Name ___Answer Key___

Here is a square from a multiplication table.

×	5	6
2	10	12
3	15	18

a. Write two true observations about patterns in the square.

b. Make up a similar square using different numbers.

c. Write three true observations about your squares.

ANSWER: **a.** Sample: The sums of the diagonals are different by 1. Moving right or down increases the number by the heading of that column or row. **b.** Answers will vary. **c.** Answers will vary.

COMMENTS & EXTENSIONS: Do the same observations hold for a 3 × 3 square? For example, for this 2 × 2, the sums along the two diagonals (10 + 18 and 15 + 12) differ by 1. Is this true with a 3 × 3 square?

✍ Make a 3 × 3 multiplication square. What observations do you notice about this square? How do these observations differ from your observations of the 2 × 2 square?

Try This

My cat weighs 3 pounds. My dog weighs 5 times as much as my cat. How much does my dog weigh?

- Use Cuisenaire Rods to model the problem.
- Draw your model.
- Write an equation to show the answer.
- Write the answer.

Cat: | lt green |

Dog: | lt green | lt green | lt green | lt green | lt green |
| orange | w | w | w | w | w |

Equation: 5 × 3 = 15   My dog weighs 15 pounds.

---

1. Jackson ran 4 laps at the track on Monday. On Wednesday, he ran 3 times as many laps. How many laps did he run on Wednesday?

Monday: | purple |

Wednesday: | purple | purple | purple |
| orange | w | w |

Equation: _____ 3 × 4 = 12 _____   Jackson ran __12__ laps on Wednesday.

2. This month, Debbie saved two times as much money as she saved last month. Last month she saved $8. How much did she save this month?

Last month: | brown |

This month: | brown | brown |
| orange | w | w | w | w | w | w |

Equation: _____ 2 × 8 = 16 _____   Debbie saved __$16__ this month.

© ETA hand2mind®

Name ___*Answer Key*___

3. This week Andrea ate 4 times as many apples as she ate last week. Last week she ate 2 apples. How many apples did she eat this week?

Last week:
| red |

This week:
| red | red | red | red |
| brown |

Equation: _____ $4 \times 2 = 8$ _____

Andrea ate __8__ apples this week.

4. A ribbon is 6 centimeters long. A piece of yarn is 3 times as long. How long is the piece of yarn?

Ribbon:
| dark green |

Yarn:
| dark green | dark green | dark green |
| orange | w | w | w | w | w | w | w | w |

Equation: _____ $3 \times 6 = 18$ _____

The piece of yarn is __18__ centimeters long.

Solve the problem. Write an equation and the answer.

5. Sheldon is 7 years old. His father is 6 times as old as he is. How old is his father?

Equation: _____ $6 \times 7 = 42$ _____

Sheldon's father is __42__ years old.

Name ___*Answer Key*___

6. Raj has 5 times as many baseball cards as Joey. If Joey has 8 cards, how many does Raj have?

Equation: _____ 5 × 8 = 40 _____

Raj has __40__ baseball cards.

7. Lena has 9 nickels. Mari has 7 times as many. How many nickels does Mari have?

Equation: _____ 7 × 9 = 63 _____

Mari has __63__ nickels.

Multiplicative Comparison

Name ___**Answer Key**___

Use Cuisenaire Rods to build the model. Use the model to complete the problem.

1. Amy has 2 cats. Her friend has 3 times as many cats. How many cats does Amy's friend have?

Amy: | red |

Friend: | red | red | red |
| dark green |

Equation: 3 × 2 = __6__   Amy's friend has __6__ cats.

2. Bonita has two times as many pets as Tom. If Tom has 8 pets, how many pets does Bonita have?

Tom: | brown |

Bonita: | brown | brown |
| orange | w | w | w | w | w | w |

Equation: _____ 2 × 8 = 16 _____   Bonita has __16__ pets.

Use Cuisenaire Rods to model the problem. Draw your model. Use the model to complete the problem.

3. Ann is 5 years old. Her brother is 3 times as old. How old is Ann's brother?

Ann's age: | yellow |

Brother's age: | yellow | yellow | yellow |
| orange | w | w | w | w | w |

Equation: _____ 3 × 5 = 15 _____   Ann's brother is __15__ years old.

Name ___*Answer Key*___

4. Darden picked 3 apples. Jack picked 7 times as many apples. How many apples did Jack pick?

Darden:

lt green

Jack:

lt green	lt green	lt green	lt green	lt green	lt green	lt green

orange	orange	w

Equation: _____ $7 \times 3 = 21$ _____

Jack picked ___21___ apples.

Write an equation that tells the answer to the problem.

5. Over the summer, Nelly read 9 books. Sam read 4 times as many books. How many books did Sam read?

Equation: _____ $4 \times 9 = 36$ _____

6. Brandon's tomato plant is 4 feet tall. His corn plant is two times as tall as his tomato plant. How tall is his corn plant?

Equation: _____ $2 \times 4 = 8$ _____

7. Luke has lived in Suntown for 6 years. His mother has lived in Suntown for 5 times as many years. How many years has Luke's mother lived in Suntown?

