## Unit 6 Lesson 18: The Volume and Dimensions of a Cylinder

### 1 A Circle's Dimensions (Warm up)

#### Student Task Statement



Here is a circle. Points $A$, $B$, $C$, and $D$ are drawn, as well as Segments $AD$ and $BC$.

1. What is the area of the circle, in square units? Select all that apply.
	1. $4π$
	2. $π8$
	3. $16π$
	4. $π4^{2}$
	5. approximately 25
	6. approximately 50
2. If the area of a circle is $49π$ square units, what is its radius? Explain your reasoning.

### 2 Circular Volumes

#### Student Task Statement

What is the volume of each figure, in cubic units? Even if you aren’t sure, make a reasonable guess.



1. Figure A: A rectangular prism whose base has an area of 16 square units and whose height is 3 units.
2. Figure B: A cylinder whose base has an area of 16$π$ square units and whose height is 1 unit.
3. Figure C: A cylinder whose base has an area of 16$π$ square units and whose height is 3 units.

### 3 What’s the Dimension?

#### Student Task Statement

The volume $V$ of a cylinder with radius $r$ is given by the formula $V=πr^{2}h$.

1. The volume of this cylinder with radius 5 units is $50π$ cubic units. This statement is true: $50π=5^{2}πh$
* 
* What does the height of this cylinder have to be? Explain how you know.
1. The volume of this cylinder with height 4 units is $36π$ cubic units. This statement is true: $36π=r^{2}π4$
* 
* What does the radius of this cylinder have to be? Explain how you know.

### 4 Cylinders with Unknown Dimensions

#### Student Task Statement



Each row of the table has information about a particular cylinder. Complete the table with the missing dimensions.

| diameter (units) | radius (units) | area of the base (square units) | height (units) | volume (cubic units) |
| --- | --- | --- | --- | --- |
|  | 3 |  | 5 |  |
| 12 |  |  |  | $108π$ |
|  |  |  | 11 | $99π$ |
| 8 |  |  |  | $16π$ |
|  |  |  | 100 | $16π$ |
|  | 10 |  |  | $20π$ |
| 20 |  |  |  | 314 |
|  |  |  | $b$ | $π⋅b⋅a^{2}$ |



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