

## 6.NS Video Game Credits

### Task

It requires  $\frac{1}{4}$  of a credit to play a video game for one minute.

- Emma has  $\frac{7}{8}$  credits. Can she play for more or less than one minute? Explain how you know.
- How long can Emma play the video game with her  $\frac{7}{8}$  credits?

### IM Commentary

This task could be used in instructional activities designed to build understandings of fraction division. With teacher guidance, it could be used to develop knowledge of the common denominator approach and the underlying rationale.

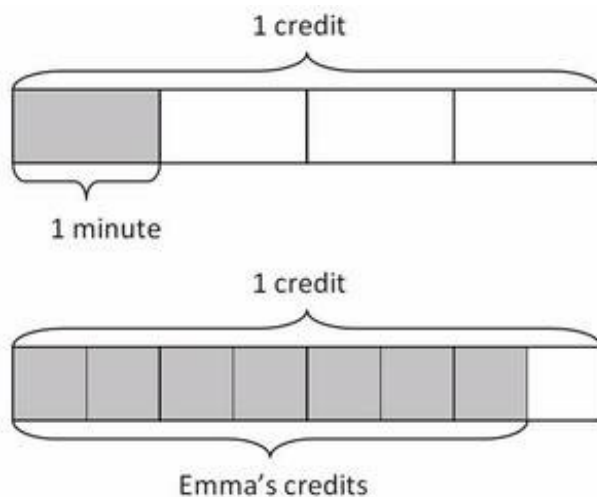
### Solutions

#### **Solution: Solution**

a. A video game requires  $\frac{1}{4}$  of a credit for one minute of playing time, which is the same as saying that the video game requires  $\frac{2}{8}$  of a credit for one minute of playing time. If Emma has  $\frac{7}{8}$  of a credit, she certainly has enough credit to play for more than one minute because  $\frac{7}{8}$  is more than  $\frac{2}{8}$ .

$$\frac{7}{8} > \frac{2}{8} \quad \text{and} \quad \frac{2}{8} = \frac{1}{4} \quad \text{thus} \quad \frac{7}{8} > \frac{1}{4}$$

b. The video game requires  $\frac{1}{4}$  of a credit for one minute of playing time, and Emma has  $\frac{7}{8}$  of a credit. If we think of  $\frac{1}{4}$  of a credit as a group, then we are really being asked, "How many groups of  $\frac{1}{4}$  are in  $\frac{7}{8}$ ?"



This is the meaning of  $\frac{7}{8} \div \frac{1}{4}$ . Looking at the picture above, we see that there are  $3\frac{1}{2}$  minutes in  $\frac{7}{8}$  credit.

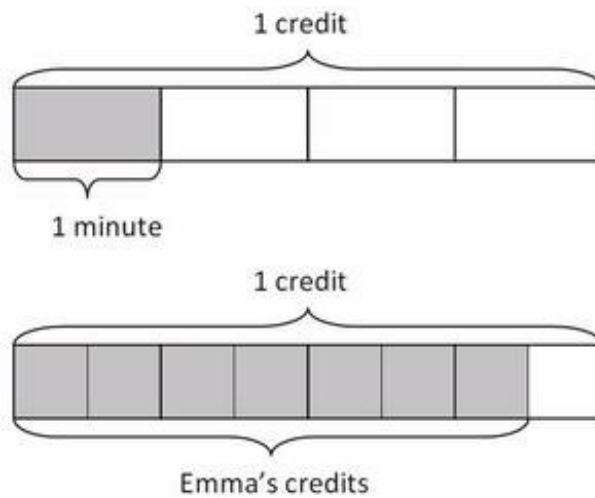
If we do the standard fraction division algorithm, we get the same thing:

$$\frac{7}{8} \div \frac{1}{4} = \frac{7}{8} \times \frac{4}{1} = \frac{28}{8} = \frac{7}{2} = 3\frac{1}{2}$$

No matter how we look at it, we can see that Emma can play the video game for  $3\frac{1}{2}$  minutes with her  $\frac{7}{8}$  of a credit.

**Solution: Another solution for part (b)**

The video game requires  $\frac{1}{4} = \frac{2}{8}$  of a credit for one minute of playing time, and Emma has  $\frac{7}{8}$  of a credit. If we think of  $\frac{2}{8}$  of a credit as a group, then we are really being asked, "How many groups of  $\frac{2}{8}$  are in  $\frac{7}{8}$ ?"



As we can see in the picture, This is the same thing as saying "How many groups of 2 are in 7. In fact, we can do our computations in a way that reflects this:

$$\begin{aligned}
 \frac{7}{8} \div \frac{2}{8} &= \frac{7}{8} \times \frac{8}{2} \\
 &= \left(7 \times \frac{1}{8}\right) \times \left(8 \times \frac{1}{2}\right) \\
 &= \left(8 \times \frac{1}{8}\right) \times \left(7 \times \frac{1}{2}\right) \\
 &= 1 \times \frac{7}{2} \\
 &= 3\frac{1}{2}
 \end{aligned}$$

So Emma can play the video game for  $3\frac{1}{2}$  minutes with her  $\frac{7}{8}$  of a credit.

**Solution: Yet another solution for part (b)**

We know that  $\frac{2}{8}$  of a credit gives 1 minute, so  $\frac{1}{8}$  of a credit gives  $\frac{1}{2}$  minute.

Since  $\frac{1}{8}$  of a credit would give  $\frac{1}{2}$  a minute, we know that  $\frac{7}{8}$  of a credit would give  $7 \times \frac{1}{2} = \frac{7}{2}$  minutes.



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