Equation: _____ $5 \times 6 = 30$ _____

2

a. A bus holds 20 passengers. How many buses are needed for the group of 24 children, 3 parents, and 2 teachers going on a field trip?

b. A van holds 12 passengers. How many vans are needed for 30 schoolchildren?

ANSWER: a. 2 buses; **b.** 3 vans

COMMENTS & EXTENSIONS: The National Assessment of Educational Progress (NAEP) has used questions like this for children around 13 years old. Many children used rote techniques and thus gave unrealistic answers. A good practice is to check one's answer within the real-life context of the problem. And make sure there are no fractional vehicles!

A school bus holds 34 students and 1 driver. Draw a bird's eye view of the bus seats. [Do not forget the driver's seat]

Try This

A tree is 24 feet tall. It is 6 times as tall as Penny. How tall is Penny?

■ Build a model using Cuisenaire Rods.

■ Draw your model.

■ Give the answer and write an equation.

Think: The tree is 24 feet tall.

Tree: | orange | orange | w | w | w | w |

| purple | purple | purple | purple | purple | purple |
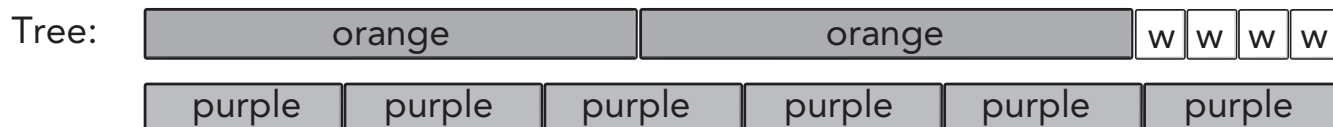
Penny: | purple | Find: 24 is 6 times as many as 4.

Penny is 4 feet tall.

Equation: $24 = 6 \times 4$, or $24 \div 6 = 4$

---

1. There are 20 monkeys in a zoo. There are 4 times as many monkeys as tigers. How many tigers are there?

Monkeys: | orange | orange |

| yellow | yellow | yellow | yellow |

Tigers: | yellow |
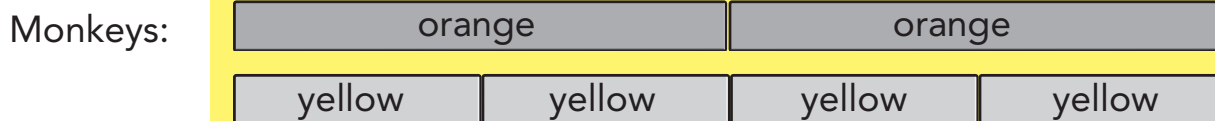
There are __5__ tigers.   Equation: ___$20 = 4 \times 5$, or $20 \div 4 = 5$___

2. A single rose costs $2 and a bunch of roses costs $12. How many times as much as a single rose does a bunch of roses cost?

Single rose: | red |

Bunch of roses: | orange | w | w |

| red | red | red | red | red | red |
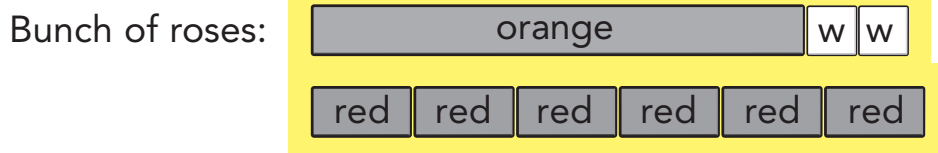
A bunch of roses costs __6__ times as much as a single rose.

Equation: ___$12 = 6 \times 2$, or $12 \div 2 = 6$___

3. A factory has 3 times as many workers as a grocery store. The grocery store has 7 workers. How many workers does the factory have?

Grocery store:

| black |

Factory:

| black | black | black |
| orange | orange | w |

The factory has __21__ workers.   Equation: _____ $3 \times 7 = 21$ _____

4. A large pizza costs \$24, which is 3 times as much as a personal pizza. How much does a personal pizza cost?

Large pizza:

| orange | orange | w | w | w | w |
| brown | brown | brown |

Personal pizza:

| brown |

A personal pizza costs \$__8__.

Equation: _____ $3 \times 8 = 24$, or $24 \div 3 = 8$ _____

5. A piece of string is 9 centimeters long. A piece of wood is 18 centimeters long. How many times as long is the piece of wood compared with the piece of string?

String:

| blue |

Wood:

| orange | w | w | w | w | w | w | w | w |
| blue | blue |

The piece of wood is __2__ times as long as the piece of string.

Equation: _____ $18 = 2 \times 9$, or $18 \div 9 = 2$ _____

© ETA hand2mind®

Name ___*Answer Key*___

6. Paolo has 6 coins in his coin collection. Roberta has 3 times as many coins as Paolo. How many coins does Roberta have?

Paolo:

| dark green |

Roberta:

| dark green | dark green | dark green |

| orange | w | w | w | w | w | w | w | w |

Roberta has __18__ 18 coins.

Equation: ___3 × 6 = 18___

Write an equation and answer the question.

