

# Lesson 1.5 Introducing Significant Digits Day2

## Objective

- Introduce rules to identify significant digits in a given number.
- Determine in trailing zeros of an integer are significant.
- Round integers and decimals to a specified number of significant digits.

- **Common Core State Standards** *7.NS.2.d*
- **Mathematical Practices** 2. Reason 4. Model mathematics. 5. Use tools strategically. 6. Attend to precision. 7. Look for and use structures

Extend **7.NS.2d** Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.

# Lesson 1.5 Review Significant Digits

A given number may contain both significant and nonsignificant digits. The rules for determining which digits in a given number are significant are as follows.

**RULE 1: All nonzero digits are significant.**

Number	Significant Digits	Number of Significant Digits
487	4, 8, and 7	3
65.211	6, 5, 2, 1, and 1	5
12,345,678.54	1, 2, 3, 4, 5, 6, 7, 8, 5, and 4	10
9,700	9 and 7	2

# Lesson 1.5 Introducing Significant Digits

A given number may contain both significant and nonsignificant digits. The rules for determining which digits in a given number are significant are as follows.

**RULE 2: Zeros in between nonzero digits are significant.**

Number	Significant Digits	Number of Significant Digits
1,006	1, 0, 0, and 6	4
2,309,005	2, 3, 0, 9, 0, 0, and 5	7
51.0007	5, 1, 0, 0, 0, and 7	6

# Lesson 1.5 Review Significant Digits

A given number may contain both significant and nonsignificant digits. The rules for determining which digits in a given number are significant are as follows.

**RULE 3: Trailing zeros in a decimal are significant.**

Number	Significant Digits	Number of Significant Digits
21.30	2, 1, 3, and 0	4
798.00	7, 9, 8, 0, and 0	5
40.0	4, 0, and 0	3

## Math Note

Trailing zeros are significant when there is a decimal point in the number.

# Lesson 1.5 Review Significant Digits

A given number may contain both significant and nonsignificant digits. The rules for determining which digits in a given number are significant are as follows.

**RULE 4:** Zeros on the left of the first nonzero digit are NOT significant.

Number	Significant Digits	Number of Significant Digits	Nonsignificant Digits
0.123	1, 2, and 3	3	0
0.04	4	1	The two 0s
0.060	6 and 0	2	The first two 0s
0.000385	3, 8, and 5	3	The first four 0s

**RULE 5:** Trailing zeros in an integer may or may not be significant due to rounding.

Number After Rounding	Rounded from 298	Significant Digits	Number of Significant Digits	Nonsignificant Digits
300	To the nearest 10	3 and 0	2	The last 0
300	To the nearest 100	3	1	The two 0s

# Lesson 1.5 Introducing Significant Digits

**Example 15 Round decimals to a given number of significant digits.**

**Use the rules of significant digits to round each decimal.**

**a)** Round 0.03468 to 3 significant digits.

# Lesson 1.5 Introducing Significant Digits

## Example 15 Round decimals to a given number of significant digits.

Use the rules of significant digits to round each decimal.

a) Round 0.03468 to 3 significant digits.

### Solution

Using **RULE 4**, the first two zeros of 0.03468 are not significant.

Only 3 significant digits are required. The fourth significant digit is 8, which is greater than 5.

So, the decimal rounded to 3 significant digits is 0.0347.

# Lesson 1.5 Introducing Significant Digits

Example 15 **Round decimals to a given number of significant digits.**

b) Round 0.07614 to 2 significant digits.



# Lesson 1.5 Introducing Significant Digits

**Example 15** Round decimals to a given number of significant digits.

**b)** Round 0.07614 to 2 significant digits.

## **Solution**

Using **RULE 4**, the first two zeros of 0.07614 are not significant.

Only 2 significant digits are required. The third significant digit is 1, which is less than 5.

So, the decimal rounded to 2 significant digits is 0.076.

# Lesson 1.5 Introducing Significant Digits

Example 15 **Round decimals to a given number of significant digits.**

c) Round 14.0408 to 5 significant digits.

# Lesson 1.5 Introducing Significant Digits

Example 15 Round decimals to a given number of significant digits.

c) Round 14.0408 to 5 significant digits.

