Bar Diagrams for Operations - *enVisionMATH*

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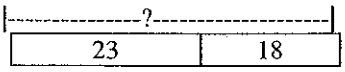
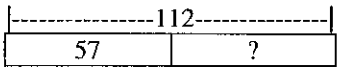
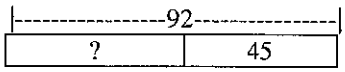
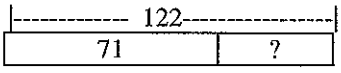
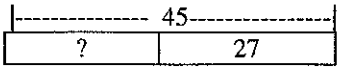
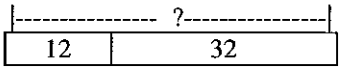
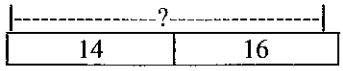
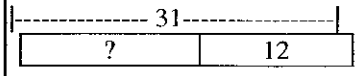
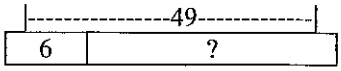
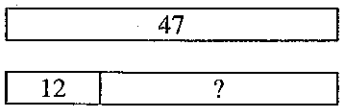
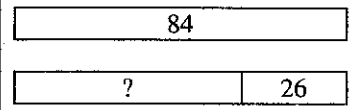
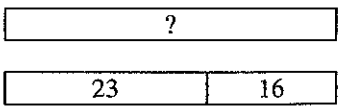
Bar Diagrams for Addition and Subtraction Situations

Problem Type **Joining**	**Example A** **Total Amount Unknown**	**Example B** **Amount Joined Unknown**	**Example C** **Initial Amount Unknown**
	Kim has 23 antique dolls. Her Father gives her 18 more antique dolls. Now how many antique dolls does she have?	Debbie has saved $57. How much more money does she need in order to have $112?	Tom had some money in his savings account. He then deposited $45 into the same account. Then he had $92 in all. How much did he have in his savings account to start?
Diagram Showing the Relationship			
Description of the Relationship	The two unequal amounts (23 and 18) are known and being joined and the total is unknown.	The initial amount is known (57). The amount being joined to that is unknown. The total is known (112).	The initial amount is unknown. The amount being joined to that is known (45) and the total is known (92).
Number Sentence	23 + 18 = ?	57 + ? = 112 112 – 57 = ?	? + 45 = 92 92 – 45 = ?

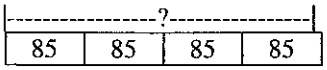
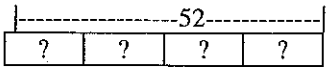
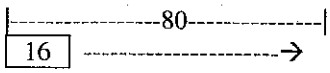
Problem Type **Separating**	**Example D** **Amount Remaining Unknown**	**Example E** **Amount Separated Unknown**	**Example F** **Initial Amount Unknown**
	Steven has 122 jelly beans. He eats 71 of them in one weekend. How many jelly beans are left?	Carrie has 45 CDs. She gives some to Jo. Now Carrie has 27 left. How many did she give to Jo?	Alan has some marbles. He lost 12 of them. Then he had 32 left. How many did he have before he lost some?
Diagram Showing the Relationship			
Description of the Relationship	The total amount is known (122) and the amount separated from that is known (71). The amount remaining is unknown.	The total amount is known (45) and the amount separated from that is unknown. The amount remaining is known (27).	The total is unknown. The amount separated from the total is known (12) and the amount remaining is known (32).
Number Sentence	122 – 71 = ?	45 - ? = 27 27 + ? = 45	? – 12 = 32 12 + 32 = ?

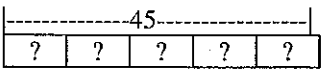
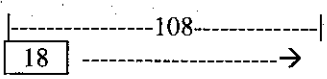
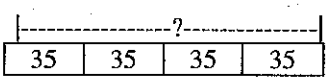
Bar Diagrams for Addition and Subtraction Situations

Problem Type	Example G Whole Unknown	Example H One Part Unknown	Example I Another Part Unknown
Part-Part-Whole	Fourteen cats and 16 dogs are in the kennel. How many dogs and cats are in the kennel?	Some adults and 12 children were on a bus. There are 31 people in all on the bus. How many adults were on the bus?	Forty-nine people went on a hike. Six were adults and the rest were children. How many children went on the hike?
Diagram Showing the Relationship			
Description of the Relationship	Each unequal part is known (14 and 16); the whole is unknown.	The first part is unknown, but the second part is known (12). The whole is known (31).	The whole is known (49) and the initial part is known (6). The other part is unknown.
Number Sentence	14 + 16 = ?	? + 12 = 31 31 – 12 = ?	6 + ? = 49 49 – 6 = ?

