

Lesson 1-1
Using Estimation Strategies

Determine whether the following data are estimates or exact values. Circle your answer choice.

- | | |
|---|--------------------------------|
| 1. The population of Florida is 16,000,000. | <u>Estimate</u> or Exact Value |
| 2. There are 512 students enrolled at St. Timothy's School. | Estimate or <u>Exact Value</u> |
| 3. Sting rays grow to be 1 m long. | <u>Estimate</u> or Exact Value |
| 4. Granny Smith apples cost \$1.99 per pound. | Estimate or <u>Exact Value</u> |

There are three main ways to estimate numbers with decimals!

Estimating by Rounding

(Use when +, - or x)

Example: The span of an eagle sting ray's fins is 3.27 m. The span of her baby's fins is 0.88 m. Estimate the difference between the spans.

Step 1: Write the equation.

$$\begin{array}{r} 3.27 \\ -0.88 \\ \hline \end{array}$$

Step 2: Round each span to the nearest whole number.

$$\begin{array}{l} 3.27 \approx 3 \\ -0.88 \approx 1 \end{array}$$

Step 3: Find the difference.

$$3 - 1 \approx 2$$

You Try! Estimate. Round to the nearest whole number before completing the operation.

$$10.13 + 1.46 =$$

↓ ↓

$$10 + 1 = \boxed{11}$$

$$4.9 \times 10.2 =$$

↓ ↓

$$5 \times 10 = 50$$

$$9.82 - 1.76 =$$

↓ ↓

$$10 - 2 = \boxed{8}$$

Challenge: A rectangular living room is 10.5 ft. by 9.25 ft. Use rounding to estimate the area of the room.

↓ ↓

$$11 \times 9 = \boxed{99 \text{ ft}^2}$$

Front-End Estimation

(Use when +) ← often with \$

Example: Suppose you want to buy and wrap a birthday gift for your friend. You select a toy for \$5.39, wrapping paper for \$1.49, and a card for \$2.95. Estimate the total cost of your selections.

Step 1: Add the front-end digits.

$$\begin{array}{r} \$5.39 \\ \$1.49 \\ + \$2.95 \\ \hline 8 \end{array}$$

Step 2: Estimate the back-end (decimals) to the nearest whole. In this case, estimate the total amount of cents to the nearest dollar.

$$\begin{array}{r} \$5.39 \\ \$1.49 \\ + \$2.95 \\ \hline \end{array} \left. \begin{array}{l} \text{About } \$1 \\ \text{About } \$1 \end{array} \right\} \text{About } \$2 \text{ total}$$

Step 3: Add the front-end and back-end estimates together.

$$\$8 + \$2 \approx \$10$$

You Try! Use Front-End Estimation to estimate each sum.

1) Estimate the total cost of a dog collar for \$5.79, a dog toy for \$2.48, and a dog dish for \$5.99.

$$\begin{array}{r} \$5.79 > \$1 \\ \$2.48 > \$1 \\ + \$5.99 \rightarrow \$1 \\ \hline 12 + 2 = \$14 \end{array}$$

2) $12.34 + 9.2 + 4.48 =$

$$\begin{array}{r} 12.34 > \$1 \\ 9.2 \\ + 4.48 \\ \hline 25 + 1 = \$26 \end{array}$$

Using Compatible Numbers

(Use when \div)

Compatible Numbers are numbers that “go well together” and are easy to compute mentally. This is very helpful when estimating a quotient.

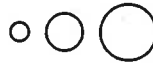
Example: Suppose you have \$50.25. About how many CDs can you buy if they cost \$7.95 each?

Step 1: Write the equation.

$$50.52 \div 7.95 \quad \text{OR} \quad \frac{50.52}{7.95}$$

Step 2: Choose compatible numbers that are easy to divide in your head!

$$\frac{50.52}{7.95} \rightarrow \text{This is very close to } 8$$



Think: What number is close to 50.52 that can be easily divided by 8? ... 48!

Step 3: Solve.

$$48 \div 8 = 6 \rightarrow \text{You can buy about 6 CDs.}$$

You Try! Use Compatible Numbers to estimate each quotient.

$$36.72 \div 7.43 = \frac{36.72}{7.43} = \frac{35}{7} = \boxed{5}$$

$$26.76 \div 2.75 = \frac{26.76}{2.75} \rightarrow \frac{?}{3} = \frac{27}{3} = \boxed{9}$$

$$412.1 \div 9.7 = \frac{412.1}{9.7} = \frac{400}{10} = \boxed{40}$$

