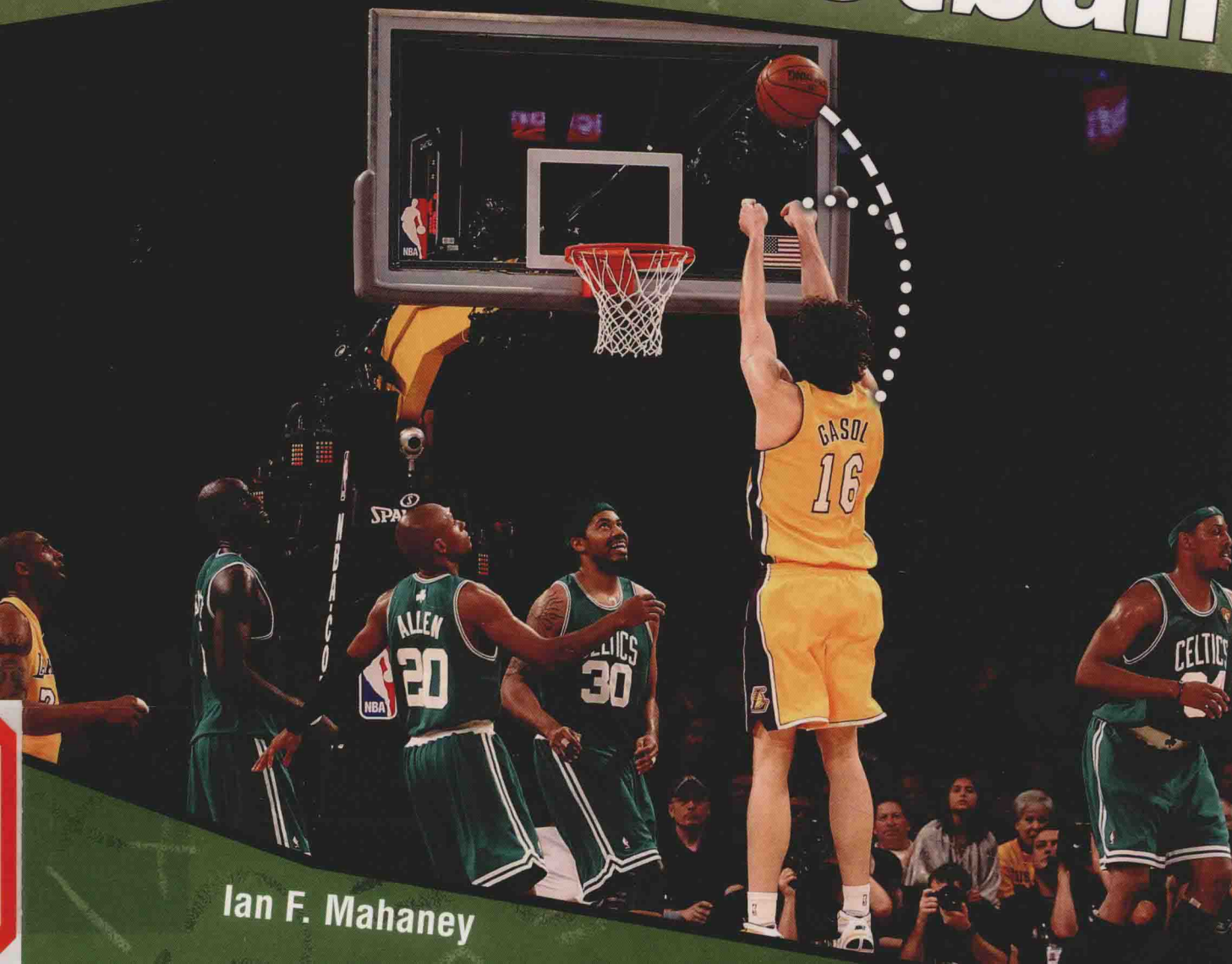
Sports Math

The Math of Basketball



Ian F. Mahaney

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Ian F. Mahaney

PowerKiDS press.
New York

For Brenda

Published in 2012 by The Rosen Publishing Group, Inc.
29 East 21st Street, New York, NY 10010

