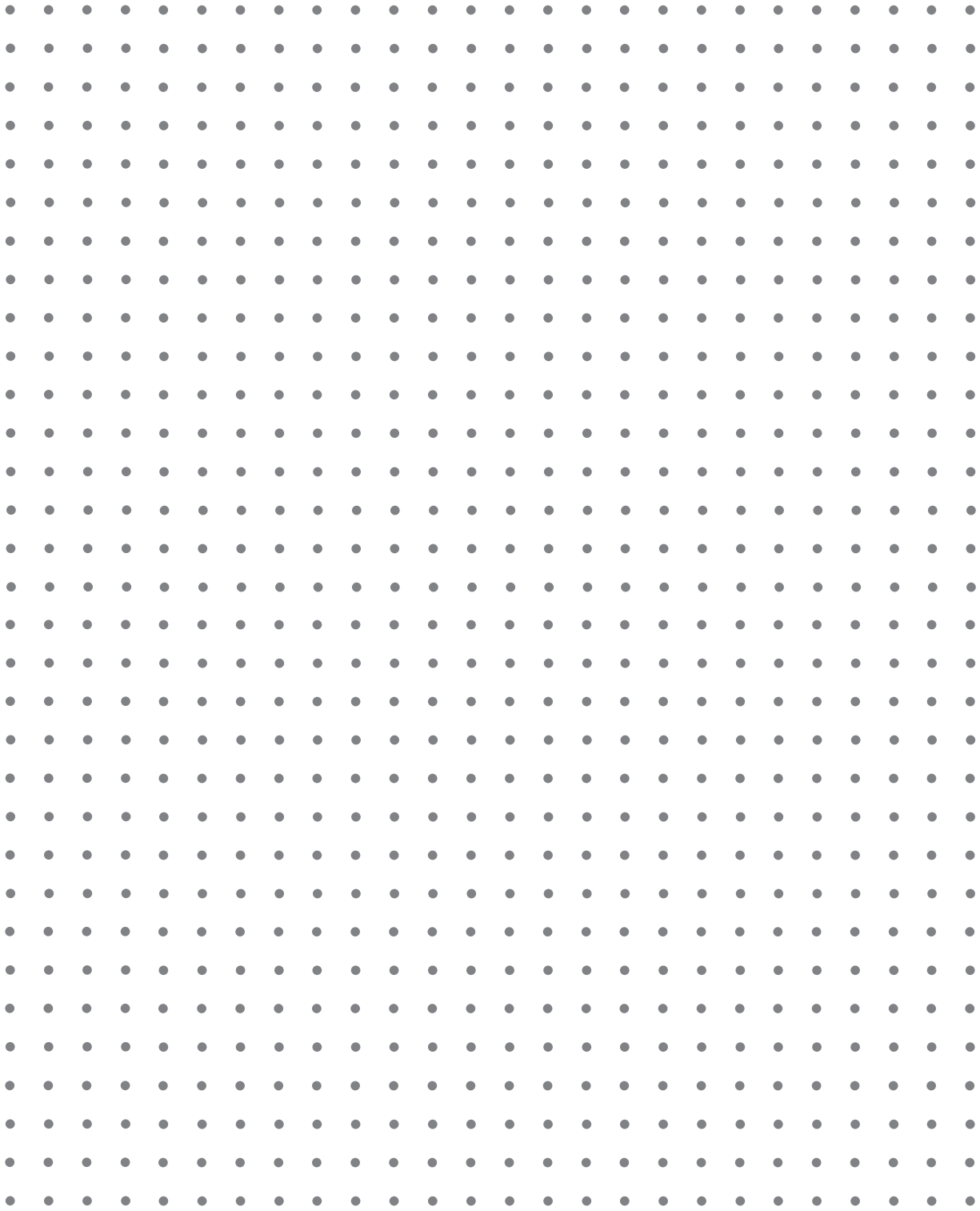
**Rectangles with Constant Area**

| | Rectangle One | Rectangle Two | Rectangle Three | Rectangle Four | Rectangle Five |
|---|---|---|---|---|---|
| Width | 12 | | | | |
| Length | | 9 | | | |
| Perimeter | | | | | |
| Area | 36 | 36 | 36 | 36 | 36 |

## LOTSADOTS



## LOTSADOTS



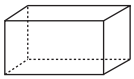
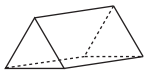
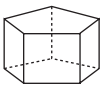
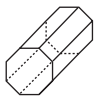
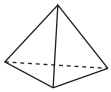
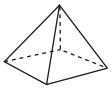
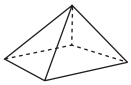
## OVERTIME

**THINK**
**SOLVE**
**EXPLAIN**

## Terms you shoud know:

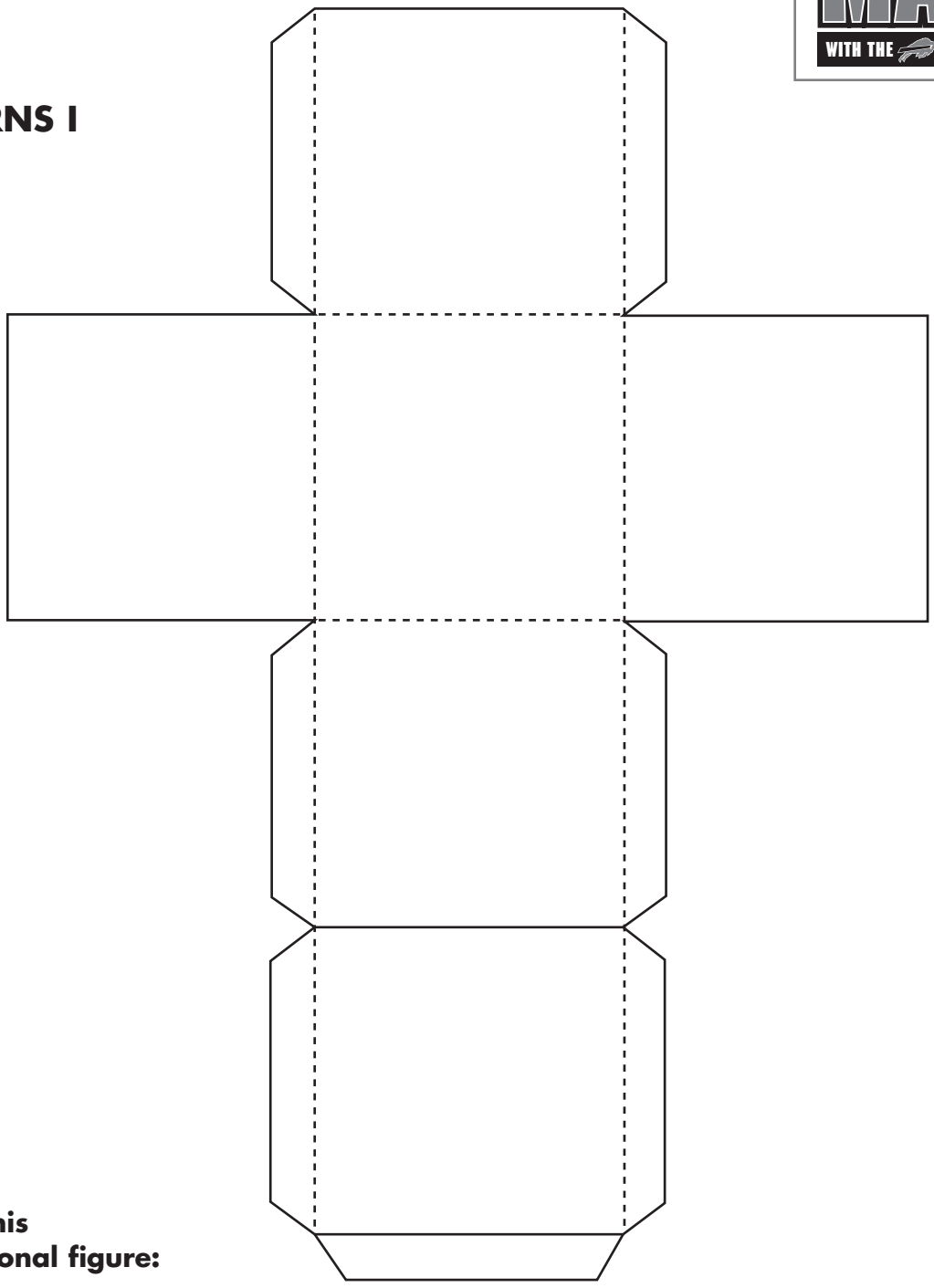
- Congruent
- Solid
- Polyhedron
- Prism