7. You read 5 times as long today as you read yesterday. If you read for 50 minutes today, how long did you read yesterday?

Equation: ___50 = 5 × 10, or 50 ÷ 5 = 10___

Answer: ___10 minutes___

8. Becki saved $32 this month. Last month she saved $8.

This month Becki saved __4__ times as much as she did last month.
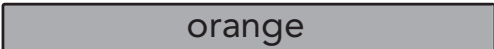
Equation: ___32 = 4 × 8, or 32 ÷ 8 = 4___

Answer: ___4 times as much___

Use Cuisenaire Rods to build the model. Use the model to solve the problem. Write an equation.

1. A rubber band was 4 centimeters long. Then it was stretched to 12 centimeters. How many times as long is the rubber band when it is stretched as it was before it was stretched?

    Before stretched:

purple

    After stretched:

orange			w	w
purple	purple	purple		

    The rubber band is __3__ times as long as it was.

    Equation: $12 = \underline{3} \times 4$, or $12 \div 4 = \underline{3}$

2. Juan picked 20 apples. He picked 5 times as many as Gus. How many apples did Gus pick?

    Juan:

orange		orange	
purple	purple	purple	purple	purple

    Gus:

purple

    Gus picked __4__ apples.

    Equation: $20 = 5 \times \underline{4}$, or $20 \div 5 = \underline{4}$

    Build a model for the problem. Draw your model for each part. Solve the problem, and write an equation.

    Models may vary.

Name __**Answer Key**__

3. A pack of pencils costs 7 times as much as one pencil. One pencil costs 3 cents. How much does a pack of pencils cost?

One pencil:

lt green

Pack of pencils:

lt green	lt green	lt green	lt green	lt green	lt green	lt green

orange	orange	w

A pack of pencils costs __21__ cents.

Equation: ____7 × 3 = 21____

4. The giraffe at the zoo is 16 feet tall, which is 4 times as tall as the chimpanzee. How tall is the chimpanzee?

Giraffe:

orange	w	w	w	w	w	w

purple	purple	purple	purple

Chimpanzee:

purple

The chimpanzee is __4__ feet tall.

Equation: ____16 = 4 × 4, or 16 ÷ 4 = 4____

Write an equation to solve the problem.

5. Andre and Zach went fishing. Zach caught 28 fish. He caught 7 times as many fish as Andre. How many fish did Andre catch?

Equation: ____28 = 7 × 4, or 28 ÷ 7 = 4____

Andre caught __4__ fish.

6. Shelly and Vicky collect stickers. Vicky has 5 times as many stickers as Shelly. If Vicky has 40 stickers, how many stickers does Shelly have?

Equation: ____40 = 5 × 8, or 40 ÷ 5 = 8____

Shelly has __8__ stickers.

3

Andy is half as old as his dad.

His dad is 42.

How old will Andy be when his dad is 50?

ANSWER: 29 years old

COMMENTS & EXTENSIONS: This is a question that requires students to determine not only what information is relevant, but in what manner and at what time it is relevant. Half is relevant only for the current year, as Andy will not be 25 when his dad is 50. Dozens of similar questions can be generated by changing the word "half," the number 42, and the number 50.

Quinn is one quarter as old as his dad. His dad is 44. How old will Quinn be when his dad is 45?

Try This

Sal bought 2 boxes of erasers. Each box contained 9 erasers. He gave 5 of the erasers to his sister. How many does he have now?

- Estimate the answer.
- Use Color Tiles or Base Ten Blocks to model the problem.
- For each step, draw your model and write an equation.

Estimate: $2 \times 10 = 20$; $20 - 5 = 15$

Step 1:
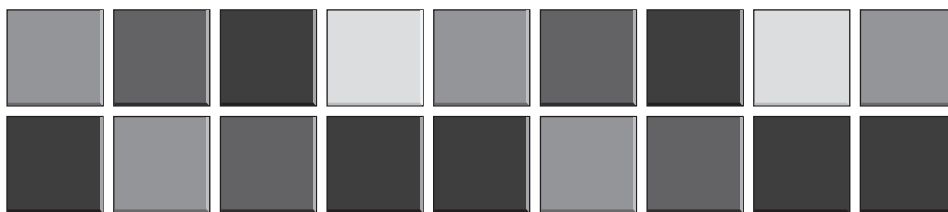
Equation: $2 \times 9 = 18$

Step 2:
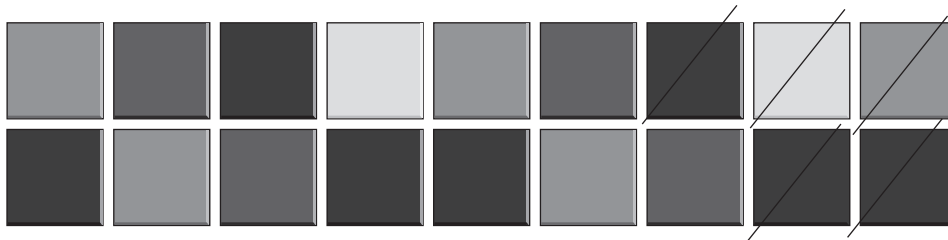
Equation: $18 - 5 = 13$

Sal has 13 erasers now.

