

FIND THE AREA OF A CIRCLE WITH A DIAMETER OF 16 INCHES. USE 3.14 FOR PI. A. 50.24 IN² B. 100.48 IN² C. 200.96

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UNDERSTANDING HOW TO FIND THE AREA OF A CIRCLE IS A FUNDAMENTAL SKILL IN GEOMETRY, APPLICABLE IN VARIOUS FIELDS SUCH AS ENGINEERING, DESIGN, AND EVERYDAY PROBLEM-SOLVING. WHEN GIVEN THE DIAMETER OF A CIRCLE, CALCULATING ITS AREA INVOLVES A STRAIGHTFORWARD PROCESS, ESPECIALLY WHEN USING AN APPROXIMATE VALUE FOR PI, LIKE 3.14. IN THIS ARTICLE, WE WILL FOCUS ON FINDING THE AREA OF A CIRCLE WITH A DIAMETER OF 16 INCHES, ILLUSTRATING THE CALCULATION PROCESS AND PROVIDING USEFUL INSIGHTS. WE WILL ALSO EXPLORE HOW THE OPTIONS A. 50.24 IN², B. 100.48 IN², AND C. 200.96 IN² RELATE TO THE PROBLEM, HELPING YOU UNDERSTAND WHICH ANSWER IS CORRECT AND WHY.

UNDERSTANDING THE BASICS: DIAMETER, RADIUS, AND AREA OF A CIRCLE

WHAT IS THE DIAMETER OF A CIRCLE?

THE DIAMETER OF A CIRCLE IS THE LONGEST DISTANCE ACROSS THE CIRCLE, PASSING THROUGH ITS CENTER. IT MEASURES THE FULL WIDTH OF THE CIRCLE AND IS CRUCIAL IN CALCULATING THE AREA BECAUSE IT RELATES DIRECTLY TO THE RADIUS.

RELATIONSHIP BETWEEN DIAMETER AND RADIUS

THE RADIUS OF A CIRCLE IS HALF OF ITS DIAMETER:

- $R = \text{DIAMETER} / 2$

FOR OUR EXAMPLE, WHERE THE DIAMETER IS 16 INCHES:

- $R = 16 \text{ INCHES} / 2 = 8 \text{ INCHES}$

FORMULA FOR THE AREA OF A CIRCLE

THE AREA (A) OF A CIRCLE CAN BE CALCULATED USING THE FORMULA:

- $A = \pi \times R^2$

WHERE:

- π (PI) IS APPROXIMATELY 3.14 IN THIS CONTEXT
- R IS THE RADIUS OF THE CIRCLE

CALCULATING THE AREA OF THE CIRCLE

STEP-BY-STEP CALCULATION

USING THE FORMULA $A = \pi \times r^2$:

1. IDENTIFY THE RADIUS: $r = 8$ INCHES
2. USE THE GIVEN APPROXIMATION FOR PI: $\pi = 3.14$
3. CALCULATE r^2 : $8 \times 8 = 64$
4. MULTIPLY BY PI: $3.14 \times 64 = 200.96$

THEREFORE, THE AREA OF THE CIRCLE IS 200.96 SQUARE INCHES.

FINAL RESULT

THE AREA OF THE CIRCLE WITH A DIAMETER OF 16 INCHES, USING 3.14 FOR PI, IS:

- 200.96 in²

THIS MATCHES OPTION C. 200.96 in² FROM THE PROVIDED CHOICES.

UNDERSTANDING THE MULTIPLE-CHOICE OPTIONS

OPTION A. 50.24 in²

THIS VALUE IS SIGNIFICANTLY SMALLER THAN THE ACTUAL AREA CALCULATED. IT MIGHT RESULT FROM A MISCALCULATION OR USING A DIFFERENT RADIUS.

OPTION B. 100.48 in²

THIS IS APPROXIMATELY HALF OF THE CORRECT AREA, SUGGESTING PERHAPS A MISTAKE IN THE RADIUS OR THE FORMULA APPLICATION.

OPTION C. 200.96 in²

THIS IS THE CORRECT AREA BASED ON THE CALCULATION USING THE SPECIFIED DIAMETER AND PI APPROXIMATION.

ADDITIONAL TIPS FOR CALCULATING CIRCLE AREAS

Use of Pi Approximations

While 3.14 is commonly used for Pi, more precise calculations often use 3.1416 or more decimal points to increase accuracy, especially in professional contexts.

