Solving Equations and  
Developing the Foundation for Proofs

Lesson 3

1. Sara cannot weigh her cat because he will not sit still on the scale. Sara weighs 88 pounds. Sara picks up her cat, steps on the scale, and sees that she and the cat weigh 96 pounds together.

* What is Sara trying to determine?
* Represent the situation with an equation.
* Solve the equation you wrote to determine the answer to Sara’s question.
* Did you use a property of equality to solve the equation? If so, which property did you use?

1. Sam and his friends order a pizza for $24. They need to figure out how much each person should pay based on the number of pieces they eat. There are 8 pieces of pizza in all.

* What are Sam and his friends trying to determine?
* Represent the situation with an equation.
* Solve the equation you wrote to determine the answer to Sam’s question.
* Did you use a property of equality to solve the equation? If so, which property did you use?

1. Ben has some money. After buying a basketball for $25, Ben has $4.56 left over. Ben wants to calculate how much money he had before he bought the basketball.

* What is Ben trying to determine?
* Represent the situation with an equation.
* Solve the equation you wrote to determine the answer to Ben’s question.
* Did you use a property of equality to solve the equation? If so, which property did you use?

1. Sally has a box of pencils. Sally gives 5 pencils to each of her 4 friends. The pencil box is now empty, and Sally is trying to determine how many pencils were in the box before she gave them to her friends.

* What is Sally trying to determine?
* Represent the situation with an equation.
* Solve the equation you wrote to determine the answer to Sally’s question.
* Did you use a property of equality to solve the equation? If so, which property did you use?

1. Write your own real-world problem in the space below. Your problem should have a reasonable and possible solution that you have already determined (but not written down).  
     
     
     
     
     
     
     
     
     
   Trade with the person next to you. They should solve the problem using the space provided. Write answers as complete sentences. Once you are both finished, trade back, and check each other’s work. If your partner is unable to complete your question or does so incorrectly, please assist them to ensure they understand the question and the process to solve for the unknown.

* What are you trying to determine?
* Represent the situation with an equation.
* Solve the equation you wrote to determine the answer to the question.
* Did you use a property of equality to solve the equation? If so, which property did you use?

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INSTRUCTIONAL ACTIVITY SUPPLEMENT

Lesson 3

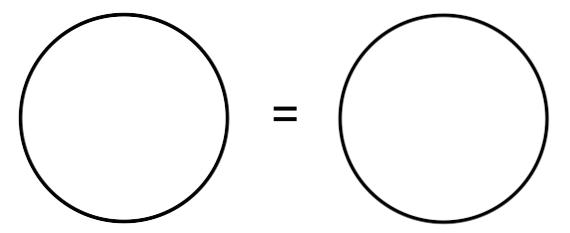
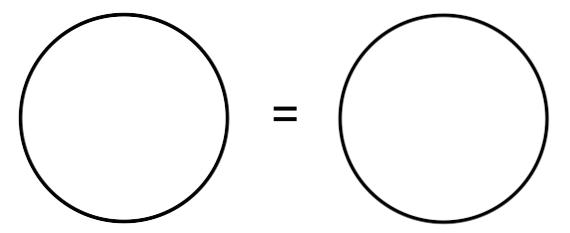
I have…, who has…?

|  |  |
| --- | --- |
| I have .  Who has the sum of a number and three? | I have *x* + 3.  Who has the product of a number and four? |
| I have 4*a*.  Who has the quotient of a number and six? | I have .  Who has the difference of five and a number? |
| I have 5 – *c*.  Who has seven more than a number? | I have 7 + *z*.  Who has ten times as many as a number? |
| I have 10*n*.  Who has one less than a number? | I have *r* – 1.  Who has one fourth of a number? |
| I have .  Who has the sum of a number and three is eleven? | I have 11 = *a* + 3.  Who has four more than a number? |
| I have 4 + *y*.  Who has seven less than a number is ten? | I have *n* – 7 = 10.  Who has the difference of a number and six is two? |
| I have *x* – 6 = 2.  Who has seven times a number is fifty-six? | I have 56 = 7*a*.  Who has twice a number is thirty? |
| I have 2*r* = 30.  Who has the quotient of twelve and a number is four? | I have .  Who has twelve more than a number is eighteen? |
| I have 18 = *c* + 12.  Who has three times as much as a number? | I have 3*z*.  Who has six less than a number? |
| I have *r* – *6*  Who has two more than a number is nine? | I have *s* + 2 = 9.  Who has five times a number is forty? |
| I have 40 = 5*n*.  Who has the sum of a number and eleven? | I have *a* + 11.  Who has the product of a number and seven? |
| I have 7*x*.  Who has the quotient of a number and 3? | I have .  Who has eight less than a number is twenty? |
| I have *y* – 8 = 20.  Who has the quotient of a number and 12 is 3? | I have .  Who has the product of six and a number? |
| I have 6*c*.  Who has two more than a number is thirty? | I have 30 = *h* + 2.  Who has three times a number is eighteen? |
| I have 3*g* = 18.  Who has the quotient of a number and seven? | I have .  Who has half a number is seventeen? |

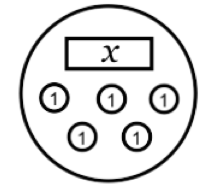
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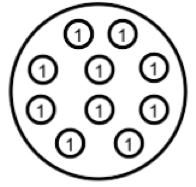
STUDENT ACTIVITY

Lessons 1 – 2

1. Use the equation *x* + 2 = 5 to answer questions (a) through (d).
   1. Draw a representation of the equation on the paper plates below.  
      
   2. Describe any steps you would take to solve for *x* using the representation you just made.
   3. Which property justifies your description in part (b)?
   4. Solve *x* + 2 = 5 algebraically, showing each step and the justification for each step or operation used.
2. Use the equation 8 = 4*x* to answer questions (a) through (d).
   1. Draw a representation of the equation on the paper plates below.  
      
   2. Describe any steps you would take to solve for *x* using the representation you just made.
   3. Which property justifies your description in part (b)?
   4. Solve 8 = 4*x* algebraically, showing each step and the justification for each step or operation.
3. Represent the model below using an equation. Then solve the equation, and include justification for each step or operation used to solve it.



1. Represent the model below using an equation. Then solve the equation, and include justification for each step or operation used to solve it.



1. Use the equation *x* – 3 = 9 to answer questions (a) through (c).
   1. Which operation would you use to isolate *x*? Explain your reasoning.
   2. Solve the equation *x* – 3 = 9, showing all steps.
   3. Which property allows you to solve using the operation you chose?
2. Use the equation to answer questions (a) through (c).
   1. Which operation would you use to isolate *a*? Explain your reasoning.
   2. Solve the equation , showing all steps.
   3. Which property allows you to solve using the operation you chose?

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STUDENT ACTIVITY

Lesson 3

Represent the situation or problem with an equation that requires you to use one of the Properties of Equality to solve. Solve the equation to answer the question. Show all work, and justify your operation with the corresponding property.

1. Sally adopted a puppy when it weighed 9 pounds. Now the dog is full grown, and it weighs 26 pounds. How much weight has the puppy gained? Write your answer as a complete sentence.

1. Ben buys a birthday cake cut into 12 pieces of the same size. Ben pays $36 for the cake. How much does each slice of cake cost? Assume each piece costs the same amount, and write your answer as a complete sentence.

1. Becky starts with a specific amount of money. Then Becky spends $6 on a toy. After buying the toy, Becky now has $5.50. How much money did Becky have before she bought the toy? Write your answer as a complete sentence.