1. Tara has 12 fruit cups and 15 pudding cups for the party. She will put equal numbers of cups on each of 3 serving trays. How many will she put on each tray?

Estimate: _____Answers will vary._____
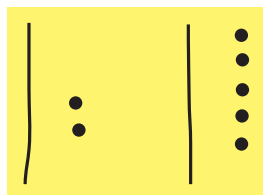
Models will vary.

$12 + 15 = 27$

Models will vary. $27 \div 3 = 9$

Answer: _____9 cups on each tray._____

Name ___*Answer Key*___

2. A pizza shop made 4 pepperoni pizzas, 11 cheese pizzas, and 6 veggie pizzas. If the 3 cooks each made the same number of pizzas, how many pizzas did each cook make?

Estimate: _____   Answers will vary.
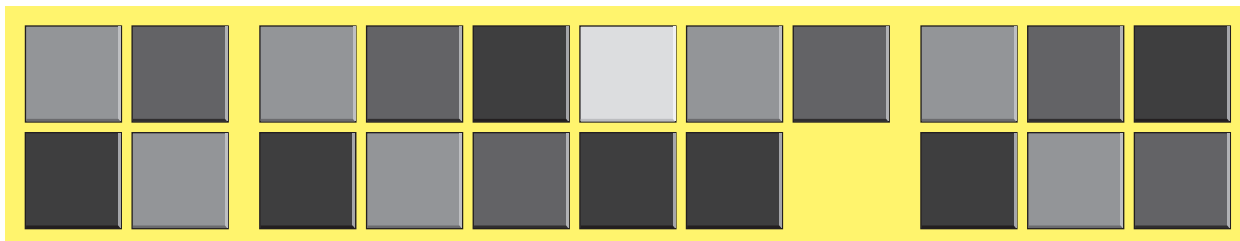
4 + 11 + 6 = 21
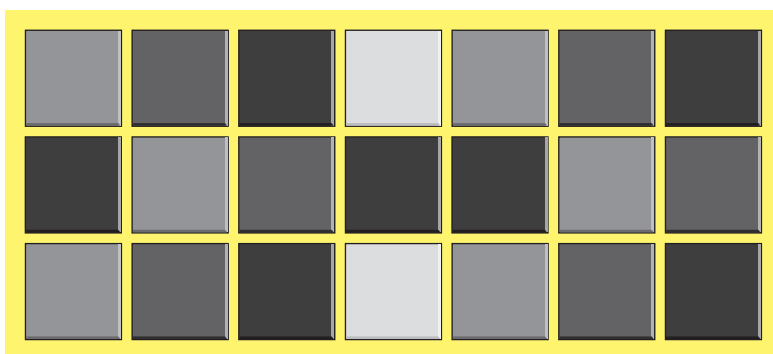
Models will vary.

Answer: ___ 21 ÷ 3 = 7 ___

3. Mrs. Hitte gave her 3 children $30 to share equally. Her son wants to buy 5 bags of marbles. If each bag costs $2, does he have enough money?

Estimate: _____   Answers will vary.
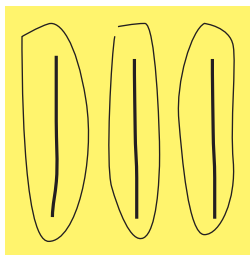
Models will vary.

30 ÷ 3 = 10

Models will vary.

5 × 2 = 10

Answer: ___ Yes, he has enough money. ___

© ETA hand2mind®

Name _____ *Answer Key*

4. There are 15 students in Mrs. Small's class. There are 17 students in Mrs. Little's class. Both classes are attending a play together. Each table at the play seats 4 children. How many tables are needed?

Estimate: _____ Answers will vary.
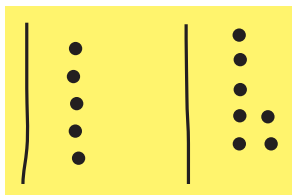
Models will vary.

15 + 17 = 32

Models will vary.

32 ÷ 4 = 8

Answer: _____ 8 tables are needed.

For each problem, estimate the answer. Write the equations you use to solve the problem, and write the answer.

5. Andrew discovered a buried treasure box. He opened it and found that it contained 12 diamonds and 22 rubies. The owner of the box gave Andrew 9 of the gems as a reward for returning it. How many gems did the owner keep?

Estimate: _____ Answers will vary.

Equations: _____ 12 + 22 = 34

_____ 34 − 9 = 25

Answer: _____ The owner kept 25 gems.

6. Jenna has 13 hardcover books and 29 paperback books. She is packing them in boxes. Each box can hold 7 books. How many boxes will she need?

Estimate: _____ Answers will vary.

Equations: _____ 13 + 29 = 42

_____ 42 ÷ 7 = 6

Answer: _____ Jenna will need 6 boxes.

Name ___*Answer Key*___

Estimate the answer to the problem. Use Color Tiles to build the models, and use the models to complete the equations and the answer.