Confirming Calculations

Always double-check your calculations:

- Verify the radius: ensure it's half of the diameter
- Use consistent units throughout
- Recalculate the multiplication to avoid errors

Practical Applications

Knowing how to find the area of a circle is useful in:

- Designing circular objects like tables or wheels
- Calculating material requirements for circular surfaces
- Understanding spatial measurements in various industries

Summary

To find the area of a circle with a diameter of 16 inches:

- Calculate the radius: 8 inches
- Apply the formula $A = \pi \times r^2$
- Using 3.14 for Pi: $A = 3.14 \times 8^2 = 3.14 \times 64 = 200.96 \text{ in}^2$

This confirms that the correct answer from the options provided is c.200.96 in².

Conclusion

Understanding how to find the area of a circle with a given diameter is a fundamental mathematical skill. By knowing the relationship between diameter, radius, and area, and applying the correct formula with an appropriate value for Pi, you can quickly determine the area of any circle. In this case, with a diameter of 16 inches and Pi approximated as 3.14, the area is 200.96 square inches, matching option c. Recognizing these calculations and options aids in solving practical problems efficiently and accurately.

Frequently Asked Questions

WHAT IS THE FORMULA TO FIND THE AREA OF A CIRCLE?

THE AREA OF A CIRCLE IS CALCULATED USING THE FORMULA $A = \pi r^2$, WHERE r IS THE RADIUS.

HOW DO YOU FIND THE RADIUS OF A CIRCLE WITH A DIAMETER OF 16 INCHES?

THE RADIUS IS HALF OF THE DIAMETER, SO $\text{RADIUS} = 16 \text{ INCHES} / 2 = 8 \text{ INCHES}$.

USING $\pi = 3.14$, WHAT IS THE AREA OF A CIRCLE WITH A DIAMETER OF 16 INCHES?

FIRST, FIND THE RADIUS (8 INCHES). THEN, $\text{AREA} = 3.14 \times 8^2 = 3.14 \times 64 = 200.96 \text{ SQUARE INCHES}$.

WHICH OF THE OPTIONS MATCHES THE AREA OF THE CIRCLE WITH A 16-INCH DIAMETER?

OPTION C: 200.96 in^2 .

IF THE DIAMETER OF A CIRCLE IS 16 INCHES, WHAT IS THE EXACT AREA USING $\pi = 3.14$?

THE AREA IS $200.96 \text{ SQUARE INCHES}$.

IS THE AREA OF THE CIRCLE WITH A 16-INCH DIAMETER CLOSER TO 50 in^2 , 100 in^2 , OR 200 in^2 ?

IT IS CLOSEST TO 200 in^2 .

HOW DOES CHANGING THE DIAMETER AFFECT THE AREA OF A CIRCLE?

SINCE THE AREA DEPENDS ON THE SQUARE OF THE RADIUS (WHICH IS HALF THE DIAMETER), INCREASING THE DIAMETER INCREASES THE AREA QUADRATICALLY.

CAN YOU VERIFY THE AREA CALCULATION FOR A CIRCLE WITH A 16-INCH DIAMETER?

YES, $\text{RADIUS} = 8 \text{ INCHES}$; $\text{AREA} = 3.14 \times 8^2 = 200.96 \text{ in}^2$, CONFIRMING THE CORRECT OPTION IS C.

ADDITIONAL RESOURCES

FIND THE AREA OF A CIRCLE WITH A DIAMETER OF 16 INCHES: AN IN-DEPTH EXPLORATION

UNDERSTANDING THE AREA OF A CIRCLE IS A FUNDAMENTAL CONCEPT IN GEOMETRY THAT FINDS APPLICATIONS IN VARIOUS FIELDS SUCH AS ENGINEERING, ARCHITECTURE, DESIGN, AND EVERYDAY PROBLEM-SOLVING. IN THIS DETAILED REVIEW, WE WILL EXPLORE HOW TO CALCULATE THE AREA OF A CIRCLE WITH A DIAMETER OF 16 INCHES, USING THE APPROXIMATE VALUE OF π AS 3.14. WE WILL ALSO ANALYZE RELATED CONCEPTS, DEMONSTRATE STEP-BY-STEP CALCULATIONS, AND DISCUSS PRACTICAL IMPLICATIONS.