## Attributes of Great Shapes

| 3-D geometric figure | Number of bases | Shape of bases | V Number of vertices | F Number of faces | E Number of edges | |
|---|---|---|---|---|---|---|
| Cube  | | | | | | |
| Rectangular prism  | | | | | | |
| Triangular prism  | | | | | | |
| Pentagonal prism  | | | | | | |
| Octagonal prism  | | | | | | |
| Tetrahedron  | | | | | | |
| Square pyramid  | | | | | | |
| Rectangular pyramid  | | | | | | |
| Cylinder  | | | | | | |
| Cone  | | | | | | |

## 3-D PATTERNS I

### CUBE

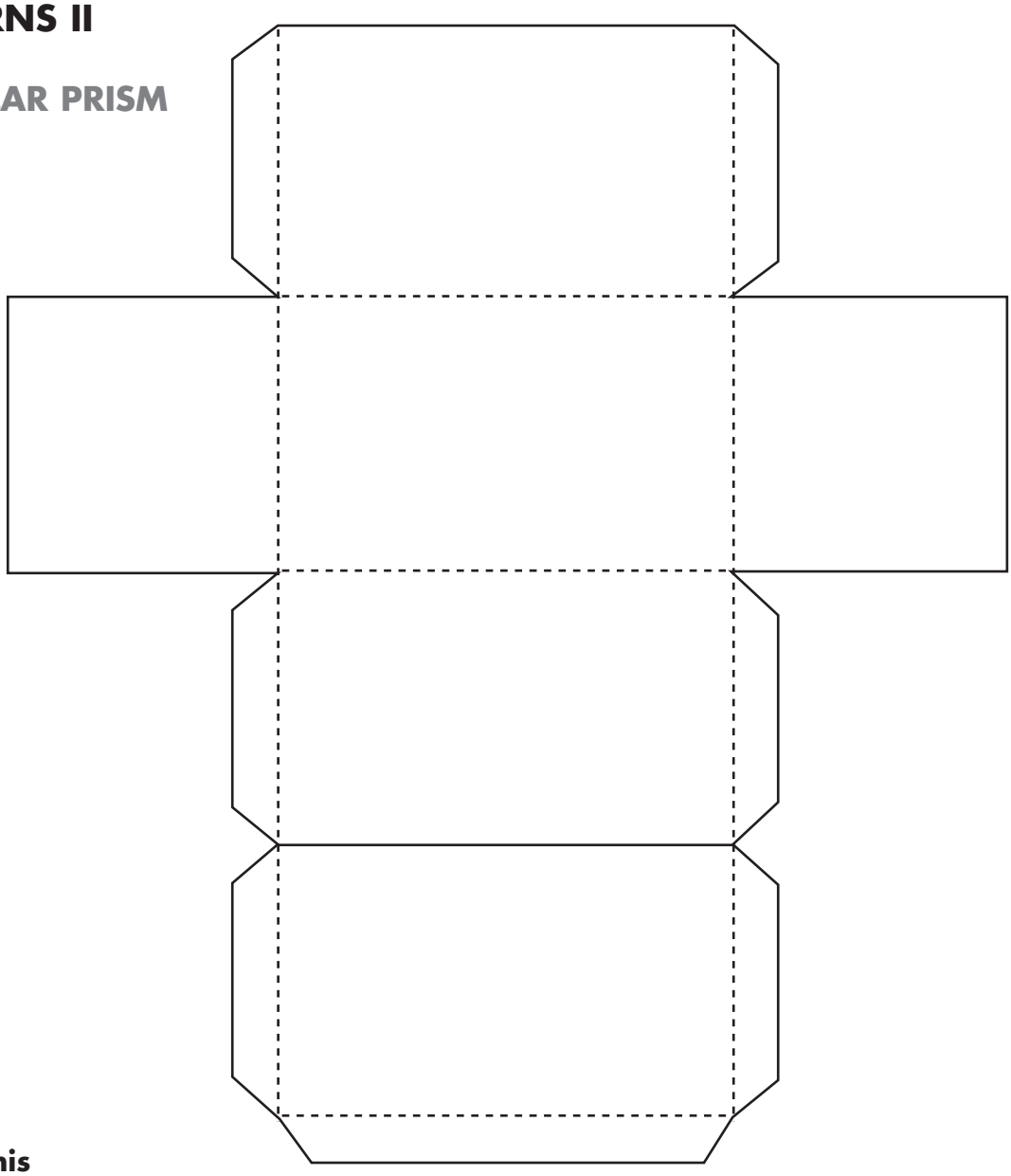


**To construct this three-dimensional figure:**

1. Cut out the pattern along the solid lines.
2. Fold the tabs along the dotted lines.
3. Fold the figure along the remaining dotted lines so that the three-dimensional shape is formed.
4. Glue the tabs to the corresponding sides of the three-dimensional shape.