First Edition

Editor: Joanne Randolph
Layout Design: Greg Tucker

Photo Credits: Cover, pp. 10–11 (main), 16–17 Christian Peterson/Getty Images; pp. 4–5 Doug Pensinger/Getty Images; pp. 6 (inset), 7 (inset), 8 (inset), 11 (inset) Shutterstock.com; pp. 6–7 (main) Brian Babineau/NBAE/Getty Images; pp. 8–9 (main) Noah Graham/Getty Images; pp. 12–13 Otto Greule Jr./Getty Images; p. 14 (inset) Jamie Squire/Getty Images; pp. 14–15 (main), 18–19 Jonathan Daniel/Getty Images; pp. 20–21 Brian Bahr/Getty Images.

Library of Congress Cataloging-in-Publication Data

Mahaney, Ian F.
The math of basketball / by Ian F. Mahaney. — 1st ed.
p. cm. — (Sports math)
Includes index.
ISBN 978-1-4488-2593-6 (library binding) — ISBN 978-1-4488-2694-0 (pbk.) — ISBN 978-1-4488-2695-7 (6-pack)
1. Basketball—Mathematics—Juvenile literature. I. Title.
GV885.1.M35 2012
796.3230151—dc22

2010027917

Manufactured in the United States of America

CPSIA Compliance Information: Batch #WW11PK: For Further Information contact Rosen Publishing, New York, New York at 1-800-237-9932

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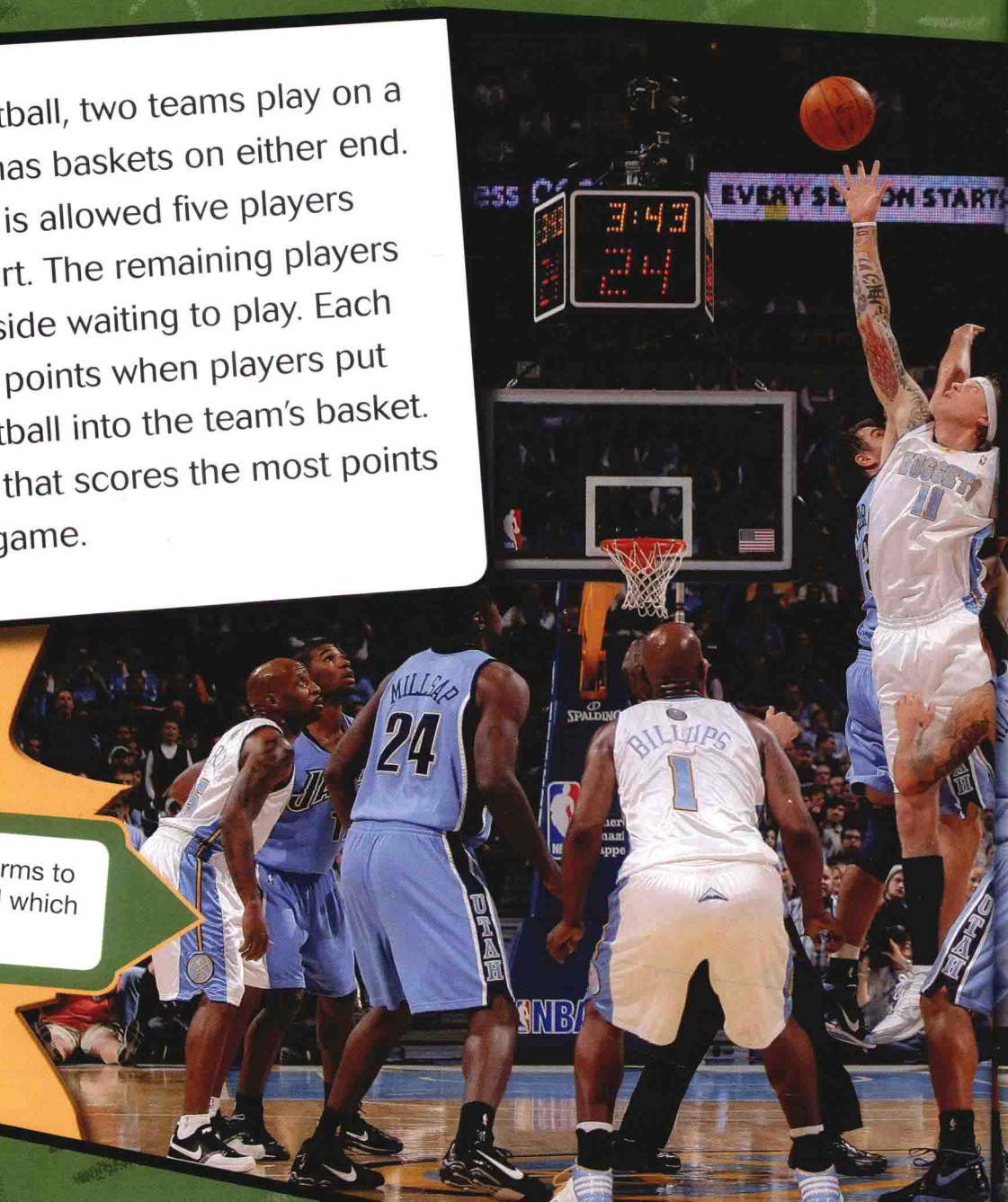
How Does Basketball Work?

