Problem Solving:
Use Reasoning

School Fair At the school fair, game winners could exchange their prizes for other prizes. The table shows some of the possible exchanges. Michael wants to find how many notebooks he would need to trade for one mug.

Prize Trade
10 pencils = 1 notebook
4 notebooks = 1 banner
4 banners = 1 t-shirt
2 mugs = 1 t-shirt

Read and Understand

What do you know?   Prize winners can exchange prizes using the equivalencies in the table.

What are you trying to find?   The number of notebooks that can be traded for one mug.

Plan and Solve

What strategy will you use?   Use reasoning.

You know that 2 mugs can be traded for 1 t-shirt. The table shows that 4 banners can also be traded for 1 t-shirt.

You know that 4 notebooks can be traded for 1 banner. You need 4 banners for 1 t-shirt. To get 4 banners you need 4×4, or 16 notebooks.

So, 16 notebooks can be traded for 1 t-shirt, which can be traded for 2 mugs. Michael wants 1 mug. He cannot cut a t-shirt in half, but he can divide the number of notebooks by 2: $16 \div 2 = 8$. Michael needs 8 notebooks to trade for 1 mug.

Look Back and Check

Is your answer reasonable?   Yes, 2 mugs can be traded for 4 banners, so 1 mug can be traded for 2 banners. Eight notebooks can also be traded for 2 banners.

Use the data in the Example to solve the problems.

1. How many banners are needed to trade for 8 t-shirts?

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2. How many pencils are needed to trade for a notebook and a banner?

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3. How many banners are needed to trade for 6 mugs? Explain.

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