UNDERSTANDING THE BASICS OF A CIRCLE'S GEOMETRY

BEFORE DIVING INTO CALCULATIONS, IT'S IMPORTANT TO UNDERSTAND THE KEY COMPONENTS INVOLVED IN THE GEOMETRY OF A

CIRCLE:

- CIRCLE: A SET OF ALL POINTS IN A PLANE THAT ARE EQUIDISTANT FROM A FIXED POINT CALLED THE CENTER.
- DIAMETER (D): THE LENGTH OF A STRAIGHT LINE PASSING THROUGH THE CENTER OF THE CIRCLE, CONNECTING TWO POINTS ON ITS CIRCUMFERENCE. FOR OUR CASE, $D = 16$ INCHES.
- RADIUS (R): THE DISTANCE FROM THE CENTER OF THE CIRCLE TO ANY POINT ON ITS CIRCUMFERENCE. IT IS HALF THE DIAMETER.
- CIRCUMFERENCE (C): THE TOTAL LENGTH AROUND THE CIRCLE, CALCULATED AS $C = \pi \times D$.
- AREA (A): THE SPACE ENCLOSED WITHIN THE CIRCLE, WHICH IS THE FOCUS OF THIS DISCUSSION.

FORMULAS FOR CALCULATING THE AREA OF A CIRCLE

THE AREA OF A CIRCLE IS GIVEN BY THE WELL-KNOWN FORMULA:

$$[A = \pi r^2]$$

WHERE:

- (A) IS THE AREA,
- (π) IS APPROXIMATELY 3.14 (PER THE GIVEN INSTRUCTION),
- (r) IS THE RADIUS OF THE CIRCLE.

SINCE THE DIAMETER IS GIVEN, THE RADIUS IS CALCULATED AS:

$$[r = \frac{D}{2}]$$

PUTTING THESE TOGETHER, THE CALCULATION FOR THE AREA BECOMES STRAIGHTFORWARD ONCE THE RADIUS IS KNOWN.

STEP-BY-STEP CALCULATION FOR DIAMETER OF 16 INCHES

STEP 1: DETERMINE THE RADIUS

GIVEN:

$$[D = 16 \text{ INCHES}]$$

CALCULATE:

$$[r = \frac{D}{2} = \frac{16}{2} = 8 \text{ INCHES}]$$

STEP 2: APPLY THE AREA FORMULA

USING:

$$[A = \pi r^2]$$

AND SUBSTITUTING $(\pi = 3.14)$ AND $(r = 8)$ INCHES:

$$[A = 3.14 \times (8)^2]$$

$$[A = 3.14 \times 64]$$

STEP 3: PERFORM THE MULTIPLICATION

CALCULATING:

$$[A = 3.14 \times 64 = 201.0 \text{ SQUARE INCHES}]$$

RESULT:

THE AREA OF A CIRCLE WITH A DIAMETER OF 16 INCHES IS APPROXIMATELY 201.0 SQUARE INCHES.

UNDERSTANDING THE SIGNIFICANCE OF THE CALCULATION

KNOWING THE AREA OF A CIRCLE WITH A SPECIFIC DIAMETER CAN BE INCREDIBLY USEFUL IN MULTIPLE REAL-WORLD SCENARIOS:

- MATERIAL ESTIMATION: FOR EXAMPLE, IF YOU'RE PLANNING TO CUT A CIRCULAR PIECE OF FABRIC, METAL, OR WOOD, KNOWING THE AREA HELPS ESTIMATE THE AMOUNT OF MATERIAL NEEDED.
- DESIGN & ENGINEERING: IN DESIGNING CIRCULAR COMPONENTS SUCH AS WHEELS, DISKS, OR TANKS, PRECISE AREA CALCULATIONS ARE VITAL FOR CAPACITY AND STRUCTURAL CONSIDERATIONS.
- CONSTRUCTION & LANDSCAPING: WHEN LAYING OUT CIRCULAR FEATURES LIKE FOUNTAINS, PATIOS, OR GARDEN BEDS, UNDERSTANDING THE AREA SUPPORTS ACCURATE PLANNING.

RELATED CALCULATIONS AND CONCEPTS

WHILE THE PRIMARY FOCUS HERE IS ON THE AREA WITH A DIAMETER OF 16 INCHES, IT'S VALUABLE TO UNDERSTAND RELATED CALCULATIONS:

1. CIRCUMFERENCE OF THE CIRCLE

USING THE FORMULA:

$$[C = \pi D]$$

SUBSTITUTING OUR KNOWN VALUES:

$$[C = 3.14 \times 16 = 50.24 \text{ INCHES}]$$

THIS MATCHES THE A.50.24 IN2 OPTION PROVIDED, INDICATING A POSSIBLE TYPO OR MISLABELING, BUT IT CONFIRMS THE CIRCUMFERENCE CALCULATION.

2. AREA WITH DIFFERENT PI APPROXIMATIONS

IF SOMEONE USES A MORE PRECISE VALUE OF PI (~ 3.14159), THE AREA WOULD BE:

$$[A = 3.14159 \times 64 \approx 201.06176 \text{ in}^2]$$

WHICH ROUNDS TO APPROXIMATELY 201.06 in^2 , VERY CLOSE TO OUR APPROXIMATION.