In basketball, two teams play on a court that has baskets on either end. Each team is allowed five players on the court. The remaining players sit on the side waiting to play. Each team gets points when players put the basketball into the team's basket. The team that scores the most points wins the game.



Players wear uniforms to make it easy to tell which team they are on.

The team with the ball is called the **offense**. It is trying to score. The other team is the **defense** and tries to stop the offense from scoring.

Basketball is full of math. Your math skills can help you learn more about this fast-paced game.

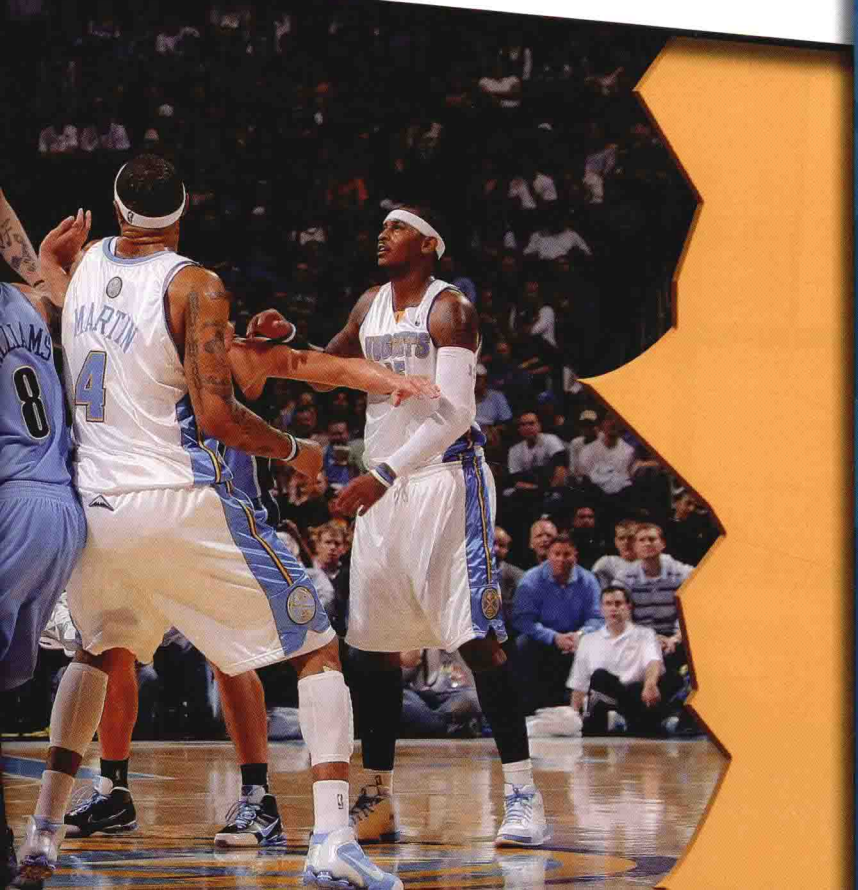


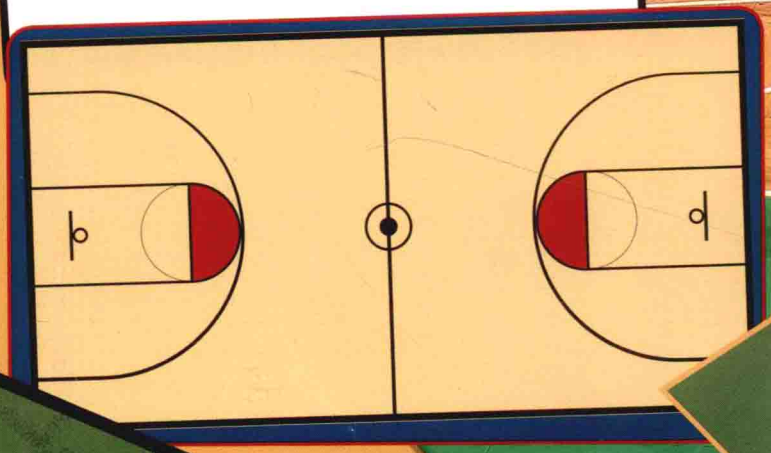
Figure It Out!

The Denver Nuggets have nine players in uniform for a game and five are playing on the court. How many players are waiting to play on the bench?

(See page 22 for the answers.)

Measuring the Court

