

Estimate Sums and Differences

Learn

UNDERWATER FLORIDA John Pennekamp Coral Reef State Park, located on Key Largo, off the coast of southern Florida, was the first undersea park in the United States. The park consists of 60,124 underwater acres and includes the famous coral reef. It also has 2,960 acres of coastal land. About how many total acres does the park have?

You can round to estimate sums and differences of whole numbers. When you **estimate**, you find a number that is close to an exact amount.

$$\begin{array}{r} 60,124 \rightarrow 60,000 \\ + 2,960 \rightarrow + 3,000 \\ \hline 63,000 \end{array} \quad \begin{array}{l} \text{Round to the nearest} \\ \text{thousand. Then add.} \end{array}$$

So, John Pennekamp Coral Reef State Park has about 63,000 acres.

Quick Review

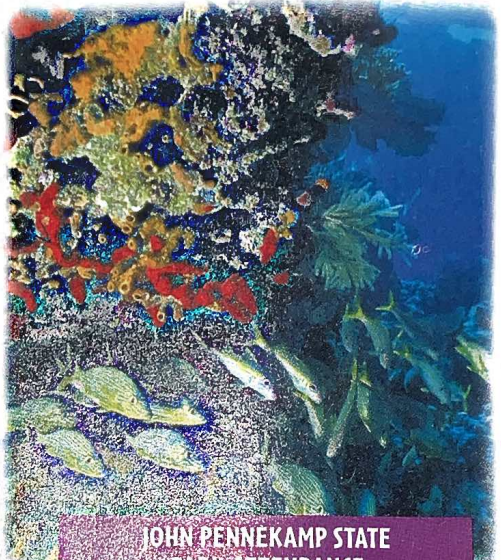
Round to the nearest thousand.

- 457,986
- 2,057,516
- 2,954
- 9,051,687
- 326,198

VOCABULARY

estimate

front-end estimation



JOHN PENNEKAMP STATE PARK ATTENDANCE

| Year | Number of Visitors |
|-----------|--------------------|
| 1991–1992 | 782,421 |
| 2000–2001 | 1,050,749 |

Example 1

About how many more people visited the park in 2000–2001 than in 1991–1992? Use the table.

$$\begin{array}{r} 1,050,749 \rightarrow 1,100,000 \\ - 782,421 \rightarrow - 800,000 \\ \hline 300,000 \end{array} \quad \begin{array}{l} \text{Round to the nearest} \\ \text{hundred thousand.} \\ \text{Then subtract.} \end{array}$$

So, about 300,000 more people visited the park in 2000–2001.

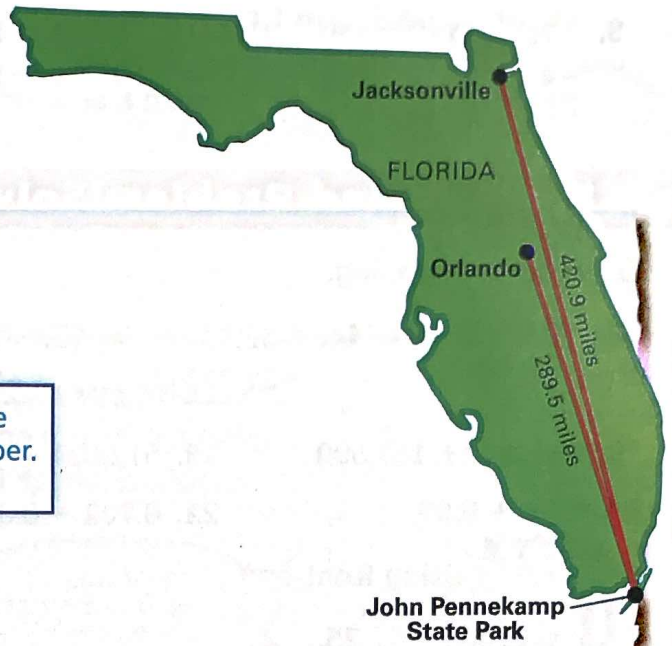
You can also round to estimate sums and differences of decimals.

More Examples

| | | |
|---|---|---|
| <p>A Round to the nearest whole number. Then subtract.</p> $\begin{array}{r} 89.5 \rightarrow 90 \\ - 1.83 \rightarrow - 2 \\ \hline 88 \end{array}$ | <p>B Round to the nearest tenth. Then add.</p> $\begin{array}{r} 3.675 \rightarrow 3.7 \\ 2.502 \rightarrow 2.5 \\ + 0.32 \rightarrow + 0.3 \\ \hline 6.5 \end{array}$ | <p>C Round to the nearest dollar. Then add.</p> $\begin{array}{r} \$10.00 \rightarrow \$10 \\ + \$ 8.19 \rightarrow + \$ 8 \\ \hline \$18 \end{array}$ |
|---|---|---|

Front-End Estimation

Another way to estimate a sum or difference is to use **front-end estimation**. When you use front-end estimation, you add or subtract the values of the front digits of each number.



Example 2

About how much farther is the park from Jacksonville than from Orlando?

| | |
|---|--|
| $\begin{array}{r} 420.9 \rightarrow 400 \\ -289.5 \rightarrow -200 \\ \hline 200 \end{array}$ | <p>Subtract the values of the front digits of each number.</p> |
|---|--|

So, the park is about 200 miles farther from Jacksonville than from Orlando.