## 3-D PATTERNS II

### RECTANGULAR PRISM

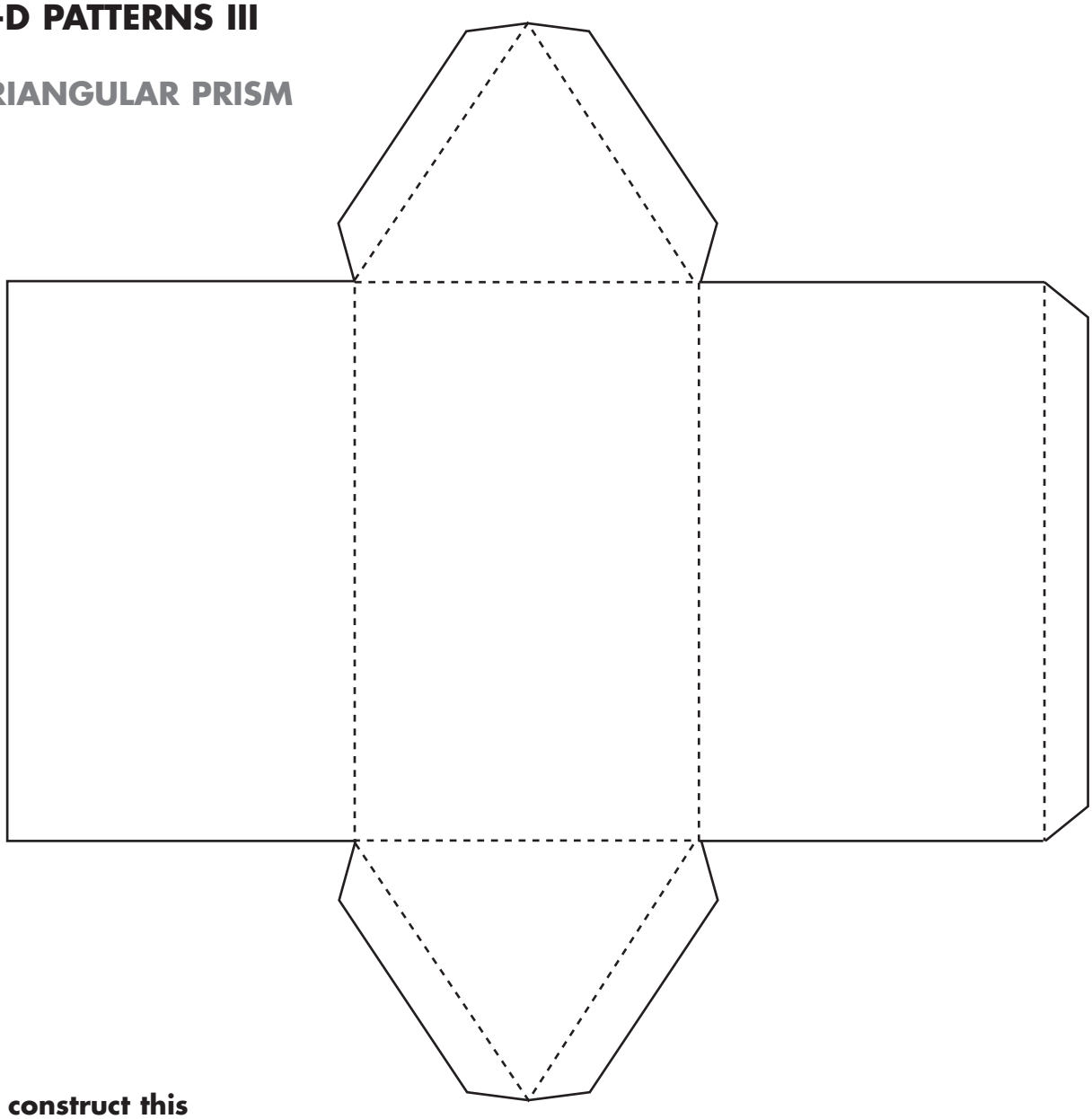


**To construct this three-dimensional figure:**

1. Cut out the pattern along the solid lines.
2. Fold the tabs along the dotted lines.
3. Fold the figure along the remaining dotted lines so that the three-dimensional shape is formed.
4. Glue the tabs to the corresponding sides of the three-dimensional shape.

## 3-D PATTERNS III

### TRIANGULAR PRISM



**To construct this three-dimensional figure:**

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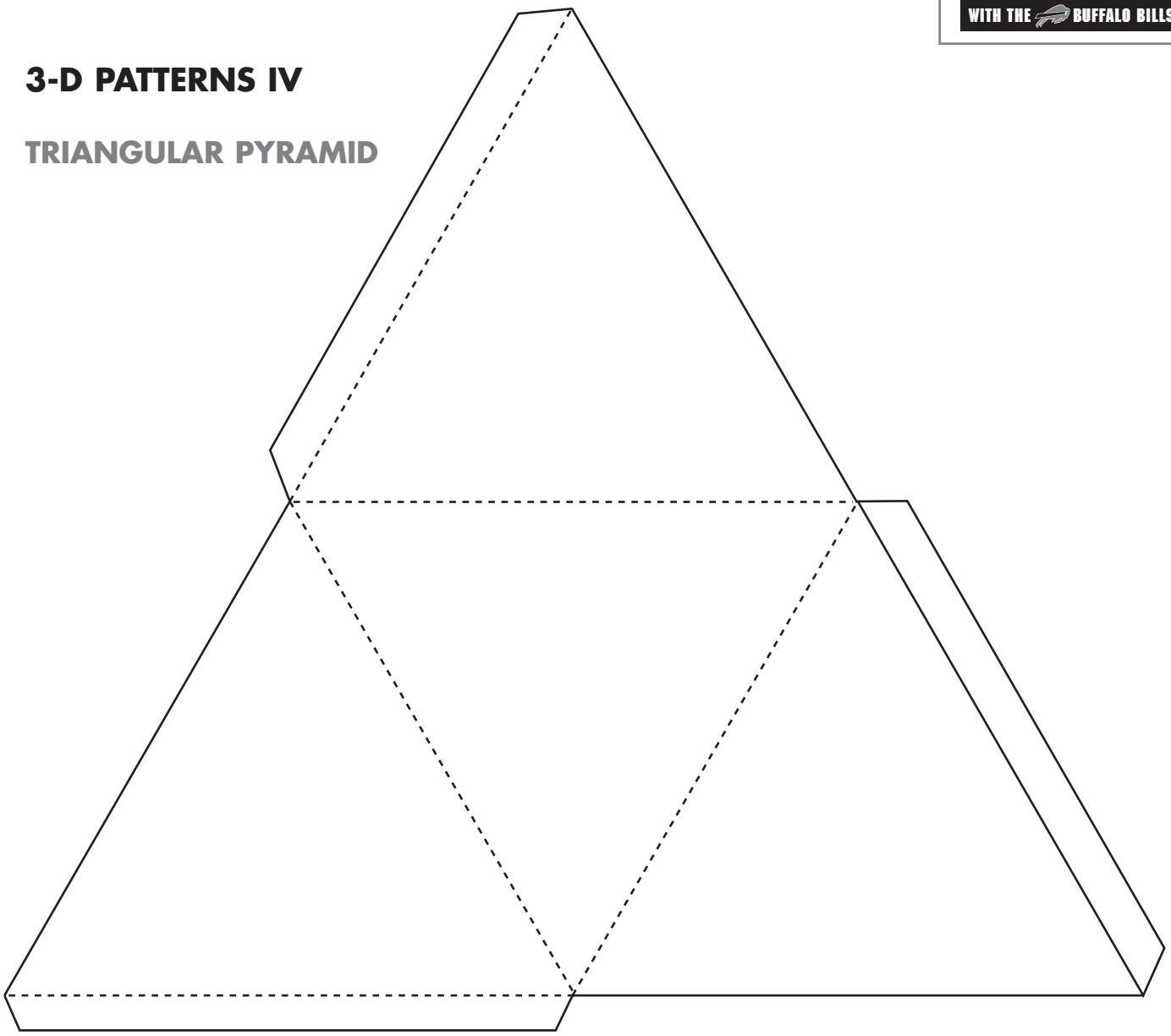
2. Fold the tabs along the dotted lines.
3. Fold the figure along the remaining dotted lines so that the three-dimensional shape is formed.
4. Glue the tabs to the corresponding sides of the three-dimensional shape.

