

Number Sense

Remote Learning Packet for ABE/Beginner GLE 2–4

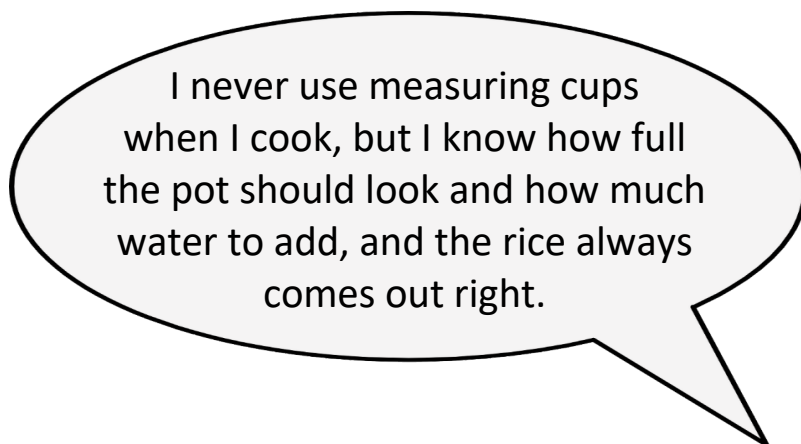
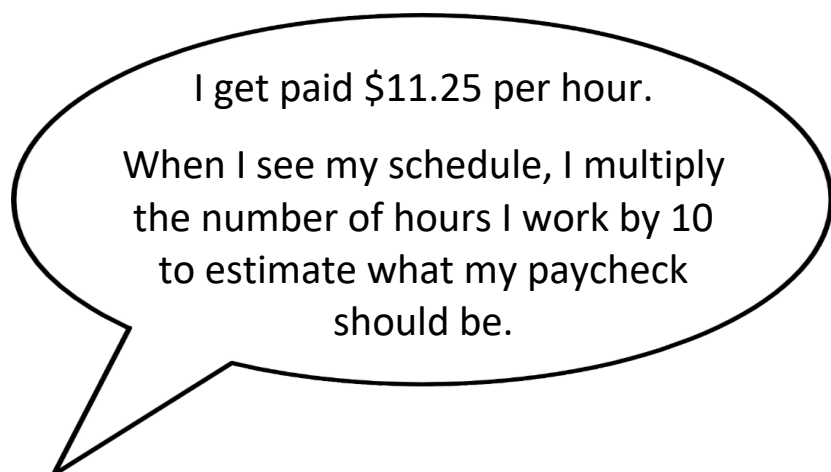
Student Packet

These materials are meant to
be done with your teacher
over the phone or computer.