1. A family is going to the museum. The family has 2 adults and 2 children. Each adult's ticket costs $5, and each child's ticket costs $3. How much will the family pay for all their tickets?
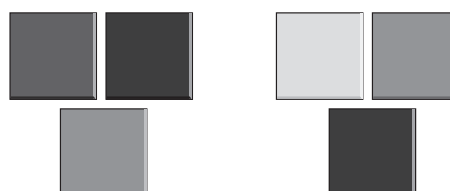
Estimate: _____ Answers will vary.

Step 1:
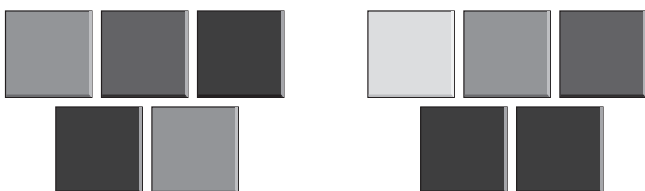
Step 2:

Think: 2 adults, $5 each.

Equation: 2 × 5 = __10__

Think: How much in all?

Equation: __10__ + __6__ = __16__

Answer: The family will pay __$16__ for all their tickets.

Think: 2 children, $3 each.

Equation: 2 × 3 = __6__

Estimate the answer, then use Color Tiles or Base Ten Blocks to build models for the problem. Sketch your models and use them to write equations. Give the answer.

2. Larry's friend gave him $20. He used the money to buy 5 packs of baseball cards for $3 each. How much money does Larry have left?

Estimate: _____ Answers will vary.

Models will vary.

5 × 3 = 15

20 − 15 = 5

Answer: _____ Larry has $5 left.
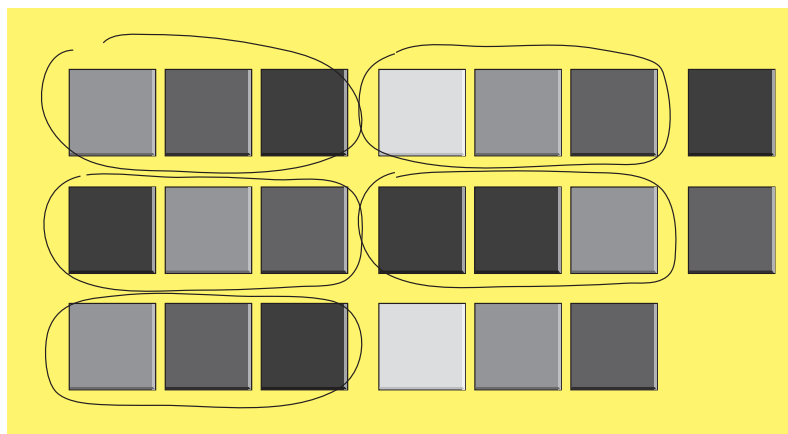
3. Eva's desk drawer contains pencils and pens. There are 4 pencils. There are 6 more pens than pencils. How many pencils and pens are there in all?
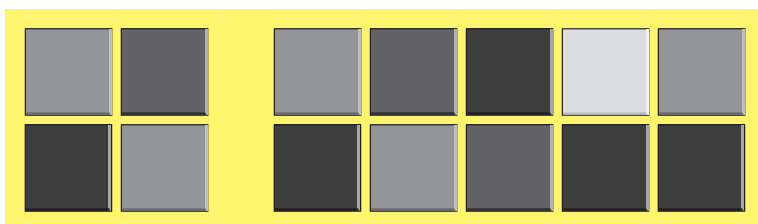
Estimate: _____   Answers will vary.
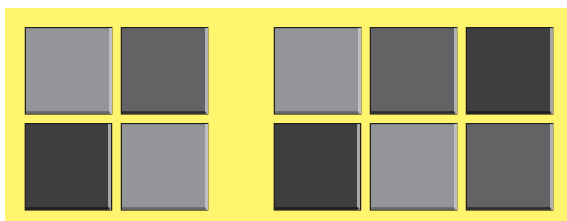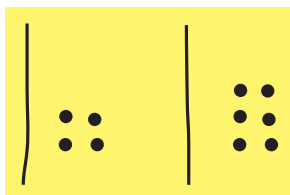

Models will vary.

4 + 6 = 10

Models will vary.

4 + 10 = 14

Answer: _____   There are 14 pencils and pens in Eva's desk drawer.

4. There are 14 students in Mrs. Smart's class. There are 16 students in Mr. Lee's class. The classes are going to the library together for reading time. Each table at the library seats 5 children. How many tables are needed?

Estimate: _____   Answers will vary.

Models will vary.

14 + 16 = 30

Models will vary.

30 ÷ 5 = 6

Answer: _____   6 tables are needed.

© ETA hand2mind®

Name _____

For each problem, estimate the answer. Write the equations you use to solve the problem, and write the answer.

5. There are 5 football games each month. The season is 4 months long. If the team won 11 games, how many did it lose?

Estimate: _____   Answers will vary.

