

Lesson 4-2

Friday, October 11, 2019

1:41 PM

MB 171

Name



Renee needs 32 strands of twine for an art project. Each strand must be 1.25 centimeters long. About how many centimeters of twine does she need? Solve this problem any way you choose!

Lesson 4-2

Estimate the Product of a Decimal and a Whole Number

I can ...

use rounding and compatible numbers to estimate the product of a decimal and a whole number.

Content Standard 5.NBT.B.7
Mathematical Practices MP.2, MP.6, MP.8

Generalize

How can you relate what you know about estimating with whole numbers to estimating with decimals? Show your work!

Rounding

$$32 \times 1.25 = 40$$

$$30 \times 1 = 30$$

About 30 cm of twine

Compatible Numbers

$$32 \times 1.25 = 40$$

$$32 \times 1 = 32$$

About 32 cm of twine

$$32 \times 1.25 = 40$$

$$30 \times 1.2 = 36.0 = 36$$

$$0dp + 1dp = 1dp$$

Look Back! **MP.2 Reasoning** Is your estimate an overestimate or an underestimate? How can you tell?

All 3 are underestimates because the factors are less than the original factors. Overestimates may be better so he has enough twine.

Essential Question: What Are Some Ways to Estimate Products with Decimals?

A wedding planner needs to buy 16 pounds of sliced cheddar cheese. About how much will the cheese cost?

You can use different strategies to estimate a product.



B One Way

Round each number to the nearest dollar and nearest ten.

$$\begin{array}{r} \$2.15 \times 16 \\ \downarrow \quad \downarrow \\ \$2 \times 20 \end{array}$$

$$\$2 \times 20 = \$40$$

The cheese will cost about \$40.

C Another Way

Use compatible numbers that you can multiply mentally.

$$\begin{array}{r} \$2.15 \times 16 \\ \downarrow \quad \downarrow \\ \$2 \times 15 \end{array}$$

$$\$2 \times 15 = \$30$$

The cheese will cost about \$30.

Convince Me! © MP.2 Reasoning About how much money would 18 pounds of cheese cost if the price is \$3.95 per pound? Use two different ways to estimate the product. Are your estimates overestimates or underestimates? Explain.

Rounding

$$18 \times \$3.95 = c$$

$$20 \times 4 = 80 \text{ About } \$80$$

C.N.

$$18 \times \$3.95 = c$$

$$15 \times 4 = 60$$

About \$60

Rounding gave an overestimate and C.N. gave an underestimate

Another Example

Manuel walks a total of 0.75 mile to and from school each day. If there have been 105 school days so far this year, about how many miles has he walked in all?

Round to the nearest whole number.

$$105 \times 0.75$$

$$\begin{array}{r} \downarrow \quad \downarrow \\ 105 \times 1 = 105 \end{array}$$

Use compatible numbers.

$$105 \times 0.75$$

$$\begin{array}{r} \downarrow \quad \downarrow \\ 100 \times 0.8 = 80 \end{array}$$

Be sure to place the decimal point correctly.

$$0.8 + 1.0 = 1.8$$



Both methods provide reasonable estimates of how far Manuel has walked.

Guided Practice

Do You Understand?

- Number Sense** There are about 20 school days in a month. About how many miles does Manuel walk each month? Write an equation to show your work.

$$20 \times 0.75 = 15$$

$$20 \times 1 = 20$$

- MP.2 Reasoning** Without multiplying, which estimate in the Another Example do you think is closer to the exact answer? Explain your reasoning.

100 x 0.8 is closer because 0.8 is closer to 0.75 than 1 is to 0.75.

Do You Know How?

In 3–8, estimate each product using rounding or compatible numbers.

$$3. 0.87 \times 112$$

$$4. 104 \times 0.33$$

$$5. 102 \times 80$$

$$6. 0.54 \times 24$$

$$7. 33.05 \times 200$$

$$8. 0.79 \times 51$$

Complete 15, 16, 21 & 22

Independent Practice

In 9–16, estimate each product.

$$9. 0.12 \times 105$$

$$10. 45.3 \times 4$$

$$11. 99.2 \times 82$$

$$12. 37 \times 0.93$$

$$13. 1.67 \times 4$$

$$14. 3.2 \times 184$$

$$15. 12 \times 0.37$$

$$16. 0.904 \times 75$$

$$10 \times 0.4 = 4$$

$$12 \times 0.4 = 4.8$$

$$10 \times 0 = 0$$

$$12 \times 0 = 0$$

$$1 \times 76 = 76$$

$$0.9 \times 80 = 72.0 = 72$$

$$1 \times 80 = 80$$

*For another example, see Set A on page 277.

Math Practices and Problem Solving

17. About how much money does Stan need to buy 5 T-shirts and 10 buttons?

18. Joseph buys a pair of shorts for \$17.95 and 4 T-shirts. About how much money does he spend?



Souvenir	Cost
Button	\$1.95
T-Shirt	\$12.50

19. Marcy picked 18.8 pounds of peaches at the pick-your-own orchard. Each pound costs \$1.28. About how much did Marcy pay for the peaches? Write an equation to model your work.

20. **MP.6 Be Precise** Joshua had \$20. He spent \$4.58 on Friday, \$7.43 on Saturday, and \$3.50 on Sunday. How much money does he have left? Show how you found the answer.

21. **Higher Order Thinking** Ms. Webster works 4 days a week at her office and 1 day a week at home. The route to Ms. Webster's office is 23.7 miles. The route home is 21.8 miles. About how many miles does she drive for work each week? Explain how you found your answer.

$$\begin{array}{r} 23.7 \rightarrow 24 \\ 21.8 \rightarrow 22 \\ \hline 46 \end{array}$$

$$\begin{array}{l} 46 \times 4 = x \\ 50 \times 4 = 200 \\ \text{About 200 miles} \end{array}$$

She drives about 46 miles each day. She drives 4 days. $50 \times 4 = 200$

Common Core Assessment

22. Rounding to the nearest tenth, which of the following give an **underestimate**?

- 39.45×1.7
- 27.54×0.74
- 9.91×8.74
- 78.95×1.26
- 18.19×2.28

$$\begin{array}{l} 39.5 \times 1.7 \uparrow \\ 27.5 \times 0.7 \downarrow \\ 9.9 \times 8.7 \downarrow \\ 79 \times 1.3 \uparrow \\ 18.2 \times 2.3 \uparrow \end{array}$$

23. Rounding to the nearest whole number, which of the following give an **overestimate**?

- 11.6×9.5
- 4.49×8.3
- 12.9×0.9
- 0.62×1.5
- 8.46×7.38