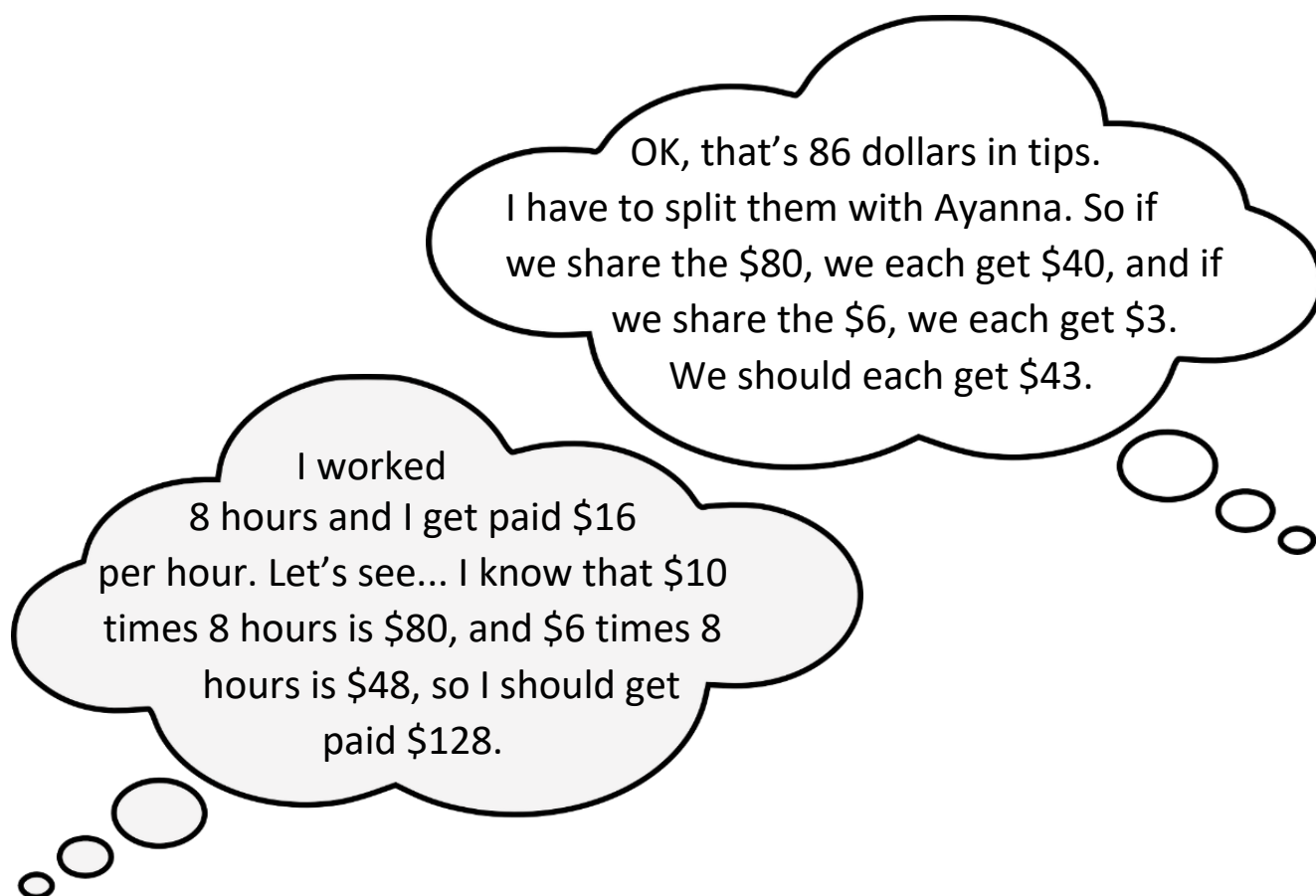
Created with funding from the Adult and Community Learning Services division of the Massachusetts Department of Elementary and Secondary Education by the SABES Mathematics and Adult Numeracy Curriculum & Instruction PD Center, which is managed by TERC, Inc.

Estimation is the ability to judge the size or amount of something. Estimation does not give us an exact answer, but helps us to have an idea of “about how much” we have.



Share an example of when you estimate in your daily life.

Number sense is the ability to break apart and put together numbers in useful ways that make them easier to work with.



Share an example of how you use number sense in your everyday life.

“Street Math” and “School Math”



Street vendor in Saúde Street Market, São Paulo, Brazil.
Photo by Wilfredor, CC license

street vendors:

people who sell something, like food or clothing, out of a stall or a cart instead of a store

accurate: correct, exact

Some children work as street vendors in Brazil. Researchers studied how they did math. When they were selling, they did math differently than when they were in school. When they were selling, they used strategies to break down numbers in their heads. They could calculate without paper. In school, the same children did math on paper, using the steps they were taught. When these children did math in their heads while selling, they were much more accurate than when they did math in school.