## 3-D PATTERNS IV

### TRIANGULAR PYRAMID

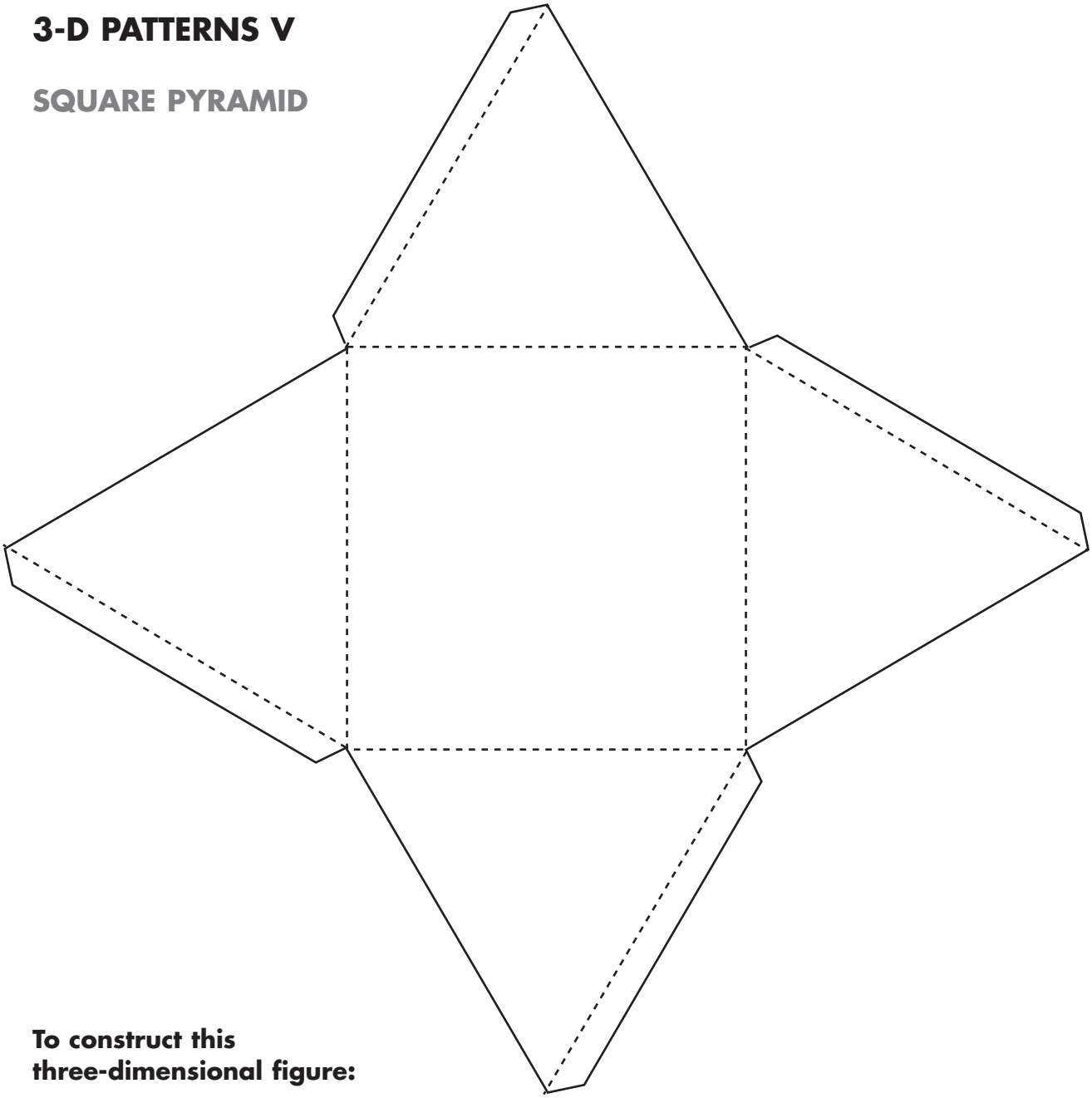


**To construct this three-dimensional figure:**

1. Cut out the pattern along the solid lines.
2. Fold the tabs along the dotted lines.
3. Fold the figure along the remaining dotted lines so that the three-dimensional shape is formed.
4. Glue the tabs to the corresponding sides of the three-dimensional shape.

