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UNIT 6 LESSON 11

**AIM**: SWBAT determine the percent error between an approximation and exact value

**THINK ABOUT IT!**

Eve is measuring the length of string to tie around a present for her friend’s birthday. She needs exactly 20 inches of string to make the type of bow that she wants. Instead of measuring it, she approximates how long it is. When she tries to tie the string, she realizes that she only cut 19 inches of string.

Step A: How many inches off was Eve’s approximation? Explain your reasoning.

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Step B: Write a ratio of the error to the exact amount of string she needed and express it as a percent.

Key Point:

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**Interaction with New Material:**

Ex.1) At the police academy, they are training their recruits to approximate the speed a vehicle is travelling just by sight and the sound the car makes when it drives by. The first recruit to try it guesses that the speed of a car passing him as 35mph. The instructor told the recruit that the actual speed of the car was 37.5mph. The second recruit tries and estimates the car to be travelling at 30mph. The instructor tells the recruit that the exact speed was 28.1mph. What are the percent errors of the recruits’ approximations to the nearest tenth of a percent? Whose approximation was more accurate?

**PARTNER PRACTICE**

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| *Bachelor Level* |

For problems 1-2, determine the percent error given the exact and approximate values.

1. Exact = 50

Approximate = 45

1. Approximate = 100

Exact = 95

1. A zookeeper predicted the weight of a new baby elephant to be 267 pounds when it was born. The elephant actually weighed 300 pounds at birth. What was the percent error of the zookeeper's prediction?
2. 33%
3. 22%
4. 99%
5. 11%

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| *Master Level* |

1. Skeeter, the dog, weighs exactly 50 pounds.  When weighed on a defective scale, he weighed 52.5 pounds. What is the percent error for the weight of Skeeter?

**INDEPENDENT PRACTICE**

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| *Bachelor Level* |

For problems 1-2, find the percent error

1. Guessed Value = 25

Measured Value = 27

1. Estimated Value = 155

Calculated Value = 155.5

1. A new pair of Adidas running shoes came out that were supposed to weigh 8 ounces. They actually weighed 10 ounces. What is the percent error of the Adidas shoes?

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| *Master Level* |

1. Which of the following objects has the greatest relative error? Fill out the greatest error and the relative error to determine your answer.

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| --- | --- | --- | --- | --- |
| **Object** | **Measured Value** | **Actual Value** | **Absolute Error** | **Percent Error** |
| Cell Phone | .6 pounds | .5 pounds |  |  |
| Computer | 3.8 pounds | 4.0 pounds |  |  |
| Television | 24.8 pounds | 24.0 pounds |  |  |
| Car | 1,950 pounds | 2,000 pounds |  |  |

Which of the following had the greatest absolute error? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Which of the following had the greatest relative error? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Why are these answers different? Explain how you know and your reasoning.

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1. When Mr. Chalfin was younger, his mother used to measure his height every couple of months. There was a specific wall where she would take the measurement and compare it to his previous heights. She would also do this for his sister. The data below was collected by my mom over one year that she did this. One time, when his mother measured his sister and him, Mr. Chalfin believed he was 54 inches, but found out he was only 45 inches at the time! His sister thought she was 35 inches, but was actually 28 inches! Mr. Chalfin’s sister said that my guess was more wrong because I was 9 inches off and she was only 7 inches off. Relatively, is she correct? Explain your reasoning.

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1. McDonald’s managers make $300 a week give or take $15. Lawyers make $3,000 a week give or take $15. Is the relative error the same for both McDonald’s managers and lawyers? Explain your reasoning.

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7) Two friends are training for the marathon. Shaneese runs 100 miles per week, give or take 5 miles. Denasia runs 20 miles per week, give or take 5 miles. What statement is true about the relative error of both runners?

* 1. Shaneese’s mileage has a larger relative error
	2. Denasia’s mileage has a larger relative error
	3. Both girls’ mileage has the same relative error
	4. There is not enough information to answer the question

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| *PhD Level* |

1. The dimensions of a rectangular yard were measured at 13.8 meters and 5 meters. The actual measurements were 15 meters by 5 meters. What was the percent error of the ***area*** of the rectangular yard?
2. At the fabric store, you ask for 2 yards of fabric. The counter clerk measured the fabric so that there was an extra 9 inches. What is the relative error for the piece of fabric?

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**EXIT TICKET**

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| Self-assessment | I mastered the learning objective today. | I am almost there.  | Need more practice and feedback. |
| Teacher feedback | You mastered the learning objective today. | You are almost there.  | You need more practice and feedback. |

1. The veterinarian weighed Oliver’s new puppy, Boaz, on a defective scale. He weighed 36 pounds. However, Boaz weighs exactly 34.5 pounds. What is the percent of error in measurement of the defective scale to the nearest tenth?
2. Cab rides from Brooklyn to Manhattan are usually around $20. Today it cost me $24. Cab rides from Brooklyn to Boston are usually around $140. Today it cost me $144. Which statement is true about the relative error of each cab ride?
3. The relative error of the cab ride to Manhattan is greater than that of the cab ride to Boston.
4. The relative error of the cab ride to Boston is greater than that of the cab ride to Manhattan.
5. The relative error is the same for both cab rides.
6. There is not enough information to solve this question.