

Multiplication and Division Problem Situations

ASYMMETRIC (NONMATCHING) FACTORS				
	Product Unknown	Multiplier (Number of Groups) Unknown	Measure (Group Size) Unknown	
Equal Groups	<p>Mayim has 8 vases to decorate the tables at her party. She cuts a ribbon $1\frac{3}{4}$ feet long to tie a bow around the vase. How many feet of ribbon does she need?</p> $8 \times 1\frac{3}{4} = x$ $x \div 8 = 1\frac{3}{4}$	<p>Mayim has some vases to decorate the tables at her party. She uses $1\frac{3}{4}$ feet of ribbon to tie a bow around each vase. If she uses 14 feet of ribbon, how many vases does she have?</p> $x \times 1\frac{3}{4} = 14$ $x = 14 \div 1\frac{3}{4}$	<p>Mayim uses 14 feet of ribbon to tie bows around the vases that decorate the tables at her party. If there are 8 vases, how many feet of ribbon are used on each vase?</p> $8x = 14$ $14 \div 8 = x$	
	Product Unknown (y)	(Unit) Rate Unknown (k)	Measure Unknown (x)	
Ratio/Rate*	<p>Tom drove 60 miles per hour (on average) for 4 hours. How many miles did he travel?</p> $4 \times 60 = y$ $\frac{y}{4} = 60$	<p>Tom drove at the same speed (on average) during his entire 4-hour trip. He traveled a total of 240 miles. At what speed did he travel (on average)?</p> $4k = 240$ $\frac{240}{4} = k$	<p>Tom drove 60 miles per hour (on average) for all 240 miles of his trip. For how many hours did he travel?</p> $60x = 240$ $\frac{240}{x} = 60$	
	Resulting Value Unknown	Scale Factor (Times as Many) Unknown	Original Value Unknown	
Multiplicative Comparison	<p>Armando's family is doing a puzzle this week that has 500 pieces. Next week's puzzle has 1.5 times as many pieces. How many pieces does next week's puzzle have?</p> $500 \times 1.5 = x$ $x \div 1.5 = 500$	<p>Sydney's middle school has 500 students. José's middle school has 750 students. How many times bigger than Sydney's school is José's school?</p> $500x = 750$ $500 = 750 \div x$	<p>Mrs. W didn't order enough tickets for the festival. Mr. D ordered 750 tickets. Mrs. W said, "You bought 1.5 times as many tickets as I did." How many tickets did Mrs. W order?</p> $1.5 \times x = 750$ $750 \div x = 1.5$	
SYMMETRIC (MATCHING) FACTORS				
	Product Unknown	One Dimension Unknown	Both Dimensions Unknown	
Area/Array	<p>Mr. Bradley bought a new mat for the front entrance to the school. One side measured $3\frac{1}{3}$ feet and the other side measured 12 feet. How many square feet does the mat cover?</p> $3\frac{1}{3} \times 12 = x$ $x \div 12 = 3\frac{1}{3}$	<p>The 40 members of the student council lined up on the stage to take yearbook pictures. The first row included 8 students and the rest of the rows did the same. How many rows were there?</p> $8x = 40$ $x = 40 \div 8$	<p>Daniella was designing a foundation using graph paper. She started with 40 squares. How many units long and wide could the foundation be?</p> $x \times y = 40$ $40 \div x = y$	
	Sample Space (Total Outcomes) Unknown	One Factor Unknown	Both Factors Unknown	
Combinatorics** (Probability and Cartesian Products)	<p>Karen has 3 shirts and 7 pairs of pants. How many unique outfits can she make?</p> $3 \times 7 = x$ $3 = x \div 7$	<p>Evelyn says she can make 21 unique ice cream sundaes (1 scoop + 1 topping) using just ice cream flavors and toppings. If she has 3 flavors of ice cream, how many toppings does she have?</p> $3y = 21$ $21 \div 3 = x$	<p>Audrey can make 21 different fruit sodas using the soda mixing machine. How many different flavorings and sodas could there be?</p> $xy = 21$ $x = 21 \div y$	

*Equal Groups problems, in many cases, are special cases of a category that includes all ratio and rate problem situations. Distinguishing between the two categories is often a matter of interpretation. Since the Ratio/Rate category is a critically important piece of the middle school curriculum and beyond, the Ratio/Rate category is given its own row here.

**Combinatorics (probability and Cartesian products) are typically not included in the table of multiplication and division problem situations. Since this is a category of problem situation addressed in middle school mathematics standards, it has been added to this table.

References

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