Multiplying and Dividing Decimals

Name: _____	Date: _____	Score: _____ / 17

Here is the trick for multiplying decimals: pretend the decimal points are not there, multiply as if you have whole numbers, and then count the total decimal places in both factors—that is where you place the point in your answer. For dividing decimals, slide the decimal in the divisor until it becomes a whole number, move the dividend's decimal the same number of places, and divide normally. A quick estimate before you calculate is your best friend—it tells you right away if the decimal point landed in the wrong spot!

Key Concepts & Quick Review

Multiply: ignore decimals → multiply → count total decimal places → insert point. 2.4×0.5: $24 \times 5 = 120$; $1 + 1 = 2$ places; $\mathbf{1.20}$

Divide: make divisor a whole number by moving its decimal right; move dividend's decimal the same; divide. $4.8 \div 0.6$: $48 \div 6 = \mathbf{8}$

Examples

① Find 2.4×0.15.

Think It Through: A good strategy is to ignore the decimals for a moment and multiply $24 \times 15 = 360$. Then count the decimal places in the original factors. The number 2.4 has 1 decimal place and 0.15 has 2, so the product needs 3 decimal places. Place the decimal three places from the right to get 0.360, which is 0.36. An estimate like $2 \times 0.2 \approx 0.4$ helps confirm that 0.36 makes sense.

Answer: 0.36

② A car travels at an average speed of $48.5\ mi$ per hour for 2.4 hours. How many miles does the car travel?

Think It Through: Use the formula distance $=$ rate $\times$ time, so compute 48.5×2.4. Ignore the decimals first: $485 \times 24 = 11{,}640$. Now count decimal places. Since each factor has one decimal place, the product needs two decimal places: 116.40, or $116.4\ mi$. It is also smart to estimate. Since 50×2 is about 100, an answer around $116\ mi$ is reasonable.

Answer: $116.4\ mi$

Practice Problems

Multiply (problems 1–12) or divide (problems 13–15).

1. $0.6 \times 0.8 =$ _____
2. $3.5 \times 2 =$ _____
3. $1.2 \times 0.5 =$ _____
4. $2.4 \times 3.5 =$ _____
5. $0.25 \times 0.4 =$ _____
6. $6.3 \times 0.07 =$ _____
7. $(-1.5) \times 0.6 =$ _____
8. $(-0.8) \times (-0.9) =$ _____

9. $4.2 \times 1.5 =$ _____

10. $0.03 \times 0.04 =$ _____

11. $(-2.5) \times 0.8 =$ _____

12. $1.25 \times 0.4 =$ _____

13. $4.8 \div 0.6 =$ _____

14. $3.6 \div 0.4 =$ _____

15. $0.48 \div 0.08 =$ _____

Study Tips

- For multiplication, **count** decimal places in both factors, then **insert** — do not guess by eye-balling the product.
- For division, make the **divisor** a whole number first by moving its decimal point; move the dividend's decimal the *same* number of places.
- Estimate first: $4.8 \div 0.6 \approx 5 \div 0.5 = 10$. If your exact answer isn't close to 8, recheck your decimal placement.

Word Problems

16. A store sells ribbon at \$$0.85$ per foot. A customer buys 3.6 feet of blue ribbon and 2.75 feet of red ribbon. Write multiplication expressions for the cost of each type, find each cost, and then find the total cost. If the customer pays with a \$$10$ bill, what is the change? _____

17. A cooling system lowers a room's temperature by $0.8°$F every minute. Write a multiplication expression for the temperature change after $12.5\ min$, and evaluate it. If the room started at $78.4°$F, what is the temperature after $12.5\ min$? Then find how many minutes it takes for the temperature to reach exactly $68°$F from the starting temperature. _____

Answer Keys

1) 0.48
2) 7
3) 0.6
4) 8.4
5) 0.1
6) 0.441
7) -0.9
8) 0.72
9) 6.3
10) 0.0012
11) -2
12) 0.5
13) 8
14) 9
15) 6
16) Blue: $\$3.06$; red: $\$2.3375 \approx \$2.34$; total $\approx \$5.40$; change $\approx \$4.60$.
17) Change $-10°$F; final $68.4°$F; $13\ min$ to $68°$F

Step-by-Step Explanations

Strategy: For Multiplying and Dividing Decimals, estimate first, then use place value to place the decimal after calculation. The estimate is the safety check that catches a misplaced decimal point.

Practice 1: $0.6 \times 0.8 =$ **Answer:** 0.48
For the first worked item, estimate first, calculate, then place the decimal where the size of the answer makes sense.

Practice 15: $0.48 \div 0.08 =$ **Answer:** 6
Near the end of this topic, estimate first, calculate, then place the decimal where the size of the answer makes sense.

Word-problem notes:

16. Answer: Blue: $\$3.06$; red: $\$2.3375 \approx \$2.34$; total $\approx \$5.40$; change $\approx \$4.60$.
Find each ribbon cost separately. For the blue ribbon, $0.85 \times 3.6 = 3.06$, so it costs \$3.06. For the red ribbon, $0.85 \times 2.75 = 2.3375$, which rounds to \$2.34 because money is measured to the nearest cent. Add the two costs: $3.06 + 2.34 = 5.40$. Then subtract from \$10 to get the change: $10 - 5.40 = 4.60$. Word problems about money often include rounding, so the context matters.

17. Answer: Change: $-0.8 \times 12.5 = -10°$F; final $= 68.4°$F; time to $68°$: $13\ min$.
Since the room is cooling, the temperature change is negative. After $12.5\ min$, the change is $-0.8 \times 12.5 = -10°$F. Starting from $78.4°$F, the new temperature is $78.4 - 10 = 68.4°$F. To reach exactly $68°$F, the room must cool by $78.4 - 68 = 10.4°$F. Divide by the rate: $10.4 \div 0.8 = 13\ min$. This is a nice reminder that $12.5\ min$ gets close, but not all the way to the target.

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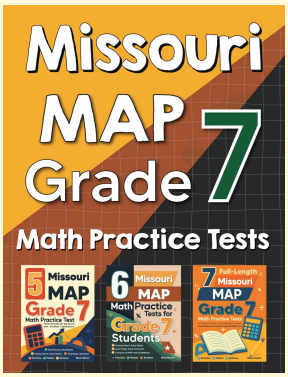

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