## 3-D PATTERNS V

### SQUARE PYRAMID

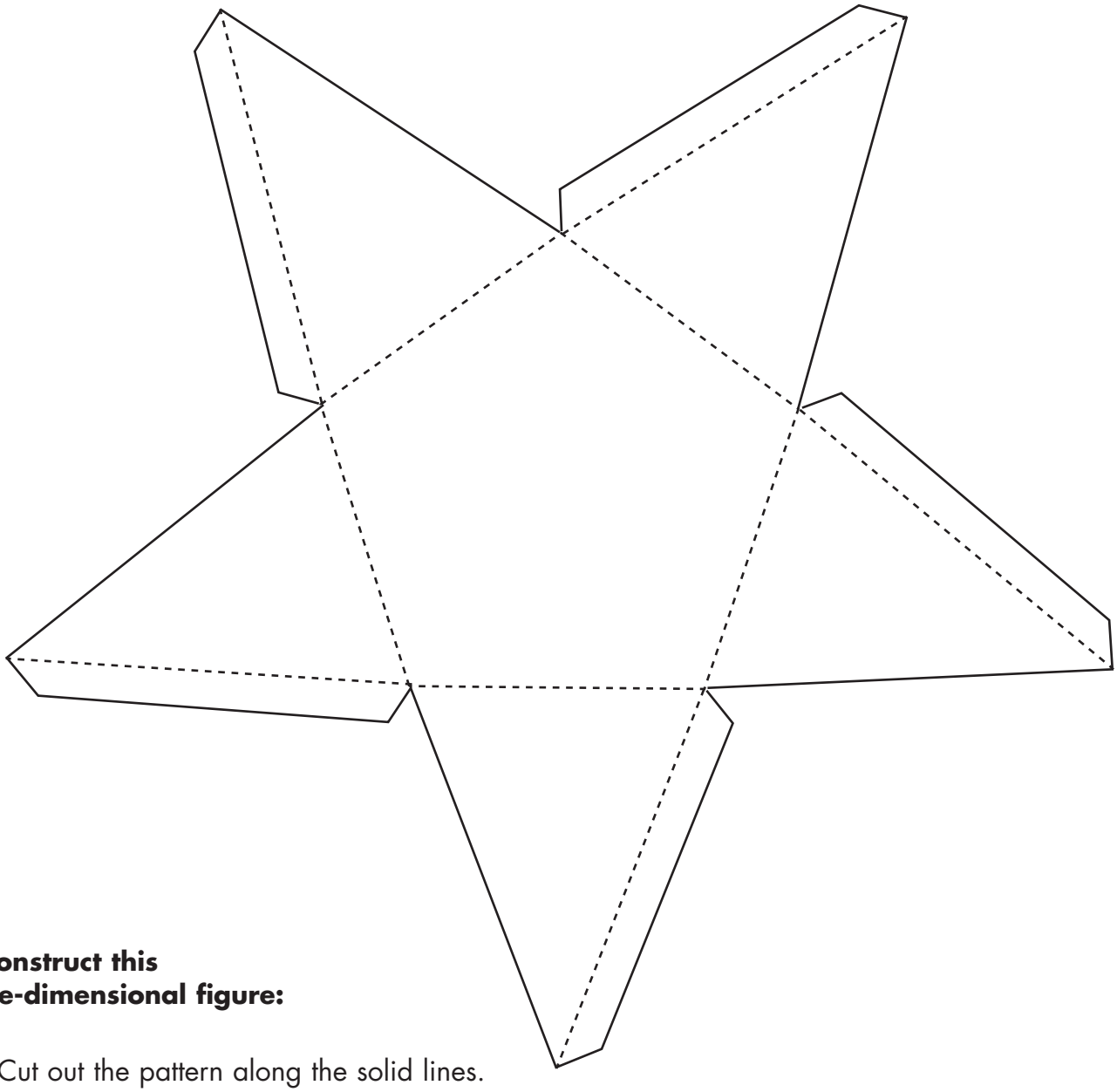


**To construct this three-dimensional figure:**

1. Cut out the pattern along the solid lines.
2. Fold the tabs along the dotted lines.
3. Fold the figure along the remaining dotted lines so that the three-dimensional shape is formed.
4. Glue the tabs to the corresponding sides of the three-dimensional shape.

## 3-D PATTERNS VI

### PENTAGONAL PYRAMID

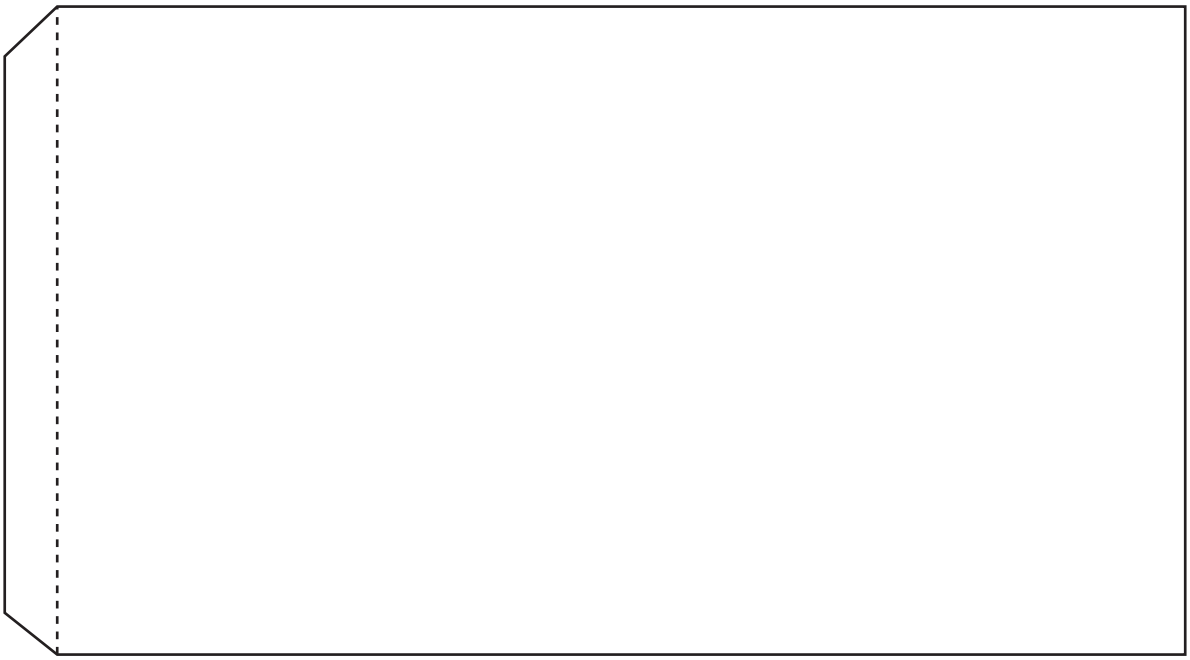


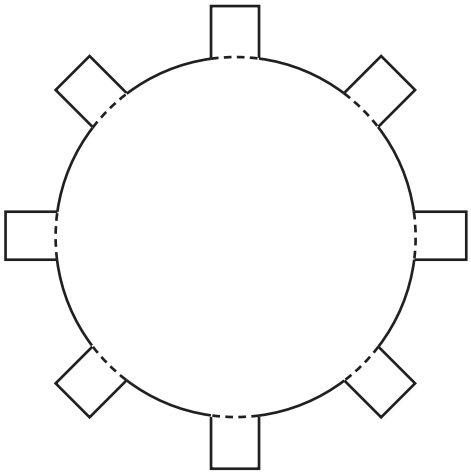
**To construct this three-dimensional figure:**

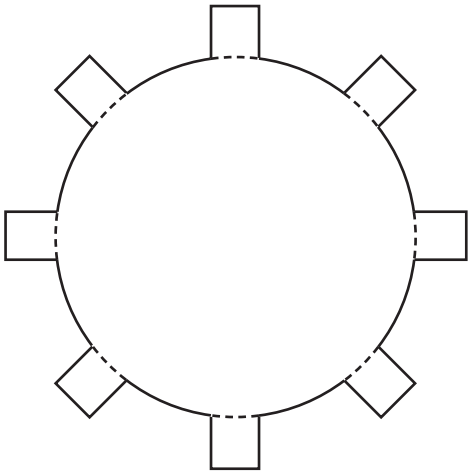
1. Cut out the pattern along the solid lines.
2. Fold the tabs along the dotted lines.
3. Fold the figure along the remaining dotted lines so that the three-dimensional shape is formed.
4. Glue the tabs to the corresponding sides of the three-dimensional shape.