Source: Adapted from Mathematics Learning - Numeracy And Culture - School, Cultural, Teachers, and Children - StateUniversity.com <https://education.stateuniversity.com/pages/2205/Mathematics-Learning-NUMERACY-CULTURE.html#ixzz6WhZj0qb9>

Questions for Discussion

1. Do you have strategies for using math in your daily life that are different from the steps you learned in school?
2. Where do you see examples of people using “street math” in the culture or community you grew up in?
3. The children they studied were more accurate when they were using their own strategies than when they were following the steps they were taught in school. What is the value of math education for these children? What do you think their math education should look like?

PART 1: Estimation and Adding**Saving Money on Coffee**

By Rahaf Almasri



My typical day can't start without a cup of hot coffee. Buying my coffee from a coffee shop would cost me \$2.50 daily, which would add up to \$75 a month. However, one cup of homemade coffee costs about \$1, which would add up to \$30 per month. So, to save some money, I will make my coffee at home.

Rahaf Almasri was a student in the TASC program at the Central Library in Brooklyn, NY. She is a Syrian mother who chose to take a chance on education in hopes of becoming a mathematics teacher to help immigrant students. The paragraph above appears in her article, "Math in Our Daily Lives", published in *The Change Agent*, Issue 47 "Math", September 2018.

Do you think Almasri is using estimation to help her figure out the cost of coffee? Why?

Have you ever tried to estimate the monthly cost of something you use daily? How could that be helpful?

About How Much?

$$\text{\$1.95} + \text{\$3.95}$$

a) \\$4 b) \\$5 c) \\$6

$$\text{\$12.75} + \text{\$3.19}$$

a) \\$15 b) \\$16 c) \\$17

$$\text{\$1.05} + \text{\$6.00} + \text{\$19.99}$$

a) \\$25 b) \\$27 c) \\$29

Source: *EMPower* book *Everyday Number Sense: Mental Math and Visual Models*

Agree or Disagree?

These are the amounts that Lianne spent on groceries over the past four weeks.

\$109

\$25

\$76

\$18

She wants to know her total for the month.

1. Lianne says start with the biggest number, then the next largest, and so on. Agree or disagree. Will this way always work?

$$\begin{array}{r} 109 \\ 76 \\ + 25 \\ 18 \\ \hline \end{array}$$

2. Peter says to put the numbers in order from smallest to largest, then start at the top and work your way down. Agree or disagree? Will this way always work?

$$\begin{array}{r} 18 \\ 25 \\ + 76 \\ 109 \\ \hline \end{array}$$

3. Ana says the order doesn't matter, just pay attention to what you're doing. Agree or disagree? Will this always work?

$$\begin{array}{r} 18 \\ 109 \\ + 76 \\ 25 \\ \hline \end{array}$$

4. Chen says take two numbers at a time and total them. Keep going until you have added everything. Agree or disagree? Will this way always work?

76	109	101
+25	+ 18	+127
101	127	

5. In your own words, what is the best advice about the order in which numbers can be added?

Source: *EMPower book Everyday Number Sense: Mental Math and Visual Models*

Which One Doesn't Belong? 1

Choose one item in this picture that you don't think belongs with the rest. Explain why.



Can you pick another item and give a different reason?

Adding Two-Digit Numbers

Directions: Using the digits 1 to 9 at most one time each, fill in the boxes to make the smallest (or largest) sum.

<div></div>	<div></div>	+	<div></div>	<div></div>
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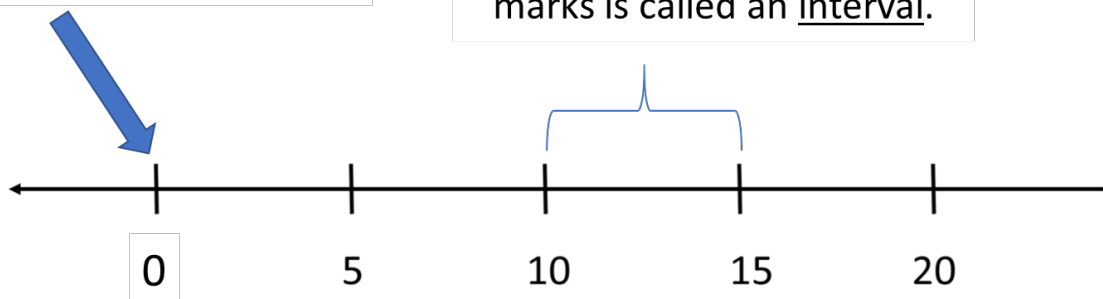