## Solution

Using **RULE 2**, all the digits in 14.0408 are significant.

Only 5 significant digits are required. The sixth significant digit is 8, which is greater than 5.

So, the decimal rounded to 5 significant digits is 14.041.

# Lesson 1.5 Introducing Significant Digits

Example 15 **Round decimals to a given number of significant digits.**

d) Round 28.702 to 4 significant digits.

# Lesson 1.5 Introducing Significant Digits

Example 15 Round decimals to a given number of significant digits.

d) Round 28.702 to 4 significant digits.

## Solution

Using **RULE 2**, all the digits in 28.702 are significant.

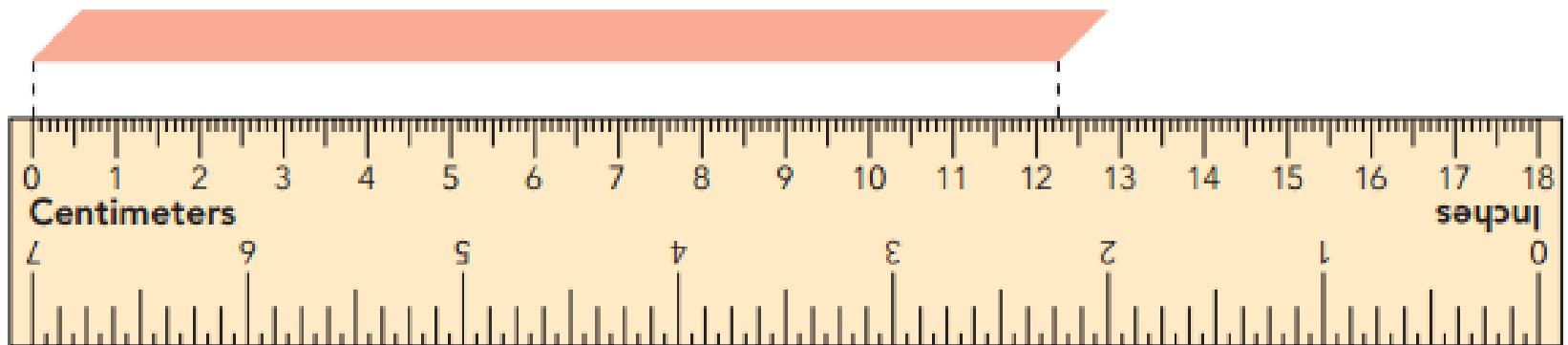
Only 4 significant digits are required. The fifth significant digit is 2, which is less than 5.

So, the decimal rounded to 4 significant digits is 28.70.

# Lesson 1.5 Introducing Significant Digits

## Example 16

Greg wants to know the circumference of the base of a cylinder. He places a paper strip around the base of the cylinder. He then measures the length of the paper strip with a ruler.

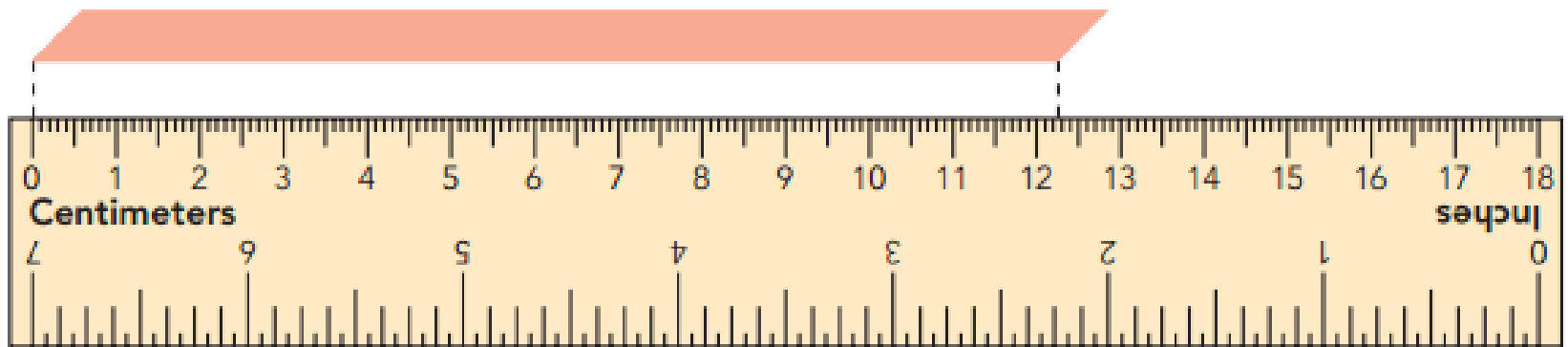


- a) List the digits in the length that are certain.