## 3-D PATTERNS VII

### CYLINDER





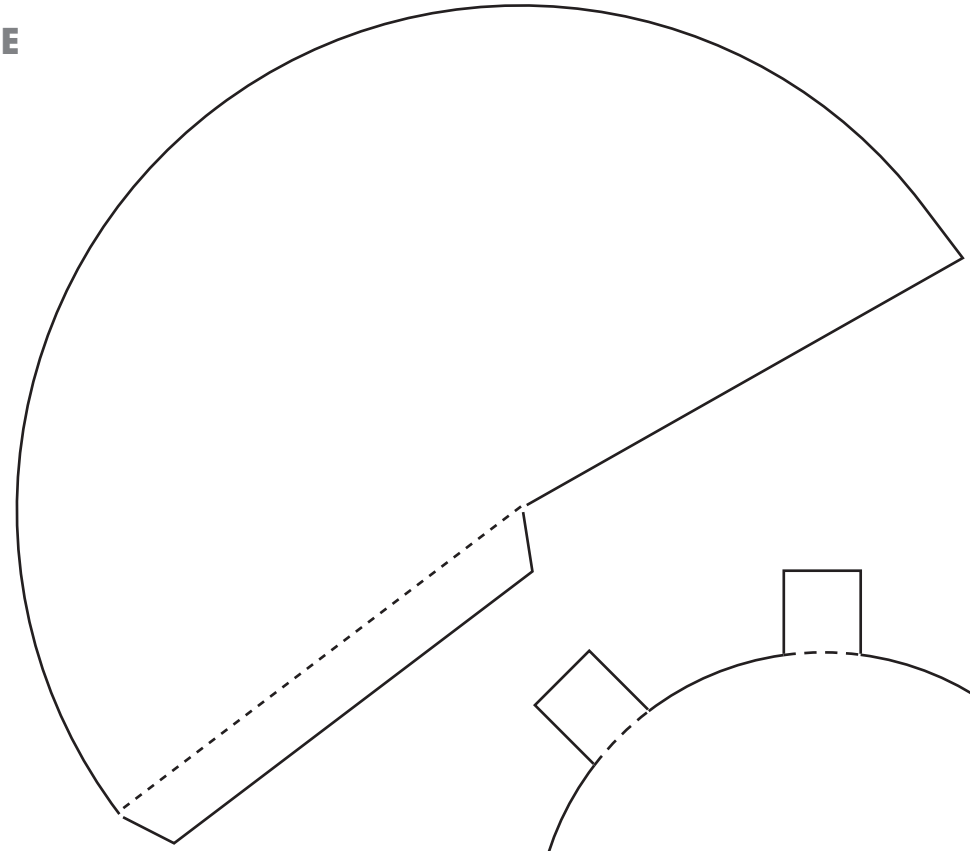


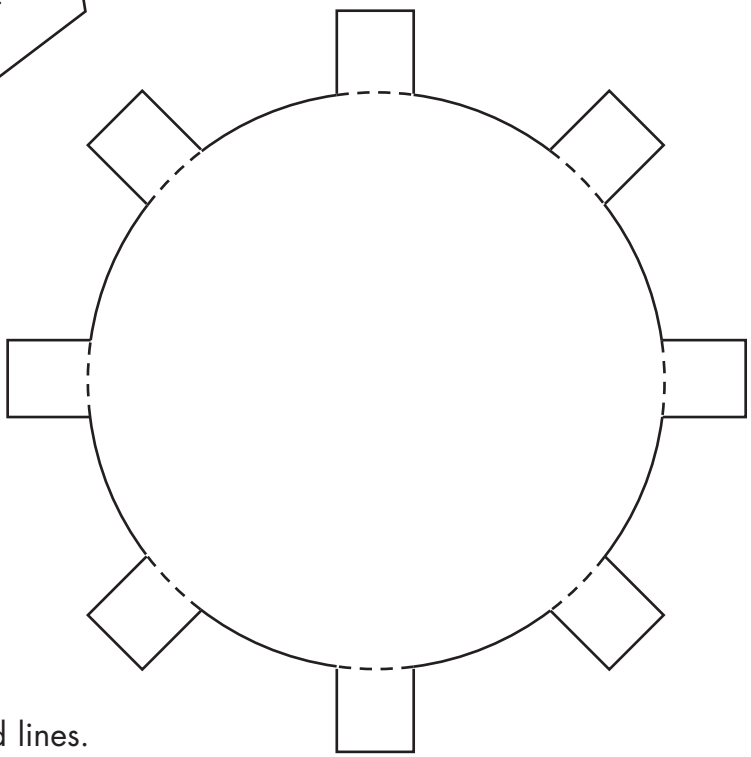
**To construct this three-dimensional figure:**

1. Cut out the pattern along the solid lines.
2. Fold the tabs along the dotted lines.
3. Fold the figure along the remaining dotted lines so that the three-dimensional shape is formed.
4. Glue the tabs to the corresponding sides of the three-dimensional shape.

## 3-D PATTERNS VIII

### CONE





**To construct this three-dimensional figure:**

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3. Fold the figure along the remaining dotted lines so that the three-dimensional shape is formed.
4. Glue the tabs to the corresponding sides of the three-dimensional shape.

## ISOMETRIC V

## INTRODUCTION TO TRANSFORMATIONS

List three types of transformations:

_____

_____

### FLIP–SLIDE–ROTATE

Use the three figures pictured on the grid on the next page to answer questions **1-4**. These figures may be transformed to other positions on the grid by translating, reflecting, or rotating them. Cut out the copies of these figures on the left of the grid to help you answer the questions.

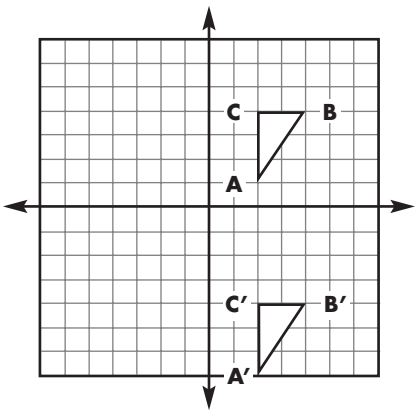
**1.** In the rectangle the coordinates of point S are (–6,3). Name the coordinates of the points P, Q, R.
P = _____ Q = _____ R = _____ S = _____

**2.** Rectangle PQRS is translated 4 units to the right and 3 units down. What are the new coordinates of the vertices?
P′ = _____ Q′ = _____ R′ = _____ S′ = _____

**3.** Triangle ABC is reflected across the y-axis. What will be the new coordinates?
A′ = _____ B′ = _____ C′ = _____

**4.** Parallelogram WXYZ is rotated 90 degrees counterclockwise. Z is the point of rotation. What are the new coordinates of the vertices?
W′ = _____ X′ = _____ Y′ = _____ Z′ = _____

**5.** In the figure pictured here, triangle ABC is transformed into triangle A′ B′ C′.
The coordinates of the vertices of A′B′C′ are:
A′ = (2, –7) B′ = (4, –4) C′ = (2, –4)




Describe a single transformation that would have this result.

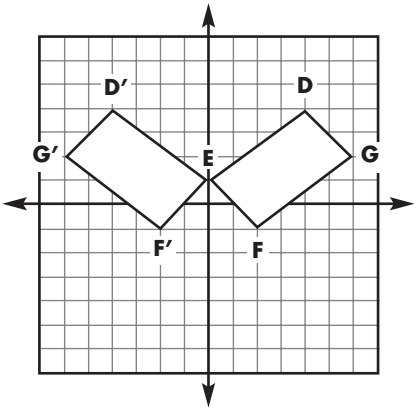
_____

_____

**6.** Rectangle DEFG is transformed into rectangle D′ E′ F′ G′. The coordinates of the vertices of E′ D′ G′ F′ are:

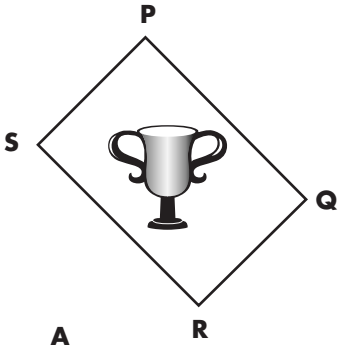
D′ = (–4, 4)  E′ = (0, 1)  F′ = (–2, –1)  G′ = (–6, 2)

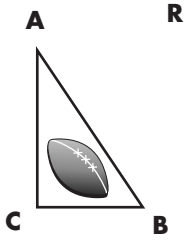
The figure was transformed by _____ it.