Source: <https://www.openmiddle.com/> - Robert Kaplinsky
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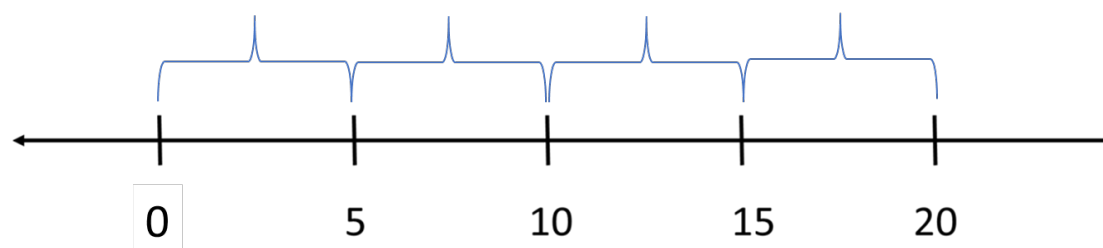
Introduction to Number Lines

This is a tick mark. It can be labeled with a number.

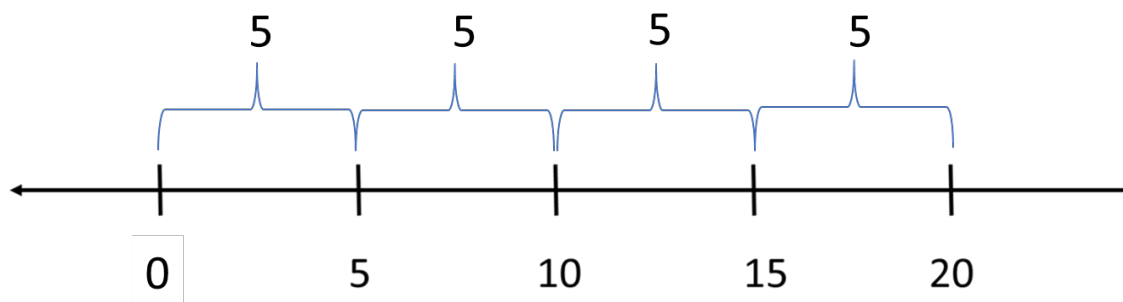
The space between two tick marks is called an interval.



Usually the spaces or intervals are the same size.



