Grade 4 Unit 7 worksheet: Making an equivalent fraction by multiplying (answer key)

ANSWERS AT A GLANCE

1. (a) 4 (b) 8 (c) 50 (d) 20 (e) 8 (f) 12 (g) 100 (h) 12
2. (a) 10 small parts, 4 shaded. (b) $\frac{2}{5} = \frac{4}{10}$. (c) The line went through every part, the shaded ones and the plain ones, so both counts doubled; no shading was added or taken away.
3. (a) 2 (b) 2 (c) $\frac{1}{6} = \frac{2}{12}$
4. (a) No. Turning 3 pieces into 12 cuts every third into 4, so the 2 counted thirds become 2 × 4 = 8 pieces, not 6. (b) $\frac{2}{3} = \frac{8}{12}$
5. $\frac{1}{2}$: $\frac{4}{8}$, $\frac{5}{10}$, $\frac{6}{12}$, $\frac{50}{100}$. $\frac{1}{4}$: $\frac{2}{8}$, none, $\frac{3}{12}$, $\frac{25}{100}$. $\frac{2}{5}$: none, $\frac{4}{10}$, none, $\frac{40}{100}$. For example, $\frac{1}{4}$ has no name in tenths, because no whole number times 4 is 10.
6. (a) 10 (b) 14 (c) $\frac{7}{5} = \frac{14}{10}$

WORKED SOLUTIONS

1. Find the missing number.

(a) $\frac{1}{3} = \frac{\square}{12}$ (b) $\frac{4}{5} = \frac{\square}{10}$ (c) $\frac{1}{2} = \frac{\square}{100}$

(d) $\frac{5}{2} = \frac{\square}{8}$ (e) $\frac{3}{4} = \frac{6}{\square}$ (f) $\frac{1}{6} = \frac{2}{\square}$

(g) $\frac{9}{10} = \frac{90}{\square}$ (h) $\frac{7}{6} = \frac{14}{\square}$

ANSWER

(a) 4 (b) 8 (c) 50 (d) 20 (e) 8 (f) 12 (g) 100 (h) 12

SOLUTION

(a) 3 × 4 = 12, so every third is cut into 4: 1 × 4 = 4.

(b) 5 × 2 = 10, so every fifth is cut into 2: 4 × 2 = 8.

(c) 2 × 50 = 100, so every half is cut into 50: 1 × 50 = 50.

(d) 2 × 4 = 8, so every half is cut into 4: 5 × 4 = 20.

(e) The top tells the cut: 3 × 2 = 6, so the bottom is 4 × 2 = 8.

(f) 1 × 2 = 2, so the bottom is 6 × 2 = 12.

(g) 9 × 10 = 90, so the bottom is 10 × 10 = 100.

(h) 7 × 2 = 14, so the bottom is 6 × 2 = 12.

2. Draw a strip cut into 5 equal parts and shade 2 of them. Then draw a line through the middle of every part, so each part becomes 2 smaller parts.

(a) How many small parts does the strip have now? How many are shaded?

(b) Write the shaded part as two equivalent fractions.

(c) Use your strip to explain why the top and the bottom were both multiplied by 2.

ANSWER

(a) 10 small parts, 4 shaded. (b) $\frac{2}{5} = \frac{4}{10}$. (c) The line went through every part, the shaded ones and the plain ones, so both counts doubled; no shading was added or taken away.

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SOLUTION

(a) The strip had 5 parts and each became 2, so it has 5 × 2 = 10 small parts. The 2 shaded parts each became 2 as well, so 2 × 2 = 4 small parts are shaded.

(b) Before the cut the shading is $\frac{2}{5}$ of the strip. After it, the same shading is 4 of 10 parts:

$$\frac{2}{5} = \frac{2 \times 2}{5 \times 2} = \frac{4}{10}$$

(c) The bottom counts the parts that make the whole strip, and every one of those was cut into 2, so it was multiplied by 2. The top counts the shaded parts, and they were cut into 2 too, so it was also multiplied by 2. The shading did not change, so the two fractions name the same amount.

3. Priya cuts a sheet cake into 6 equal pieces and puts frosting flowers on 1 of them. More guests come, so Priya cuts every piece the same way until the cake has 12 equal pieces.

(a) Into how many smaller pieces was each piece cut?

(b) How many of the small pieces have flowers?

(c) Write the flower part of the cake as two equivalent fractions.