A basketball court is shaped like a rectangle. The National Basketball Association (NBA) is a **professional league**. An NBA court is 94 feet (29 m) long and 50 feet (15 m) wide. The court is divided in half and each team defends one half. Do you want to figure out how



This picture shows what a basketball court looks like. The small circles with the lines behind them are the baskets.

much space each team defends? You would write the equation like this:

94 feet ÷ 2 = 47 feet.

To find the area of one half of the court, you would then write:

47 feet x 50 feet = 2,350 square feet.

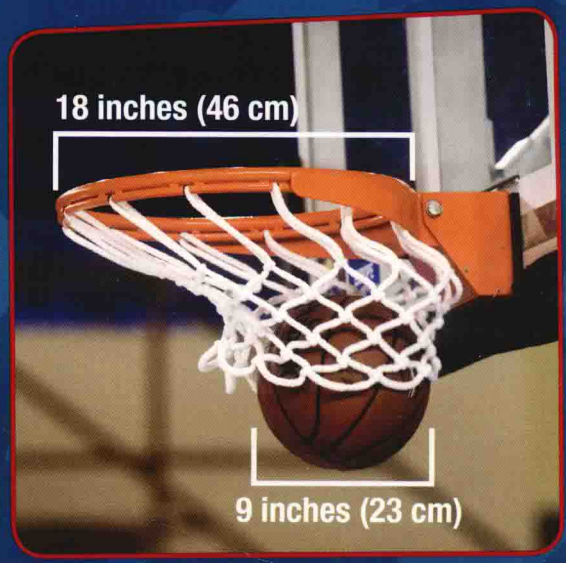
The two baskets are on either end of the court, along the short sides of the rectangle. The baskets are 10 feet (3 m) off the ground and measure 18 inches (46 cm) wide.

Here the player in maroon is trying to defend the basket from the offensive player in white.

Figure It Out!