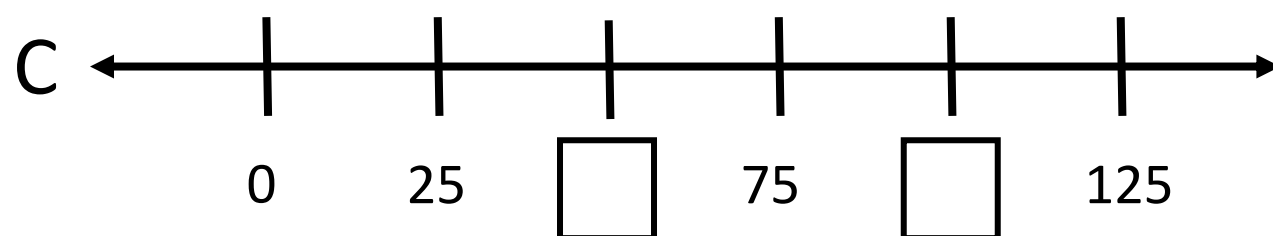
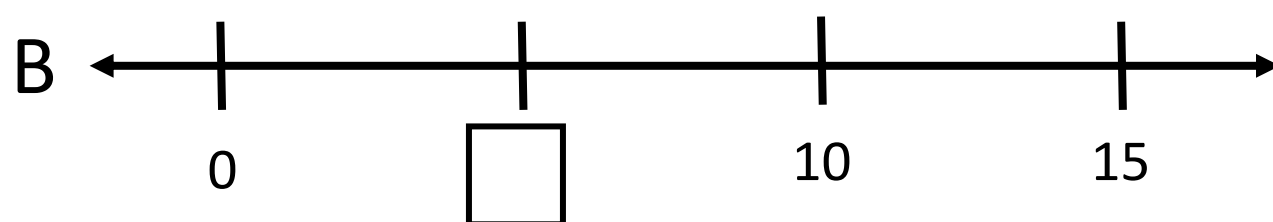
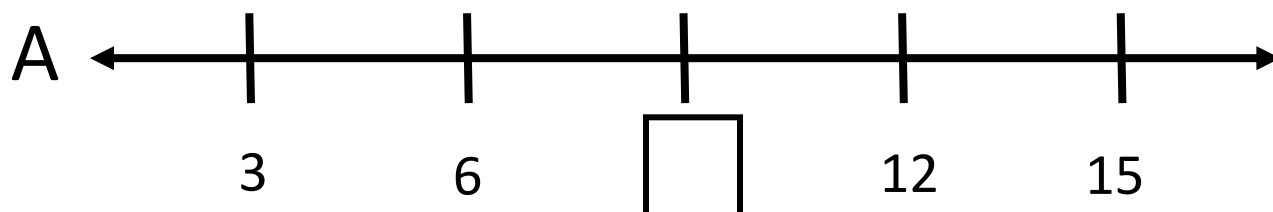
Intervals of the same size have the same value.



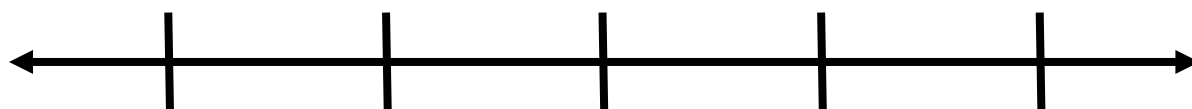
The numbers keep growing by the same amount.

Number Line Puzzles 1a

Fill in the missing numbers.

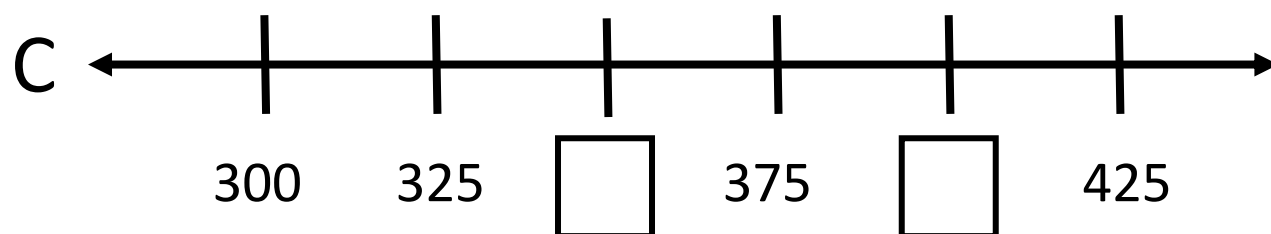
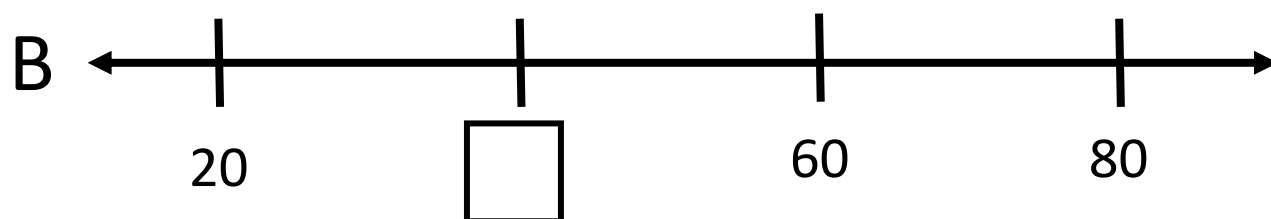
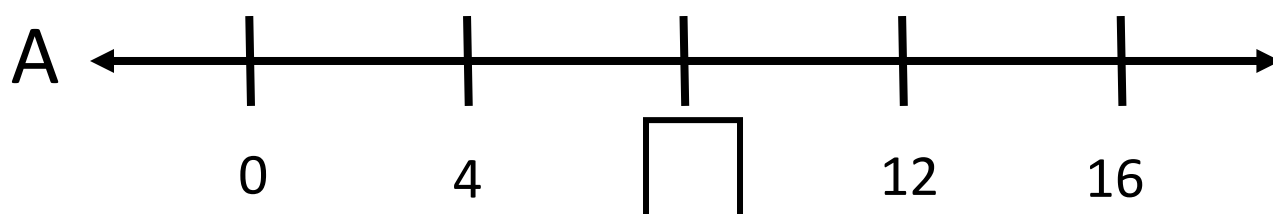