# Lesson 1.5 Introducing Significant Digits

## Example 16

Greg wants to know the circumference of the base of a cylinder. He places a paper strip around the base of the cylinder. He then measures the length of the paper strip with a ruler.



a) List the digits in the length that are certain.

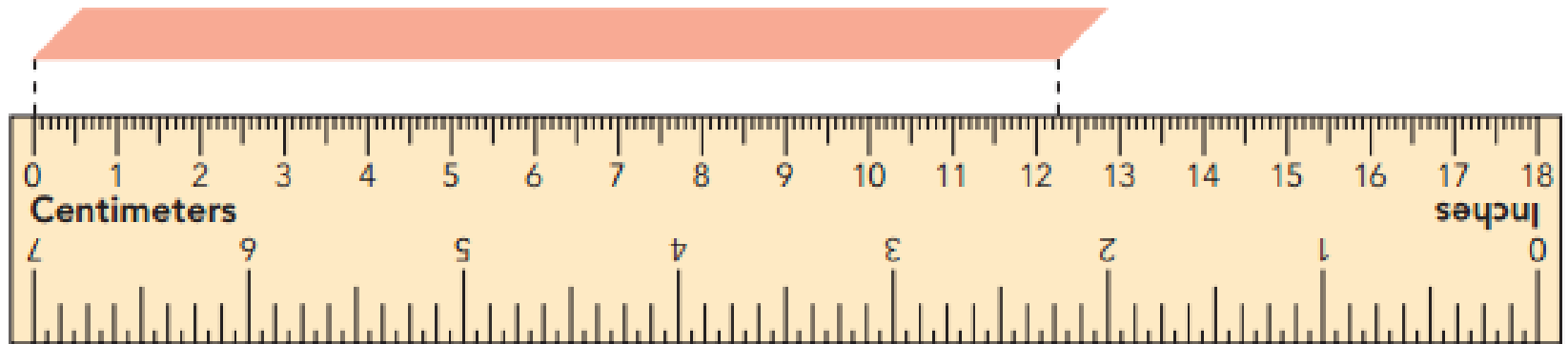
### Solution

From the ruler, the length seems to be between 12.2 centimeters and 12.3 centimeters. Greg knows the length is at least 12.2 centimeters. So, the digits in 12.2 are certain.

# Lesson 1.5 Introducing Significant Digits

## Example 16

Greg wants to know the circumference of the base of a cylinder. He places a paper strip around the base of the cylinder. He then measures the length of the paper strip with a ruler.



- List the digits in the length that are certain.
- List the digit that is not certain, the estimated digit. Write an approximate length to two decimal places.



# Lesson 1.5 Introducing Significant Digits

## Example 16

- b) List the digit that is not certain, the estimated digit. Write an approximate length to two decimal places.

### **Solution**

Greg estimates that the digit in the second decimal place is 5, since the length seems to be between 12.2 centimeters and 12.3 centimeters. The approximate length is 12.25 centimeters, where the digit 5 is estimated.

# Lesson 1.5 Introducing Significant Digits

## Example 16

- c) State the number of significant digits the length has.

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## Example 16

- c) State the number of significant digits the length has.