ANALYSIS OF THE MULTIPLE CHOICE OPTIONS

IN THE ORIGINAL PROMPT, THREE OPTIONS ARE PRESENTED:

- A. 50.24 in^2
- B. 100.48 in^2
- C. 200.96 in^2

LET'S ANALYZE EACH:

- OPTION A (50.24 in^2): THIS VALUE ALIGNS WITH THE CIRCUMFERENCE CALCULATION, NOT THE AREA. SINCE WE CALCULATED THE CIRCUMFERENCE AS 50.24 INCHES, THIS SEEMS TO BE A MISCLASSIFICATION.
- OPTION B (100.48 in^2): THIS IS ROUGHLY HALF OF OUR CALCULATED AREA. IT COULD BE A MISCALCULATION OR A DIFFERENT PARAMETER, PERHAPS RELATED TO A DIFFERENT RADIUS.
- OPTION C (200.96 in^2): THIS CLOSELY MATCHES OUR CALCULATED AREA OF APPROXIMATELY 201.0 in^2 , CONSIDERING ROUNDING. IT SEEMS TO BE THE CORRECT CHOICE IF THE QUESTION AIMS FOR THE MOST ACCURATE APPROXIMATION.

PRACTICAL IMPLICATIONS AND REAL-WORLD APPLICATIONS

UNDERSTANDING HOW TO FIND THE AREA OF A CIRCLE WITH A GIVEN DIAMETER HAS NUMEROUS PRACTICAL APPLICATIONS:

- MANUFACTURING: WHEN CREATING CIRCULAR COMPONENTS, KNOWING THE EXACT AREA HELPS DETERMINE THE AMOUNT OF RAW MATERIAL REQUIRED.
- AGRICULTURE: CALCULATING THE AREA OF CIRCULAR PLOTS FOR PLANTING OR IRRIGATION PLANNING.
- EVENT PLANNING: DETERMINING THE AMOUNT OF FLOORING, TURF, OR OTHER MATERIALS NEEDED FOR CIRCULAR AREAS.
- EDUCATION: TEACHING STUDENTS THE IMPORTANCE OF FORMULAS, UNIT CONVERSIONS, AND APPROXIMATION TECHNIQUES.

ADDITIONAL CONSIDERATIONS

WHEN PERFORMING SUCH CALCULATIONS, CONSIDER THE FOLLOWING:

- UNIT CONSISTENCY: ALWAYS ENSURE MEASUREMENTS ARE IN THE SAME UNITS TO AVOID ERRORS.

- PI APPROXIMATION: USING 3.14 IS COMMON FOR QUICK ESTIMATES, BUT MORE PRECISE CALCULATIONS MAY USE 3.14159 OR A CALCULATOR'S PI FUNCTION.

- ROUNDING: BE AWARE OF ROUNDING AT EACH STEP, ESPECIALLY IN CRITICAL CALCULATIONS WHERE PRECISION MATTERS.

CONCLUSION

CALCULATING THE AREA OF A CIRCLE WITH A DIAMETER OF 16 INCHES USING PI APPROXIMATED AS 3.14 YIELDS AN AREA OF APPROXIMATELY 201.0 SQUARE INCHES. THIS CALCULATION IS STRAIGHTFORWARD WHEN UNDERSTANDING THE BASIC GEOMETRY CONCEPTS INVOLVED, ESPECIALLY THE RELATIONSHIP BETWEEN DIAMETER AND RADIUS. RECOGNIZING THE SIGNIFICANCE OF THESE CALCULATIONS EXTENDS BEYOND ACADEMIC EXERCISES INTO PRACTICAL, REAL-WORLD APPLICATIONS ACROSS NUMEROUS INDUSTRIES.

IN SUMMARY:

- RADIUS (R): 8 INCHES
- AREA (A): APPROXIMATELY 201.0 IN²
- CIRCUMFERENCE (C): 50.24 INCHES

UNDERSTANDING THESE RELATIONSHIPS ENABLES PROFESSIONALS AND STUDENTS ALIKE TO APPROACH PROBLEMS INVOLVING CIRCLES WITH CONFIDENCE, ENSURING ACCURATE MEASUREMENTS AND EFFECTIVE PLANNING.

IN ESSENCE, THE KEY TAKEAWAY IS THAT THE AREA OF A CIRCLE WITH A 16-INCH DIAMETER IS APPROXIMATELY 201 SQUARE INCHES WHEN USING 3.14 FOR PI.

Find The Area Of A Circle With A Diameter Of 16 Inches Use 3 14 For Pi A 50 24 In2b 100 48 In2c 200 96

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