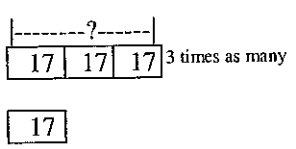
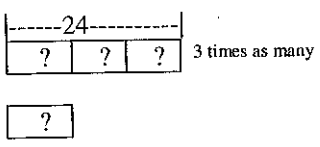
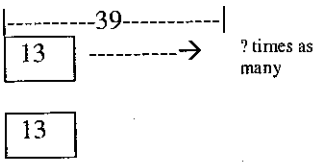
Problem Type	Example J Amount More (or Less) Unknown	Example K Smaller Amount Unknown	Example L Larger Amount Unknown
Comparison	Alex has 47 toy cars. Keisha has 12 cars. How many more cars does Alex have?	Fran spent $84 which was $26 more than Alice spent. How much did Alice spend?	Barney has 23 old coins. Steve has 16 more old coins than Barney. How many old coins does Steve have?
Diagram Showing the Relationship			
Description of the Relationship	Two known amounts (47 and 12) are being compared. The amount more/less is unknown.	The larger amount is known (84), and smaller amount is unknown. The amount more the larger is than the smaller is known (26).	One smaller amount is known (23), and the larger amount is not known. The amount more the larger is than the smaller is known (16).
Number Sentence	47 – 12 = ?	84 - ? = 26 84 – 26 = ?	23 + 16 = ? ? – 23 = 16

Bar Diagrams for Multiplication and Division Situations

	Example M Total Amount Unknown	Example N Amount per Group Unknown	Example O Number of Groups Unknown
Problem Type **Joining Equal Groups**	Kim has 4 photo albums. Each album has 85 pictures. How many photos are in her 4 albums?	Pam had 4 bags and put the same number of apples in each bag. She ended up with 52 apples in bags. How many did she put in each bag?	Fred bought some books that each cost $16. He spent $80 altogether. How many books did he buy?
Diagram Showing the Relationship			
Description of the Relationship	Four equal known amounts (85) are being joined to find the unknown total.	A known number (4) of unknown but equal amounts are being joined to give a known total (52).	A known amount (16) is being joined an unknown number of times to itself to get a known total (80).
Number Sentence	4 x 85 = ?	4 x ? = 52 52 ÷ 4 = ?	? x 16 = 80 80 ÷ 16 = ?

Problem Type **Separating Equal Groups**	Example P Amount per Group Unknown	Example Q Number of Groups Unknown	Example R Total Amount Unknown
	Byron has 45 pigeons. He keeps them in 5 pens with the same number of pigeons in each. How many pigeons are in each pen?	A total of 108 children signed up for soccer. How many 18-person teams can be made?	Kim had some cards. She put them into piles of 35 and was able to make 4 piles. How many cards did she have to start?
Diagram Showing the Relationship			
Description of the Relationship	The total is known (45) and being separated into a known number of equal groups (5) but the amount in each group is unknown.	The total is known (108) and being separated into equal groups of a known amount (18). The number of equal groups needed to match the total is unknown.	The total amount is unknown. It is separated into a known number of groups (4) with a known equal amount in each (35).
Number Sentence	45 ÷ 5 = ?	216 ÷ 18 = ? 18 x ? = 216	? ÷ 4 = 35 4 x 35 = ?

Bar Diagrams for Multiplication and Division Situations

Problem Type **Comparison**	**Example S** **Larger Amount Unknown**	**Example T** **Smaller Amount Unknown**	**Example U** **Number of Times as Many Unknown**
	Alex has 17 toy cars. Keisha has 3 times as many. How many cars does Keisha have?	Barney has 24 old coins. This is 3 times more coins than Steve has. How many old coins does Steve have?	Ann's teacher is 39 years old. Ann is 13 years old. Ann's teacher is how many times as old as Ann?
Diagram Showing the Relationship			
Description of the Relationship	The smaller amount is known (17) and the larger amount is a given number of times more (3). The larger quantity is not known.	The larger amount is known (24) and is a given number of times greater than the small amount (3). The smaller amount is not known.	The larger amount (39) and the smaller amount (13) are known. How many times more the larger amount is than the smaller amount is not known.
Number Sentence	$3 \times 17 = ?$	$3 \times ? = 24$ $24 \div 3 = ?$	$? \times 13 = 39$ $39 \div 13 = ?$