Mr. Tu's Excellent Examples

Module 12
Baseball Groundskeeper

Use the picture on page 100 of the official dimensions of a major league baseball field to solve any questions concerning the baseball field.
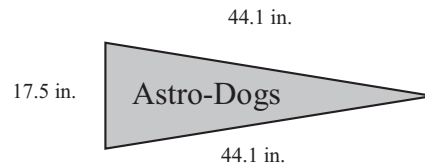
Applying Lesson 12.1

1. When a batter hits a homerun he runs the perimeter of the infield. If each side is the distance between the bases, how far does the batter run?

   The batter runs 360 feet.

2. The pitcher's mound has an 18-foot diameter. What is the circumference of the pitcher's mound?

   The circumference of the pitcher's mound is about 56.52 feet.

3. Look at the baseball pennant below. What is the perimeter of the pennant?

44.1 in.

17.5 in.   Astro-Dogs

44.1 in.

The perimeter of the pennant is 105.7 inches.

Applying Lesson 12.2

1. What is the area of the portion of the infield inside the bases?

90 x 90 = 8,100

The area of the infield inside the bases is 8,100 square feet.

2. What is the area of the pitcher's mound?

$3.14 \times 9^2 = 254.34$

The area of the pitcher's mound is about 254.34 square feet.

3. The home plate circle has a diameter of 26 feet. What is the area of the home plate circle?

$3.14 \times 13^2 = 530.66$

The area of the home plate circle is about 530.66 square feet.
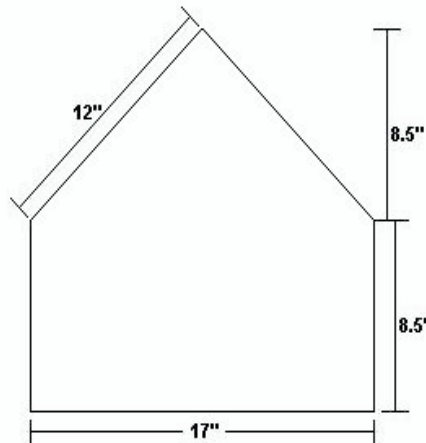
4. The on-deck circle has a diameter of 5 feet. What is the area of the on-deck circle?

$3.14 \times 2.5^2 = 19.625$

The area of the on-deck circle is about 19.625 square feet.

Applying Lesson 12.3

1. Look at the diagram of the home plate. What is the area in square inches?

17 x 8.5 + ½(17 x 8.5) = 144.5 + 72.25 = 216.75

The area of the home plate is 216.75 square inches.

2. Each batter's box measures 4 feet by 6 feet. What is the area of a 26-foot diameter home plate circle without the batter's boxes?

2(4 x 6) = 48
13^2 x 3.14 = 530.66
530.66 – 48 = 482.66

The area of the home plate circle without the batter's boxes is about 482.66 square feet.

Applying Lesson 12.4

1. The groundskeeper at a baseball stadium rolls the field with a cylinder that is 6 feet wide and has a diameter of 5 feet. How much area is covered with each turn of the roller? (Hint: This can be computed by calculating the lateral surface area of the cylinder.)

5 x 3.14 = 15.7 ft
15.7 x 6 = 94.2

The area covered by each turn of the cylinder is about 94.2 square feet.

2. A baseball has a 9-inch circumference. What is the surface area of a baseball?
   (Hint: First, determine the radius to the nearest hundredth.)

$$9 \div 3.14 = 2.87$$
$$2.87 \div 2 = 1.435 \text{ or } 1.44$$
$$4 \text{ x } 3.14 \text{ x } 1.44^2 = 26.04$$

The surface area of the baseball is about 26.04 square inches.

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Applying Lesson 12.5

1. A contractor is pouring pier foundations (cylinders) at a baseball stadium to
   support new light poles. Each foundation has a 6-foot diameter and is 25 feet
   deep. How many cubic feet of concrete will this foundation contain?

$$3.14 \text{ x } 3^2 \text{ x } 25 = 706.5$$

Each pier foundation will contain about 706.5 cubic feet of concrete.

2. For publicity, a baseball team created a giant baseball-shaped balloon.
   The balloon will have a 10-foot radius. To determine how much helium will be
   required to fill the balloon, the volume of the balloon must be calculated. What is
   the volume of the balloon in cubic feet?

$$\frac{4}{3} (3.14) \text{ x } 10^3 = 4,186.67$$

The volume of the balloon is about 4,187 cubic feet.

Applying Lesson 12.6 and 12.7

1. The baseball team uses cone-shaped paper cups for their water. The cups have a diameter of 7 centimeters and a height of 10 centimeters. To the nearest centimeter, how many cubic centimeters of water can each cup contain?

$$\frac{1}{3}(3.14)(3.5)^2(10) = 128.22$$

Each cup can hold about 128 cubic centimeters of water.

2. What is the lateral surface area of each cup? The slant height is 10.3 centimeters.

$$(3.14)(3.5)(10.3) = 113.197$$

The lateral surface area of the cup is about 113.197 square centimeters.

99

Use this diagram of the official dimensions of a major league baseball field to solve the questions concerning a baseball field.

INFIELD / OUTFIELD GRASS LINE: 95 ft. radius from front of Pitching Rubber

SECOND BASE

INFIELD

90 ft. between Bases

Third Base to First Base:
127 ft., 3-3/8 in.
(also Home Plate to
Second Base)

FOUL LINE

FOUL LINE

THIRD BASE

PITCHING MOUND:
18 ft. diameter
circle

FIRST BASE

13 ft. arcs
around Bases

COACH'S BOX

90 ft. between Bases

PITCHING RUBBER
to Home Plate:
60 ft., 6 in.

COACH'S BOX:
15 ft. from Foul Line
20 ft. w. x 5 ft. d.

BATTER'S
BOXES

Home Plate Area:
26 ft. circle

HOME PLATE

ON-DECK
CIRCLE:
5 ft. diameter

ON-DECK
CIRCLE

CATCHER /
UMPIRE BOX

BACKSTOP, GRANDSTAND or
FENCE: minimum 60 ft. from
Home Plate to Foul Lines.