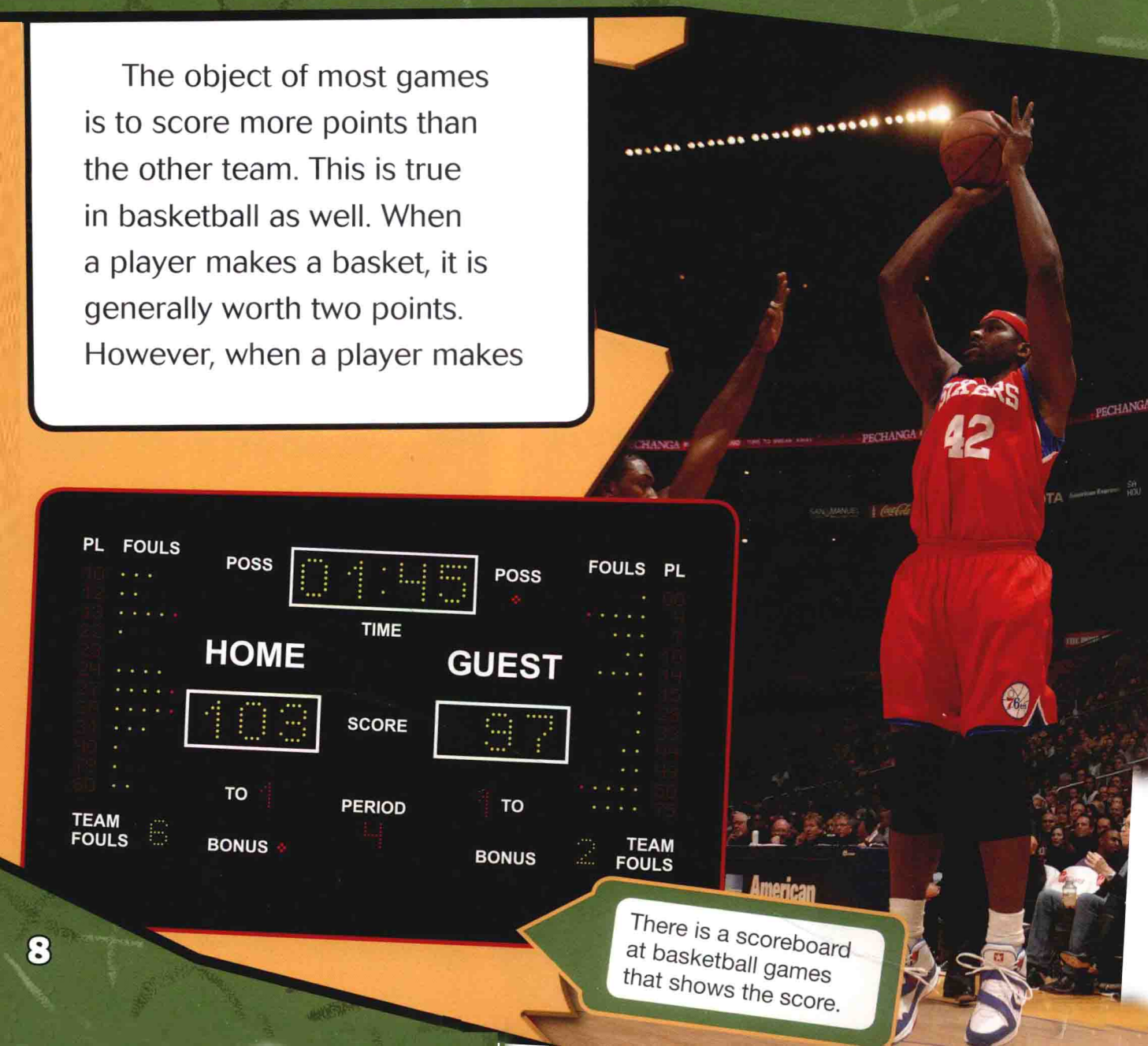
The ball's diameter is about 9 inches (23 cm). How much smaller is the basketball than the basket?

(See page 22 for the answers.)