Equations: _____ $4 \times 5 = 20$ _____

_____ $20 - 11 = 9$ _____

Answer: _____ The team lost 9 games. _____

6. On Monday, Mickey bought 2 packs of animal cards. On Tuesday, he bought 4 packs. Each pack has 9 cards. He gave 19 cards to his friend. How many cards does Mickey have left?

Estimate: _____   Answers will vary.

Equations: _____ $(2 \times 9) + (4 \times 9) = 54$ _____

_____ $54 - 19 = 35$ _____

Answer: _____ Mickey has 35 cards left. _____

4

One player needs to have exactly two liters of liquid. Can you figure out how to get 2 liters using the following containers? No other containers are available.

5 Liters   4 Liters   10 Liters
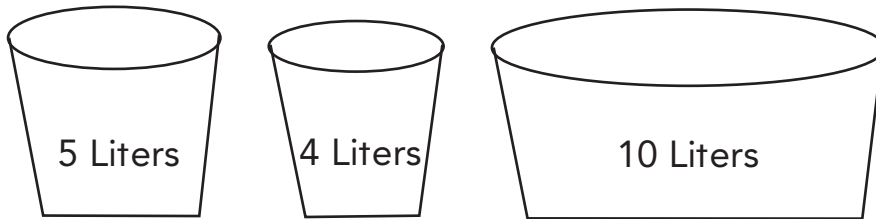
ANSWER: Example: Fill the 5-liter container; pour it into the 4-liter container, leaving 1 liter. Put this 1 liter into the 10-liter container. Empty the 4-liter container and repeat this process to put a second liter in the 10-liter container. There are more ways.

COMMENTS & EXTENSIONS: Set other targets for children using the 5-liter, 4-liter, and 10-liter containers.
Here is another challenge: you have a 2-liter container, a 7-liter container, and an infinite supply of fluid. Using the containers, what measurements can you get?

Name ___*Answer Key*___

Try This

Emily had 6 flowers. Then she bought 9 more flowers from a florist. She will give the same number of flowers to each of her 2 teachers. How many flowers can she give each teacher?

- Choose a tool and build a model.
- For each step in the problem, draw your model and write an equation.
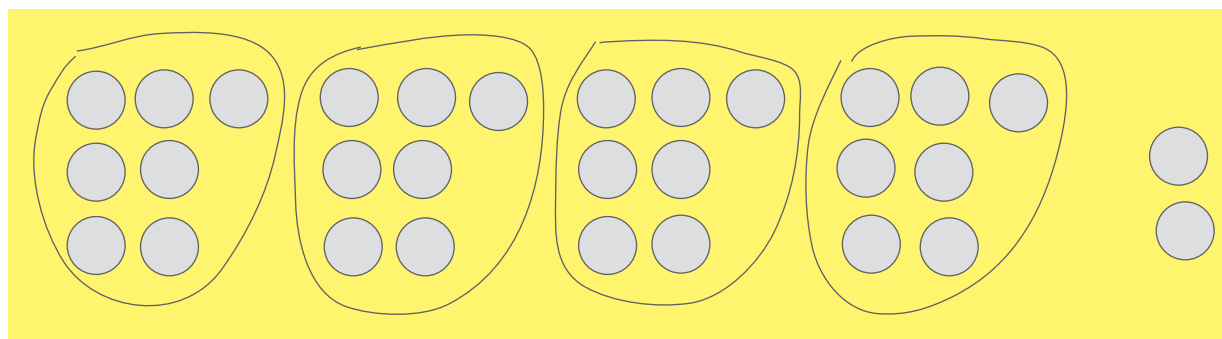- Give the answer.

Step 1:
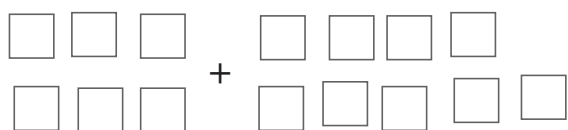
Equation: 6 + 9 = 15

Step 2:
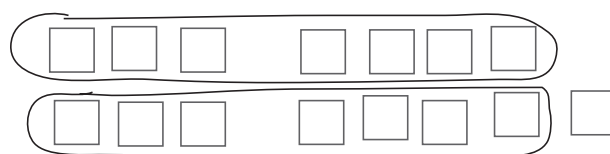
Equation: 15 ÷ 2 = 7 R1

Answer: 7 flowers

1. Jackie baked 3 trays of 10 muffins. After they cooled, she divided them equally into 4 bags. How many muffins did she put in each bag?
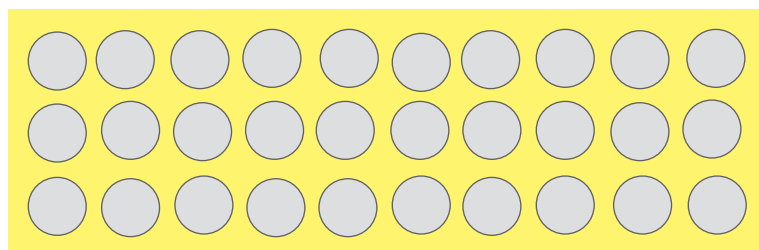
3 × 10 = 30

