

# 7.RP Stock Swaps, Variation 2

Alignments to Content Standards: 7.RP.A

## Task

Microsoft Corp. wants to acquire 1.5 million shares of Apple Corp. that are worth \$374 per share and is willing to swap Microsoft Corp. shares at \$26 per share. How many shares (to the nearest share) do they need to offer to get an even swap?

## IM Commentary

This problem can be solved in more than one way. The choice in solution method may reflect the comfort and mathematical sophistication of the student.

Teachers should be aware that the context of stock purchase may not be familiar to 7th graders. The context should be explained to students if needed.

## Solutions

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### **Solution: Using rates**

This problem can be solved by setting up a simple equation for the total worth of each side of the transaction:

$$\frac{374 \text{ dollars}}{\text{share}} \cdot 1,500,000 \text{ shares} = \frac{26 \text{ dollars}}{\text{share}} \cdot x \text{ shares} .$$

Or

$$374 \cdot 1,500,000 \text{ dollars} = 26 \text{ dollars} \cdot x.$$

Notice how the "shares" in the numerator and the denominator cancel each other out.

Solve for  $x$  to get:

$$x = \frac{374 \cdot 1,500,000 \text{ dollars}}{26 \text{ dollars}} = \frac{374 \cdot 1,500,000}{26}.$$

With both the "shares" and the "dollars" canceled out, there are no units left. It is important to note that the equation is set up so that  $x$  has no units. It is the NUMBER of shares because the question asked "how many?" All that is necessary is to compute how much money Apple's shares are worth (step 1) and then compute the number of shares at \$26 dollars a share it would take to give this much money (step 2).

The total cost of the Apple shares is

$$\frac{374 \text{ dollars}}{\text{share}} \cdot 1.5 \text{ million shares} = 561 \text{ million dollars}.$$

At \$26 per share for Microsoft, they must offer

$$561,000,000 \text{ dollars} \cdot \frac{\text{share}}{26 \text{ dollars}} = 21,576,923 \text{ shares}.$$

(To the nearest share.)

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### **Solution: Using the unit rate**

Alternatively, the ratio of the cost of Apple shares to Microsoft shares is 374 to 26, so the unit rate is 14.38461538.... If we compute this with units, we see that

$$\frac{\frac{\$374}{\text{Apple share}}}{\frac{\$26}{\text{Microsoft share}}} = \frac{374 \text{ Microsoft shares}}{26 \text{ Apple shares}} \approx 14.384 \frac{\text{Microsoft shares}}{\text{Apple share}}$$

In other words, there are about 14.384 Microsoft shares needed per Apple share. If Microsoft must match the 1.5 million shares of Apple, we multiply the unit rate with 1.5 million to get the 21,576,923 Microsoft shares.



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