ANSWER

(a) 2 (b) 2 (c) $\frac{1}{6} = \frac{2}{12}$

SOLUTION

(a) The cake went from 6 pieces to 12 pieces, and 6 × 2 = 12, so every piece was cut into 2.

(b) The pieces with flowers were cut the same way, so they became 1 × 2 = 2 small pieces.

(c) No flowers moved, so the flower part is the same amount in both names:

$$\frac{1}{6} = \frac{1 \times 2}{6 \times 2} = \frac{2}{12}$$

4. Owen wants to write $\frac{2}{3}$ in twelfths. He writes $\frac{2}{3} = \frac{6}{12}$ and says, "I multiplied the top by 3 and the bottom by 4."

(a) Is Owen right? Explain using what happens when you cut the pieces.

(b) Write $\frac{2}{3}$ in twelfths correctly.

ANSWER

(a) No. Turning 3 pieces into 12 cuts every third into 4, so the 2 counted thirds become 2 × 4 = 8 pieces, not 6. (b) $\frac{2}{3} = \frac{8}{12}$

SOLUTION

(a) Owen is not right. To turn 3 pieces into 12 pieces, every third is cut into 4, because 3 × 4 = 12. One cut goes through every piece, the counted ones too, so each of the 2 counted thirds also becomes 4 pieces. The top must be multiplied by the same 4, not by 3.

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(b)

$$\frac{2}{3} = \frac{2 \times 4}{3 \times 4} = \frac{8}{12}$$

5. Fill in the table. Each box holds a name for the fraction at the start of its row, with the bottom number at the top of its column. If no whole number fits on top, write "none".

Fraction	bottom 8	bottom 10	bottom 12	bottom 100
$\frac{1}{2}$				
$\frac{1}{4}$				
$\frac{2}{5}$				

Then pick one box where you wrote "none" and explain in one sentence why no whole number fits.

ANSWER

$\frac{1}{2}$: $\frac{4}{8}$, $\frac{5}{10}$, $\frac{6}{12}$, $\frac{50}{100}$. $\frac{1}{4}$: $\frac{2}{8}$, none, $\frac{3}{12}$, $\frac{25}{100}$. $\frac{2}{5}$: none, $\frac{4}{10}$, none, $\frac{40}{100}$. For example, $\frac{1}{4}$ has no name in tenths, because no whole number times 4 is 10.

SOLUTION

For each box, find the number that turns the old bottom into the new bottom, then multiply the top by the same number.

Halves: 2 × 4 = 8, 2 × 5 = 10, 2 × 6 = 12, 2 × 50 = 100, so $\frac{1}{2} = \frac{4}{8} = \frac{5}{10} = \frac{6}{12} = \frac{50}{100}$.

Quarters: 4 × 2 = 8, 4 × 3 = 12, 4 × 25 = 100, so $\frac{1}{4} = \frac{2}{8} = \frac{3}{12} = \frac{25}{100}$. For tenths, 4 × 2 = 8 and 4 × 3 = 12, so no whole number times 4 makes 10: none.

Fifths: 5 × 2 = 10 and 5 × 20 = 100, so $\frac{2}{5} = \frac{4}{10} = \frac{40}{100}$. No whole number times 5 makes 8 or 12 (5 × 1 = 5, 5 × 2 = 10, 5 × 3 = 15): none for both.

Any "none" can be explained the same way: the quarters (or fifths) cannot each be cut into the same whole number of pieces to make that many pieces in all.

6. Every granola bar in a box is marked into 5 equal pieces that snap apart. Andre has 7 of these pieces, which is more than one whole bar. Andre snaps every piece into 2 smaller pieces.

(a) How many small pieces make one whole bar?

(b) How many small pieces does Andre have?

(c) Write the amount of granola bar Andre has as two equivalent fractions.

ANSWER

(a) 10 (b) 14 (c) $\frac{7}{5} = \frac{14}{10}$

SOLUTION

(a) A whole bar was 5 pieces and each became 2, so a whole bar is 5 × 2 = 10 small pieces.

(b) Each of the 7 pieces became 2 small pieces: 7 × 2 = 14.

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(c) Before snapping, Andre has $\frac{7}{5}$ of a bar. Snapping does not change how much granola there is, so

$$\frac{7}{5} = \frac{7 \times 2}{5 \times 2} = \frac{14}{10}$$

The rule works the same when the top is bigger than the bottom.

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