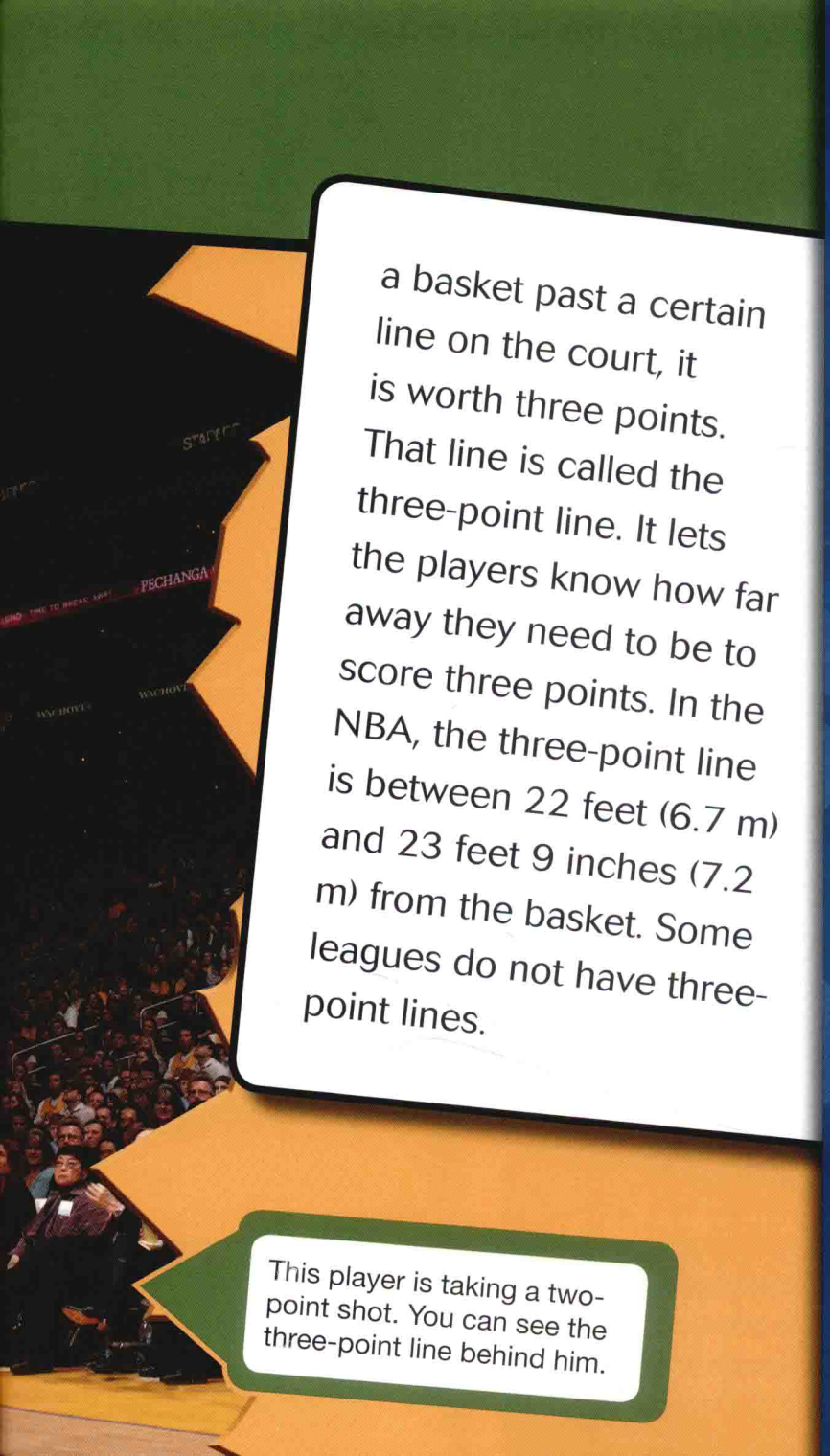
Point Math

The object of most games is to score more points than the other team. This is true in basketball as well. When a player makes a basket, it is generally worth two points. However, when a player makes



There is a scoreboard at basketball games that shows the score.

a basket past a certain line on the court, it is worth three points. That line is called the three-point line. It lets the players know how far away they need to be to score three points. In the NBA, the three-point line is between 22 feet (6.7 m) and 23 feet 9 inches (7.2 m) from the basket. Some leagues do not have three-point lines.



This player is taking a two-point shot. You can see the three-point line behind him.

Figure It Out!

A person can do some quick math to find out how far behind one team is from the other. Say the Denver Nuggets are losing to the Utah Jazz 92–84. How many points behind are the Nuggets? What is the fewest number of baskets they can make to take the lead?

(See page 22 for the answers.)

Fouls

The defense tries to do everything it can to stop the offense from scoring. This includes guarding the offensive players, or trying to keep them from getting passes or making shots.

In order to make the game fair, the defense has to follow certain rules when trying to stop the other team. The defense cannot push,

It's a Fact!

The offense can be charged with a foul, too. An offensive player cannot run over a defensive player when the defensive player is standing still. This is called a charge. When it happens, a foul is called. The other team gets the ball.

hit, hold on to, or run into an offensive player. If a defensive player breaks these rules, he gets a foul. Sometimes the offensive player receives free throws when he is fouled. A free throw is a chance to score while the person shooting is not defended. The players take free throws from the free-throw line. Each free throw made is worth one point.

Here Tony Allen of the Boston Celtics is fouling Kobe Bryant of the Los Angeles Lakers.