30 ÷ 4 = 7 R2

Answer: __7__ muffins

Name _____ *Answer Key* _____

2. A teacher has 5 bags of marbles. Two of the bags have 4 marbles in them. The other 3 bags have 5 in them. How many marbles are there in all?
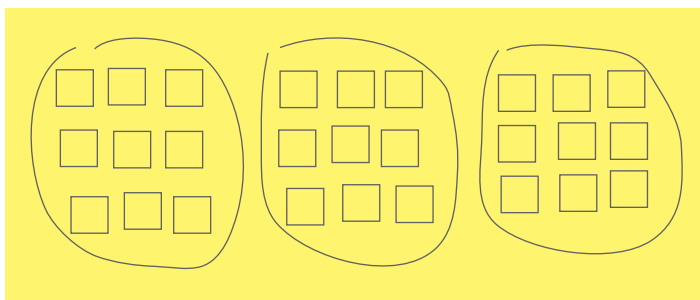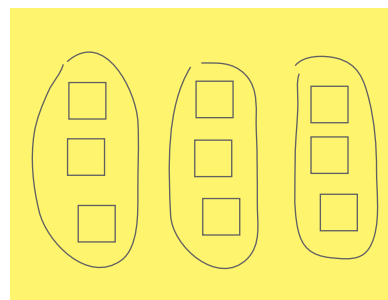
8 + 15 = 23

2 × 4 = 8
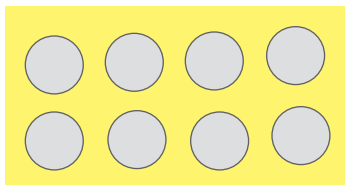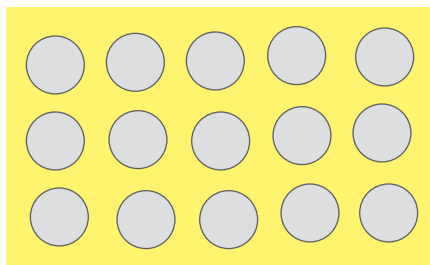
3 × 5 = 15

Answer: ___23___ marbles

3. Mr. Little divided $27 equally among his 3 children. His daughter, Lisa, used her money to buy 3 gifts. If each gift cost the same amount. What was the price of each gift?
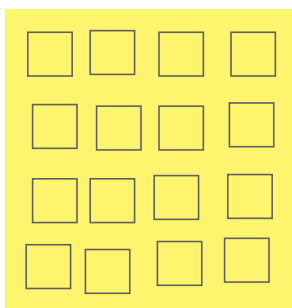
27 ÷ 3 = 9

9 ÷ 3 = 3
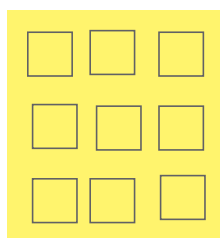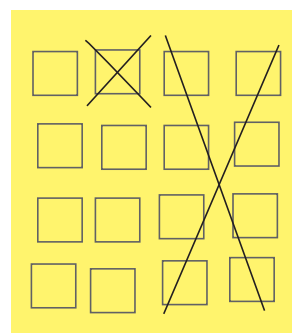
Answer: ___$3___

4. You earn $4 for each hour of babysitting and $3 for each hour of weeding the garden. Last week you did 4 hours of babysitting and 3 hours of weeding. How much more did you earn babysitting than you earned weeding?

3 × 3 = 9

4 × 4 = 16

16 – 9 = 7

Answer: ___$7___

4 **Multistep Problems II**

Name _____ *Answer Key* _____

Solve the problem. Write equations and give the answer.

5. Michael had 22 books and got 9 more for his birthday. If each of his cubbies can hold 6 books, how many cubbies does Michael need for his books? Explain.

$$22 + 9 = 31$$

$$31 \div 6 = 5 \text{ R1}$$

_____ Answer: 5 cubbies can hold only 30 books, so Michael needs one more. _____

_____

6. DVDs are on sale for $4. Books are on sale for $3. You want to buy 5 DVDs and 4 books. If you have $35, do you have enough money? Explain.
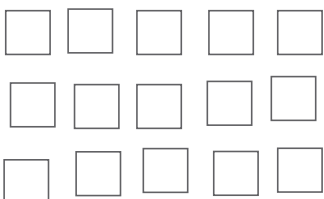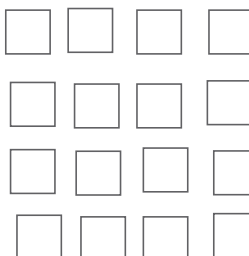
$$5 \times 4 = 20$$

$$4 \times 3 = 12$$

$$20 + 12 = 32$$

_____ Answer: Yes. The DVDs and books cost $32, which is less than $35. _____

_____

Name __*Answer Key*__

Use Centimeter Cubes to build the model. Use the model to complete the problem.