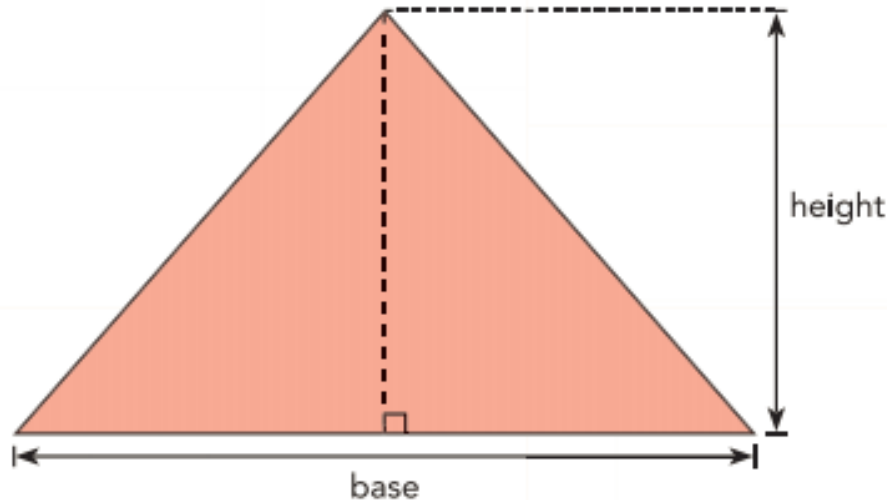
### **Solution**

The approximate length 12.25 centimeters has 4 significant digits.

# Lesson 1.5 Introducing Significant Digits

## Example 17

Gavin measured the base to be 12.64 centimeters and the height of a triangle to be 7.15 centimeters.

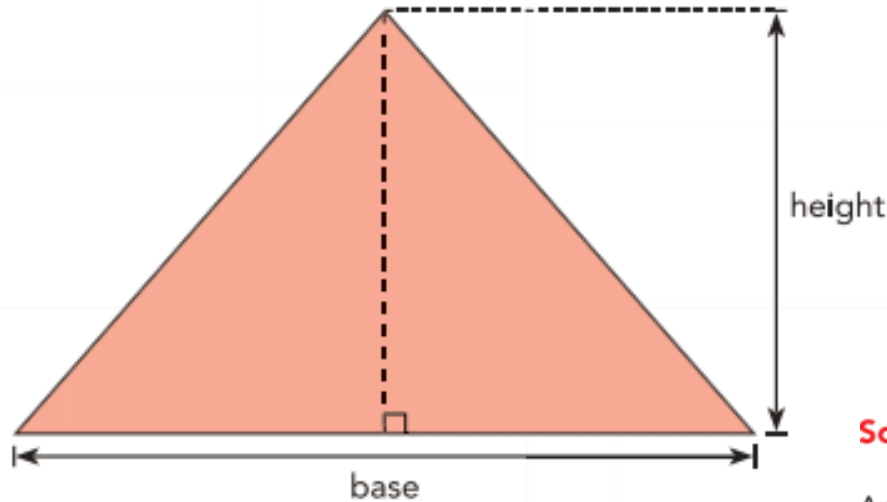


- Calculate the area of the triangle.
- State the area of the triangle correct to 3 significant digits.

# Lesson 1.5 Introducing Significant Digits

## Example 17

Gavin measured the base to be 12.64 centimeters and the height of a triangle to be 7.15 centimeters.



### Solution

$$\begin{aligned}\text{Area of triangle} &= \frac{1}{2} \cdot 12.64 \cdot 7.15 \\ &= 45.188 \text{ cm}^2\end{aligned}$$

The area of the triangle is 45.188 square centimeters.

a) Calculate the area of the triangle.

b) State the area of the triangle correct to 3 significant digits.

### Solution

The area of the triangle correct to 3 significant digits is 45.2 square centimeters.

# Lesson 1.5 Introducing Significant Digits

## Independent Practice #7-21 and 24-26

### Practice 1.5

Round each integer to the number of significant digits stated in the parentheses.

7 8,496 (to 2 significant digits)

8 187,204 (to 3 significant digits)

9 39,148 (to 3 significant digits)

10 40,100 (to 2 significant digits)

11 5,300,924 (to 4 significant digits)

12 111,111 (to 4 significant digits)

13 99,000 (to 3 significant digits)

14 820,635 (to 1 significant digit)

Round each decimal to the given number of significant digits.

15 0.7621 (to 1 significant digit)

16 1.0087 (to 2 significant digits)

17 45.91082 (to 5 significant digits)

18 0.08507 (to 3 significant digits)

19 520.8 (to 3 significant digits)

20 4.381 (to 2 significant digit)



Lesson Check #7 & 15

*(can round a number to a given number of significant digits)*