Candace Parker plays for the Los Angeles Sparks. She makes about 70 percent of the free throws she takes.

Figure It Out!

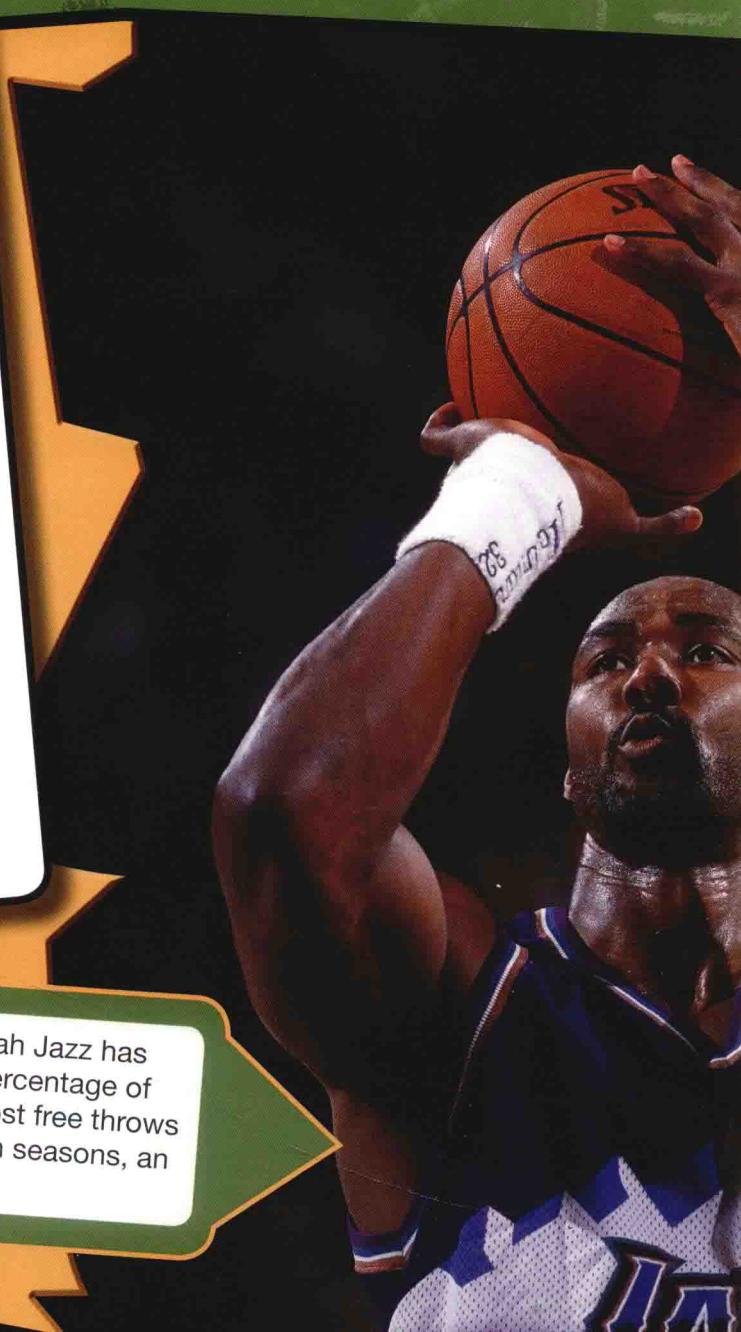
During a basketball game, free throws can add many points to a team's score. If the Los Angeles Sparks, a women's professional basketball team, score 4 three-point shots, 32 two-points shots, and 13 free throws, how many points have they scored?

(See page 22 for the answers.)