More Examples

A $3,287 + 4,501$

$$\begin{array}{r} 3,287 \rightarrow 3,000 \\ +4,501 \rightarrow +4,000 \\ \hline 7,000 \end{array}$$

B $587 - 435$

$$\begin{array}{r} 587 \rightarrow 500 \\ -435 \rightarrow -400 \\ \hline 100 \end{array}$$

C $13.6 + 22.9$

$$\begin{array}{r} 13.6 \rightarrow 10 \\ +22.9 \rightarrow +20 \\ \hline 30 \end{array}$$

- In Example A, how would a rounded estimate differ from the front-end estimate?
- When you use front-end estimation to estimate a sum, is your estimate greater than or less than the actual sum? Explain.

Check

1. Explain how you use front-end estimation to estimate the sum $73.25 + 91.02$.
2. How is estimating sums and differences of decimals like estimating sums and differences of whole numbers?

Estimate by rounding.

- | | | | | |
|---|---|---|---|---|
| 3. $\begin{array}{r} 85,476 \\ -41,131 \\ \hline \end{array}$ | 4. $\begin{array}{r} 845,008 \\ +124,895 \\ \hline \end{array}$ | 5. $\begin{array}{r} 1.22 \\ +3.51 \\ \hline \end{array}$ | 6. $\begin{array}{r} \$1.78 \\ -\$1.04 \\ \hline \end{array}$ | 7. $\begin{array}{r} 4.87 \\ +2.94 \\ \hline \end{array}$ |
|---|---|---|---|---|

LESSON CONTINUES



Estimate by using front-end estimation.

$$\begin{array}{r} 8. \quad 752,401 \\ -491,922 \\ \hline \end{array}$$

$$\begin{array}{r} 9. \quad 21,421 \\ +32,970 \\ \hline \end{array}$$

$$\begin{array}{r} 10. \quad \$52.89 \\ -\$18.78 \\ \hline \end{array}$$

$$\begin{array}{r} 11. \quad 5.681 \\ +3.025 \\ \hline \end{array}$$

$$\begin{array}{r} 12. \quad 4.35 \\ -0.78 \\ \hline \end{array}$$

Practice and Problem Solving Extra Practice, page 58, Set B

Estimate by rounding.

$$\begin{array}{r} 13. \quad 93,582 \\ +82,785 \\ \hline \end{array}$$

$$\begin{array}{r} 14. \quad 82,631 \\ -22,965 \\ \hline \end{array}$$

$$\begin{array}{r} 15. \quad \$7.92 \\ +\$5.39 \\ \hline \end{array}$$

$$\begin{array}{r} 16. \quad 30.23 \\ +13.65 \\ \hline \end{array}$$

$$\begin{array}{r} 17. \quad \$7.36 \\ -\$6.41 \\ \hline \end{array}$$

$$18. \quad 397,352 + 187,590$$

$$19. \quad 512,824 - 495,008$$

$$20. \quad 1,289,405 + 3,321,945$$

$$21. \quad 2.39 + 8.06$$

$$22. \quad 0.702 - 0.397$$

$$23. \quad 14.782 + 8.110$$

Estimate by using front-end estimation.

$$\begin{array}{r} 24. \quad 502,963 \\ -132,631 \\ \hline \end{array}$$

$$\begin{array}{r} 25. \quad 42,110 \\ +16,850 \\ \hline \end{array}$$

$$\begin{array}{r} 26. \quad 2.704 \\ +1.818 \\ \hline \end{array}$$

$$\begin{array}{r} 27. \quad \$500.00 \\ -\$279.65 \\ \hline \end{array}$$

$$\begin{array}{r} 28. \quad 7.153 \\ +4.099 \\ \hline \end{array}$$

$$29. \quad 5,278 + 3,621$$

$$30. \quad 13,500 - 11,693$$

$$31. \quad 6,345,672 - 1,254,789$$

$$32. \quad 24.89 \approx 17.34$$

$$33. \quad 33.872 + 12.946$$

$$34. \quad 37.054 + 27.922$$

Estimate to compare. Write $<$ or $>$ for each \bullet .

$$35. \quad 69,210 + 24,391 \bullet 68,258 + 45,924$$

$$36. \quad 74,361 + 24,391 \bullet 91,308 - 25,924$$

$$37. \quad 82,356 - 14,638 \bullet 86,551 - 13,725$$

$$38. \quad 8.14 - 4.89 \bullet 7.45 - 2.37$$


$$39. \quad 2.8 + 9.1 \bullet 11 + 5$$

$$40. \quad 7.925 + 5.392 \bullet 15.431 - 4.974$$

USE DATA For 41–42, use the table.

41. About how much farther is it to John Pennekamp State Park from Chattanooga, TN, than from Montgomery, AL?

42. Josh drove from his home in Greensboro, NC, to John Pennekamp State Park, and then he drove to visit his cousin in Tallahassee, FL. About how many miles did he drive?

43.  **Write a problem** in which front-end estimation gives an estimate closer to the exact answer than rounding.

| DISTANCE TO JOHN PENNEKAMP STATE PARK (in miles) | |
|--|--------|
| Chattanooga, TN | 836.22 |
| Greensboro, NC | 850.34 |
| Montgomery, AL | 746.49 |
| Tallahassee, FL | 539.02 |

44. Three duffel bags weigh 49.49 pounds, 53.73 pounds, and 77.89 pounds. Estimate the total weight to the nearest pound.