Create your own number line puzzle below.

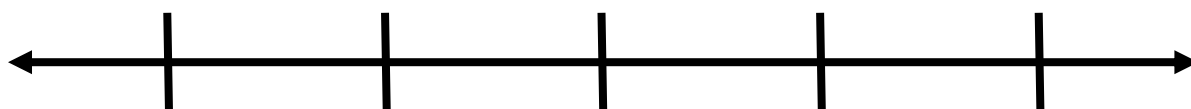


Number Line Puzzles 1b

Fill in the missing numbers.



Create your own number line puzzle below.



Name _____ Date _____

Estimation and Number Sense: Part 1, Estimation and Adding

Objective	My Progress (Struggling, Learning, Mastery)
I can estimate the total when adding several amounts.	
I can explain my strategy for estimating to others.	
I can give a reason why one choice doesn't belong with the group.	
I can keep working on a challenging problem even if I don't understand it right away.	
I can fill in missing numbers on a number line.	

PART 2: Rounding

balance: the amount of money left in a bank account

to balance a checkbook: to make sure that the balance of an account is correct by subtracting everything that was spent

Using Rounding to Balance My Checkbook

I used to balance my checkbook to the penny. It used to make me crazy. I would be up at night for hours trying to get the cents to come out right.

Then my friend said, just round up, then you don't have to worry about running out of money.

So when I balance my checkbook, this is what I do. This monthly charge is \$33.33. Sometimes I round to \$34, sometimes \$40 because it's easier to subtract. The point is to always round up. First of all, it's easier to subtract the rounded number, and you know you will never run out of money, because you always have a little more in your account than the balance shows.

— Retired teacher, paraphrase of in-person interview

Balancing to the cent:

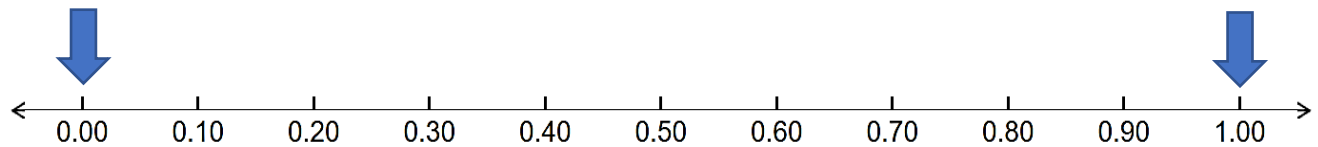
- My starting balance is \$100.
- I spent exactly \$33.33.
- My new balance is exactly \$66.67.
- $100 - 33.33 = 66.67$