1. Jenny wants to buy 3 books that cost $5 each. She gets paid $4 to walk a dog. If she walks 4 dogs, will she earn enough to buy the books?
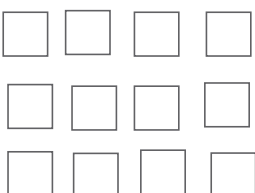
Step 1: □ □ □ □ □
□ □ □ □ □
□ □ □ □ □

Step 2: □ □ □ □
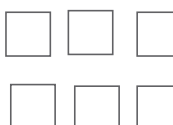□ □ □ □
□ □ □ □
□ □ □ □

Equation: $3 \times 5 =$ ___15___

Equation: $4 \times 4 =$ ___16___

Answer:

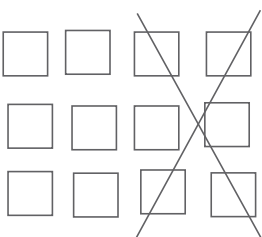Yes, she has enough money; she will earn $16, which is more than $15.

2. Tabitha bought 3 boxes of fish food and 2 packets of cat food. Each box of fish food contains 4 pouches, and each packet of cat food contains 3 pouches. How many more pouches of fish food than cat food did Tabitha buy?

Step 1: □ □ □ □
□ □ □ □
□ □ □ □

Step 2: □ □ □
□ □ □

Equation: $3 \times 4 =$ ___12___

Equation: $2 \times 3 =$ ___6___

Step 3: □ □ □ □
□ □ □ □
□ □ □ □

Equation: $12 - 6 =$ ___6___

Answer:

Tabitha bought 6 more pouches of fish food than cat food.

Name _**Answer Key**_

Use Centimeter Cubes to model the problem. Draw your models, write equations, and give the answer.

3. Raul has 23 tins and a case that has 9 shelves. Six of the shelves can hold only 2 tins. Three shelves can hold only 3 tins. Can he fit all the tins on the 9 shelves? Explain.
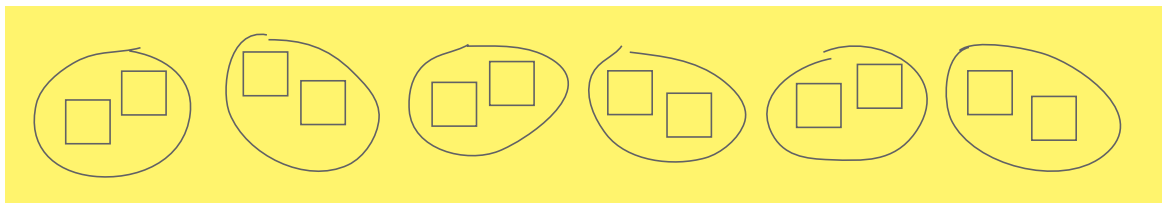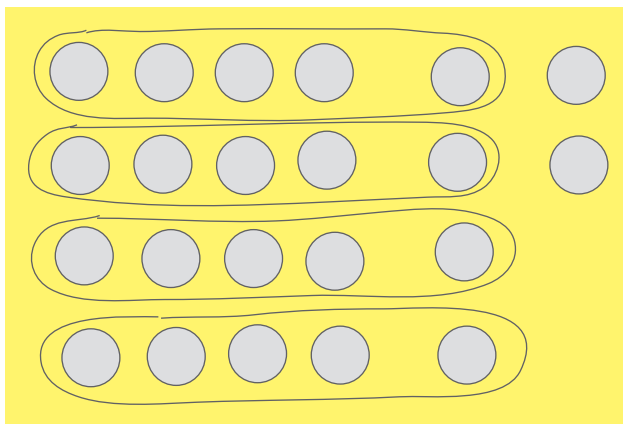
$6 \times 2 = 12$
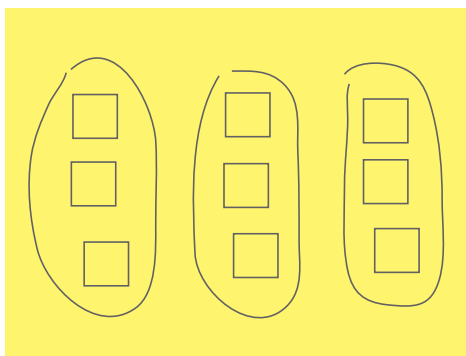
$3 \times 3 = 9$

$12 + 9 = 21$

Answer:

No, the shelves can hold only 21 tins, and he has 23.

_____

4. Cameron bought 6 bottles of water to add to the 16 bottles he already had. Now he wants to divide the water equally between 4 friends. How many bottles can each friend get?

$16 + 6 = 22$

$22 \div 4 = 5 \text{ R2}$

Answer: ___5___ bottles

Write equations for the problem and give the answer.

5. Cecile bought 2 pairs of flip-flops that cost $8 each and a pair of tennis shoes that cost $22. How much did she pay for her flip-flops and tennis shoes together?

$$2 \times 8 = 16$$

$$16 + 22 = 38$$

Answer: __$38__

6. Maria picked 9 red flowers and 8 yellow flowers from her garden. If each vase can hold only 5 flowers, how many vases does she need?

$$9 + 8 = 17$$

$$17 \div 5 = 3 \text{ R}2$$

Answer: at least __4__ vases