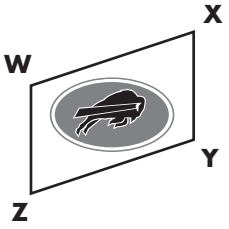


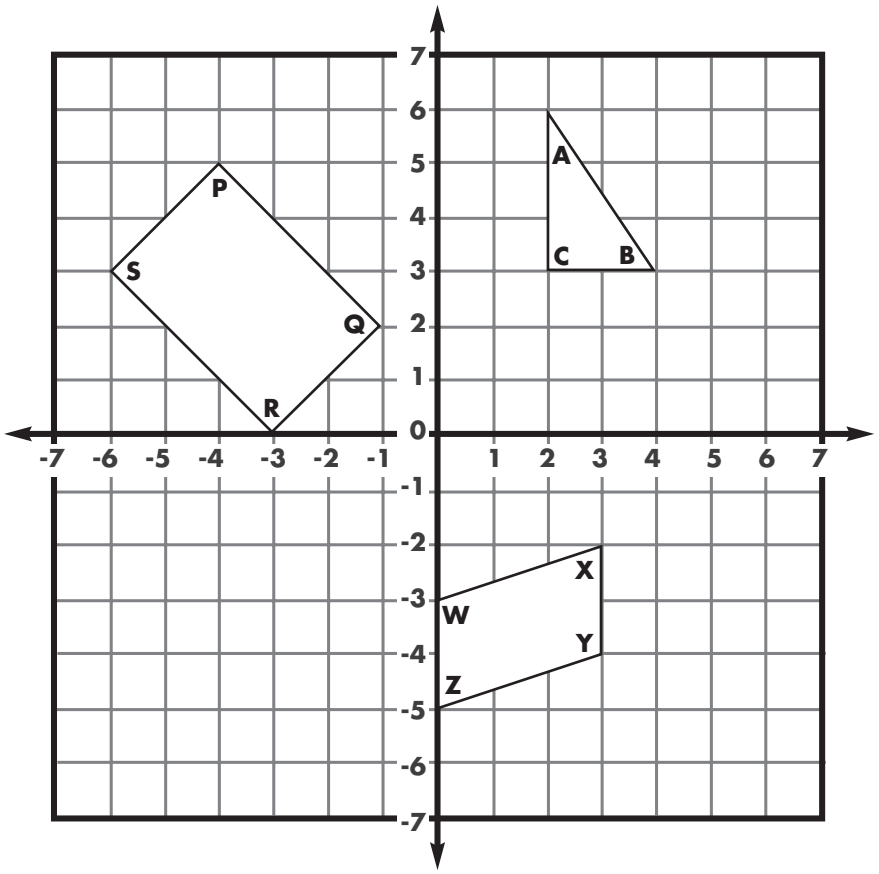

**FLIP–SLIDE–ROTATE DIAGRAM**

Three figures are pictured on this grid. They may be transformed to other positions on the grid by translating, reflecting, or rotating them. Cut out the copies of these figures on the left side of the page to help answer questions **1-4** on the previous page.



## TAILGATE PARTY

A company is buying tailgate party tickets for their employees. The tailgate party will be in the Ralph Wilson Stadium parking lot for the last home game of the season. Tickets cost either $99 per person or $149 per person. The company ordered twenty tickets at $99 and fifty tickets at $149. (Round answers to the nearest cent.)

**1.** What is the total cost for this event?

_____

**2.** What is the average cost per person for the party?

_____

The company must decide now if they wish to continue the tailgate tradition, because the cost of the tailgate party will increase next year.

**3.** If the $99 tickets increase 3.5%, what is the new cost of this ticket?

_____

**4.** If the $149 tickets increase 2.5%, what is the new cost of this ticket?

_____

**5.** What is the total cost for next year's party if twenty of the lower priced and fifty of the higher priced tickets are purchased?

_____

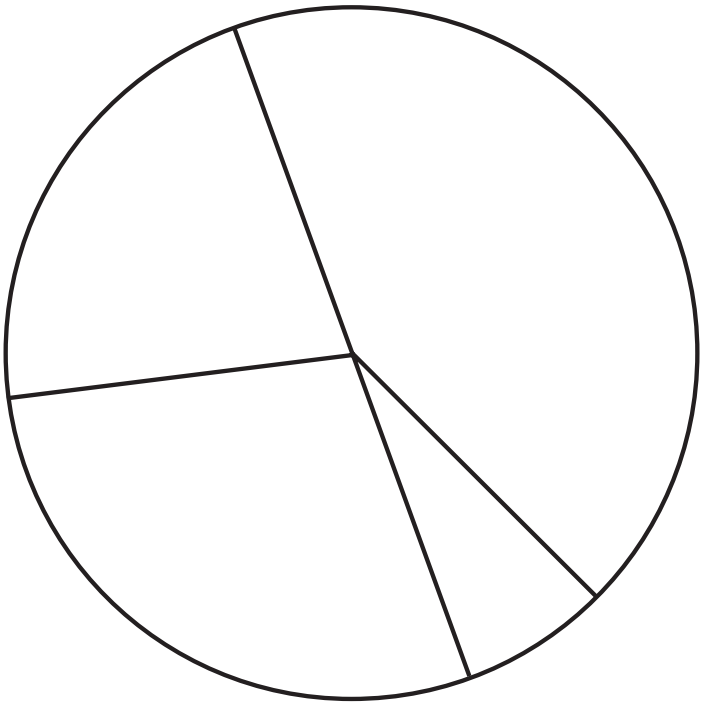
**6.** What is the total dollar increase for the $149 package (50 tickets)?

_____

**7.** The expenses for the Tailgate Party are shown below:

| | |
|---|---|
| **FOOD** | **30%** |
| **TICKETS** | **42%** |
| **PAPER PRODUCTS** | **8%** |
| **SOFT DRINKS** | |

**8.** Complete the circle graph below using the information from the chart above.



**BE SURE TO:**

- **Include a title**
- **Label each section**
- **Fill in percentages for each section**

Graph each point onto the given coordinate grid. Connect the series of points between breaks. What is the picture?