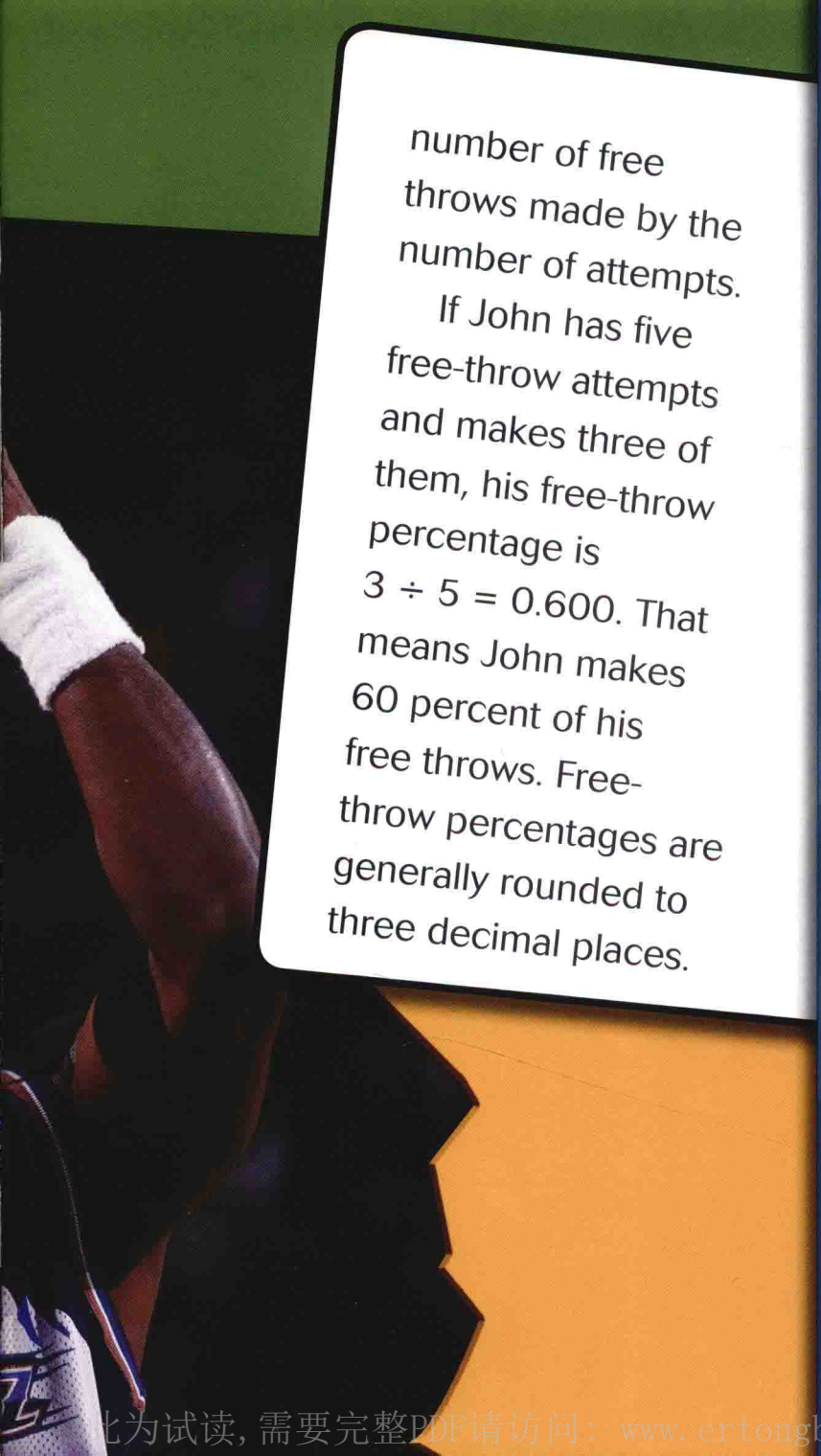
Free-Throw Percentages

Free throws are a great chance to score. Players that make the most of free throws add many points to their teams' score. Coaches and fans pay close attention to how often each player makes free throws instead of missing.

A free-throw percentage shows how often a player makes free throws. It is found by dividing the



Karl Malone of the Utah Jazz has a career free-throw percentage of .742. He made the most free throws in the league for seven seasons, an NBA record.



number of free throws made by the number of attempts.

If John has five free-throw attempts and makes three of them, his free-throw percentage is $3 \div 5 = 0.600$. That means John makes 60 percent of his free throws. Free-throw percentages are generally rounded to three decimal places.

Figure It Out!

If a player gets 15 free throws and makes 4 of them, what is her free-throw percentage?

A) $15 + 4 = 19\ \%$
B) $15 \div 4 = 3.750$
C) $4 \div 15 = 0.266$

(See page 22 for the answers.)