



Multiplication as scaling

GRADE 5 MATH

Name _____

Date _____

Do **not** calculate unless an item asks you to. Compare the multiplier with 1. One skill: **multiplication as scaling**.

WORKED EXAMPLE

Multiplying does **not** always make things bigger — that is true only when the multiplier is **more than 1**. Since $4/4$ **is** 1, multiplying 8 by $4/4$ leaves 8 alone; $3/4$ is less than $4/4$, so $8 \times 3/4$ must be **less** than 8, and $5/4$ is more, so $8 \times 5/4$ must be **more**. The multiplier alone decides, with **no multiplying**. And always ask **bigger than which?** — $2/3 \times 6$ is bigger than $2/3$ (multiplied by 6) and smaller than 6 (multiplied by $2/3$). The **other** factor decides.

1. Without calculating, is $20 \times 7/8$ more or less than 20? Give your reason.

APPLICATION

Show your thinking

Answer

2. Without calculating, is 20×1 more or less than 20? Give your reason.

APPLICATION

Show your thinking

Answer

3. Without calculating, is $20 \times \frac{9}{8}$ more or less than 20? Give your reason.

APPLICATION

Show your thinking

Answer

4. $\frac{3}{5} \times 9$. Without calculating, is the answer bigger or smaller than 9? And bigger or smaller than $\frac{3}{5}$? Explain both.

REASONING

Show your thinking

Answer

5. Zed says multiplying always makes a number bigger. Every example he has ever done agrees with him. Show him an example that does not, and explain why his rule seemed to work for so long.

REASONING

Show your thinking

Answer

6. Explain why $8 \times \frac{3}{4}$ must be less than 8, using the fact that $\frac{4}{4} = 1$. Do not work out $8 \times \frac{3}{4}$.

REASONING

Show your thinking

Answer