**OUTLINE**
(16, 25)
(19, 19)
(20, 16)
(20, 12)
(19, 4)
(18, 0)
(14, –14)
(11, –22)
(8, –23)
(8, –21)
(12, –8)
(8, –9)
(4, –10)
(2, –10)
(–4, –9)
(–10, –9)
(–14, –10)
(–17, –13)
(–18, –18)
(–21, –15)
(–22, –11)
(–21, –8)
(–18, –4)
(–19, –2)
(–22, 0)
(–18, 2)
(–20, 3)
(–18, 4)
(–16, 6)
(–18, 6)
(–22, 2)
(–20, 6)
(–17, 10)
(–14, 13)
(–10, 15)
(–5, 16)
(4, 15)
(10, 16)
(17, 20)
(16, 25)
**BREAK**

(–4, –3)
(–2, –2)
(2, –2)
(3, –3)
**BREAK**

(10, –13)
(9, –13)
(8, –14)
(10, –16)
(13, –17)
(14, –18)
(14, –19)
(13, –21)
(11, –22)
(8, –21)
(7, –21)
(8, –22)
(10, –23)
(13, –22)
(15, –20)
(15, –16)
(14, –14)
(13, –15)
(11, –14)
(10, –13)
**BREAK**

(5, –3)
(4, –1)
(2, 0)
(–1, 0)
(–4, –1)
(–5, –2)
(–6, –4)
(–5, –5)
(–2, –6)
(1, –6)
(3, –5)
(4, –4)
(5, –3)
**BREAK**

(4, –1)
(6, 1)
(8, 3)
**BREAK**

(–4, –1)
(–6, 0)
(–9, 3)
**BREAK**

(5, –2)
(8, 2)
(9, 3)
(10, 5)
(11, 9)
(10, 7)
(9, 6)
(7, 3)
(5, 1)
(3, 0)
**BREAK**

(–3, –1)
(–5, 0)
(–7, 2)
(–10, 5)
(–11, 8)
(–11, 5)
(–10, 2)
(–8, 0)
(–5, –2)
**BREAK**

(5, –3)
(8, –4)
(9, –4)
(7, –6)
(5, –7)
(2, –6)
(3, –5)
(6, –6)
(7, –5)
(4, –4)
**BREAK**

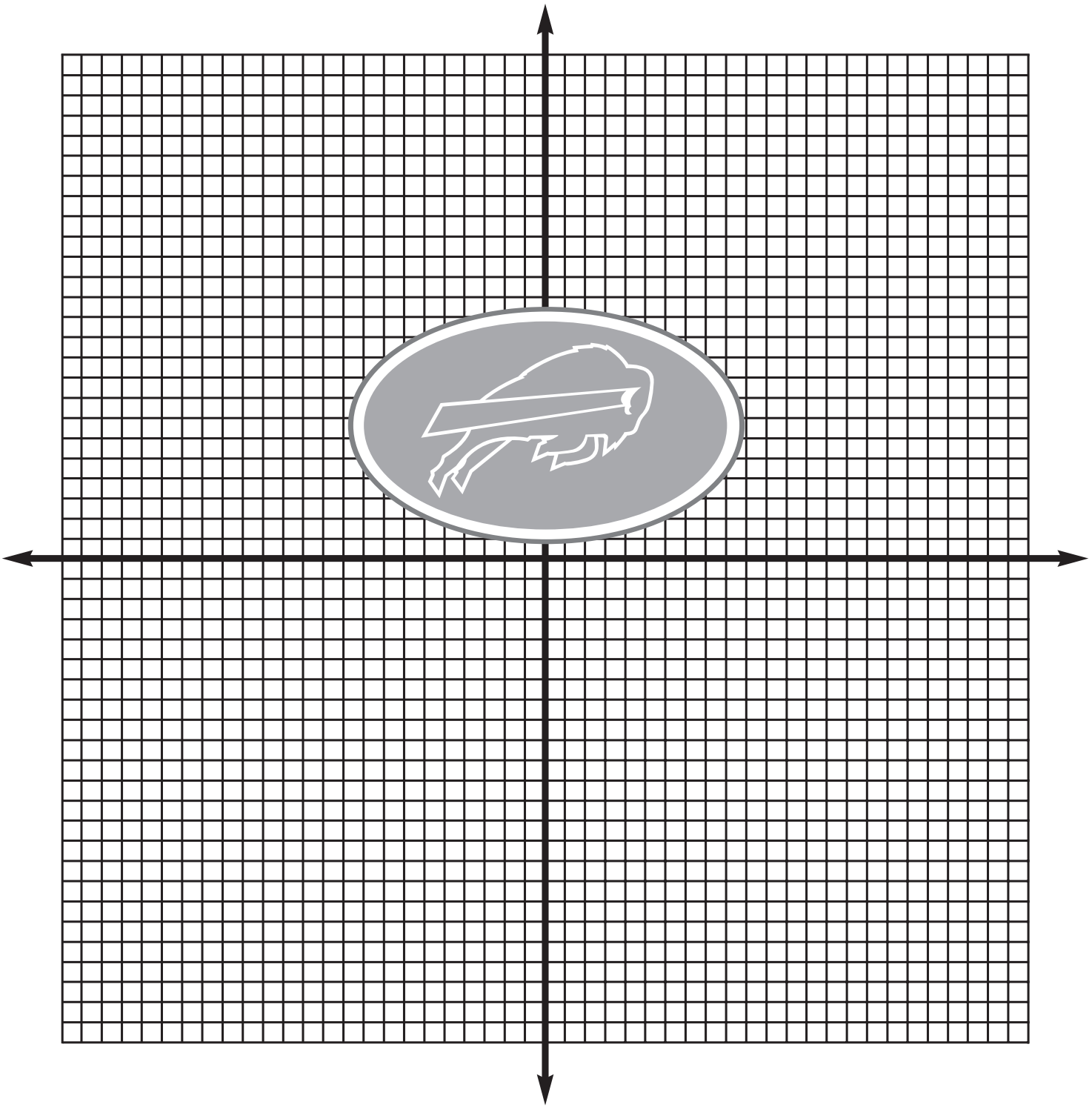
(–5, –3)
(–9, –5)
(–10, –4)
(–8, –7)
(–6, –7)
(–4, –6)
(–5, –5)
(–6, –6)
(–8, –6)
(–8, –5)
(–6, –4)
**BREAK**

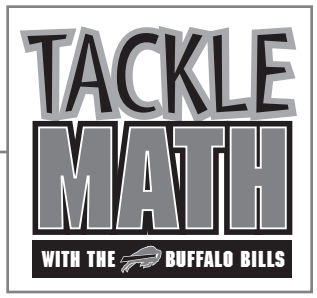
(–2, –1)
(–2, –3)
**BREAK**

(0, –1)
(0, –3)
**BREAK**

(2, –1)
(2, –3)
**BREAK**

## BILLS MYSTERY GRID






In the following exercise, solve each equation.
Then use the answers to decode the message.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 9 | 0 | –7 | 6 | | 7 | –6 | | 8 | 7 | –9 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| –3 | 8 | 0 | –5 | 7 | –2 | 4 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 10 | –1 | –1 | –7 | 1 | 0 | 8 | 8 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| –5 | –1 | –8 | | –2 | 5 | 5 | 3 | | –7 | –1 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| –3 | –4 | 0 | 2 | –7 | 7 | 2 | 5 | | –7 | –1 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 5 | | 4 | –1 | –1 | 3 |

**1)** Y + 17 = 12

**2)** S – 0 = $^{-}$6

**3)** U/4 = $^{-}$2

**4)** C – 7 = $^{-}$5

**5)** R/$^{-}$4 = 1

**6)** E + 11 = 16

**7)** 4L = 32

**8)** 4 = 0 + G

**9)** $^{-}$5 I = $^{-}$35

**10)** H/$^{-}$1 = $^{-}$6

**11)** 79B = 79

**12)** 16P = $^{-}$48

**13)** 12T = $^{-}$84

**14)** F + 3 = 13

**15)** N – 3 = $^{-}$5

**16)** 8D = 24

**17)** 6 + K = $^{-}$3

**18)** $^{-}$7 + M = 2

**19)** 3 – O = 4

**20)** A/$^{-}$249 = 0

**21)** What is the message?