LESSON MAKER PRO

# Product Sense

*Estimate fraction products and check answers.*

**GRADE 5 · 5.NOS.D.12.a**

**5.NOS.D.12.a** "Estimate products by reasoning about benchmark numbers and assess reasonableness of answers (e.g., 1/2 × 3/4 will be less than 3/4 because I will have one half of 3/4)."

NAME _____ DATE _____

## USE A BENCHMARK

Replace a fraction that is near 0, 1/2, or 1 with that benchmark to estimate a product. When you multiply a positive number by a fraction less than 1, the product must be smaller than the number you started with. Use both ideas to check whether a claimed answer makes sense.

**WORKED EXAMPLE**

Estimate 7/12 × 2/3 using a benchmark. Could the exact product be 2/3?

1. 7/12 is close to 1/2.
2. 1/2 × 2/3 = 1/3, so the product is about 1/3.
3. Because 7/12 is less than 1, the exact product must be less than 2/3.

**Answer: About 1/3; no, 2/3 cannot be the exact product.**

## PRACTICE 6 problems

**1** Use 1/2 for 5/9 to estimate 5/9 × 3/4. Could the exact product be 3/4? Explain briefly.

**ANSWER** _____

**2** Use 1 for 11/12 to estimate 11/12 × 4/5. Is 1/5 a reasonable answer? Explain briefly.

**ANSWER** _____

**3** Use 1/4 for 3/10 to estimate 3/10 × 5/6. Is 1/4 a reasonable answer? Explain briefly.

**ANSWER** _____

**4** Use 1 for 7/8 to estimate 7/8 × 2/5. Is 7/20 a reasonable answer? Explain briefly.

**ANSWER** _____

**5** Use 1/4 for 1/6 to estimate 1/6 × 3/5. Could the exact product be 3/5? Explain briefly.

**ANSWER** _____

**6** Use 1/2 for 4/7 to estimate 4/7 × 5/8. Is 5/14 a reasonable answer? Explain briefly.

**ANSWER** _____

## APPLY IT Show your work

**1** In a game, you earn 5/6 of a 3/4-point bonus. Use 1 for 5/6 to estimate the points you earn. A teammate says you earned 1 1/4 points. Is that reasonable? Explain.

WORK SPACE

**ANSWER** _____

**2** A playlist lasts 4/5 hour. Mia listens to 3/8 of it. Use 1/2 for 3/8 to estimate how long she listens. A friend says she listens for 3/10 hour. Is that reasonable? Explain.

WORK SPACE

**ANSWER** _____

## CHALLENGE One step up

Two classmates estimate 5/11 × 7/9. Eli says 7/18, and Nia says 4/5. Find the exact product. Then use 1/2 for 5/11 and a size check to explain which classmate has a reasonable estimate.

WORK SPACE AND ANSWER

**ANSWER KEY**

# Product Sense

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## PART 1 · PRACTICE

| # | PROBLEM | ANSWER |
|---|---|---|
| 1 | Use 1/2 for 5/9 × 3/4. Could the exact product be 3/4? Explain briefly. | **About 3/8; no. Multiplying 3/4 by a fraction less than 1 gives less than 3/4.** |
| 2 | Use 1 for 11/12 to estimate 11/12 × 4/5. Is 1/5 a reasonable answer? Explain briefly. | **About 4/5; no. Since 11/12 is near 1, the product should be near 4/5, not 1/5.** |
| 3 | Use 1/4 for 3/10 to estimate 3/10 × 5/6. Is 1/4 a reasonable answer? Explain briefly. | **About 5/24; yes. The exact product is 1/4.** |
| 4 | Use 1 for 7/8 to estimate 7/8 × 2/5. Is 7/20 a reasonable answer? Explain briefly. | **About 2/5; yes. The exact product is 7/20.** |
| 5 | Use 1/4 for 1/6 to estimate 1/6 × 3/5. Could the exact product be 3/5? Explain briefly. | **About 3/20; no. Multiplying 3/5 by 1/6 gives less than 3/5.** |
| 6 | Use 1/2 for 4/7 to estimate 4/7 × 5/8. Is 5/14 a reasonable answer? Explain briefly. | **About 5/16; yes. The exact product is 5/14.** |

## PART 2 · APPLY IT

1. **About 3/4 point; no. You earn less than the full 3/4-point bonus.** Replacing 5/6 with 1 gives 1 × 3/4 = 3/4 point. The exact amount is 5/8 point, which is less than 3/4 point.
2. **About 2/5 hour; yes. The exact time is 3/10 hour.** The estimate is 1/2 × 4/5 = 2/5 hour. The exact product, 3/8 × 4/5, is 3/10 hour.

## CHALLENGE

**The exact product is 35/99. Eli's 7/18 is reasonable because 1/2 × 7/9 = 7/18. Nia's 4/5 is greater than 7/9, but the product must be less than 7/9.**

Accept equivalent fractions for estimates and exact products. For reasonableness checks, accept a correct comparison using a benchmark, an exact product, or the fact that multiplying by a fraction less than 1 makes the product smaller.