Balancing using rounding:

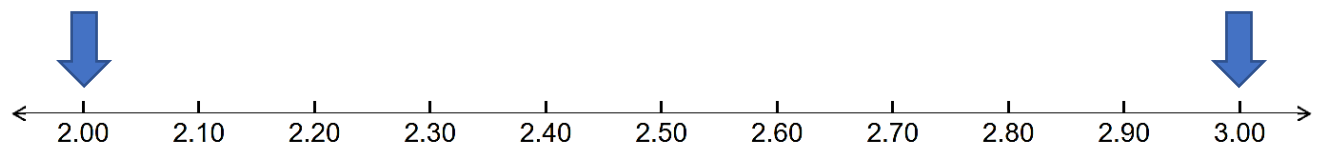
- My starting balance is \$100.
- I estimate that I spent \$40.
- My estimated new balance is \$60.
- $100 - 40 = 60$

Is It Closer to... ?

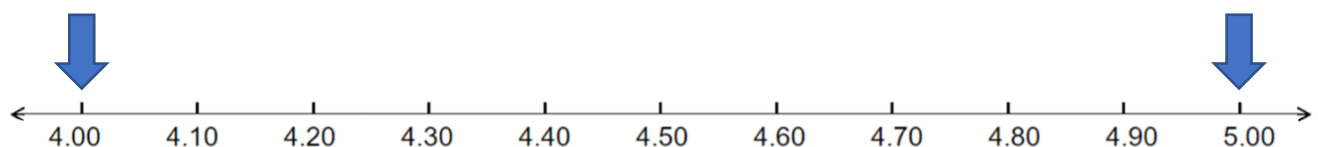
\$0.75



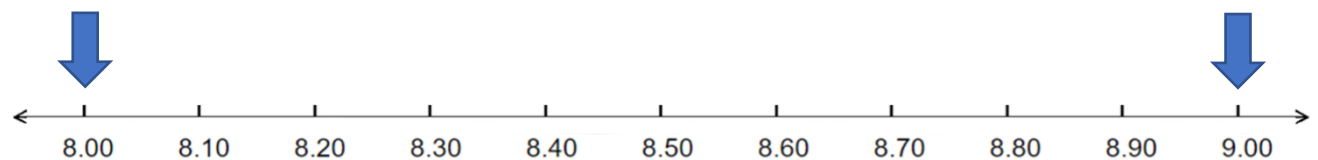
\$2.39



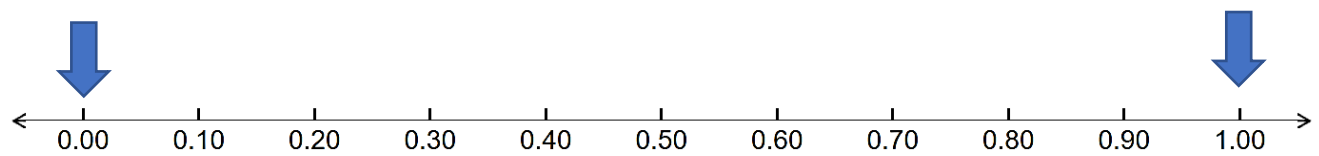
\$4.85



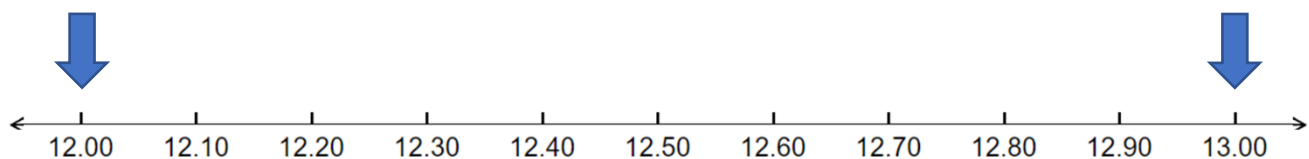
\$8.67



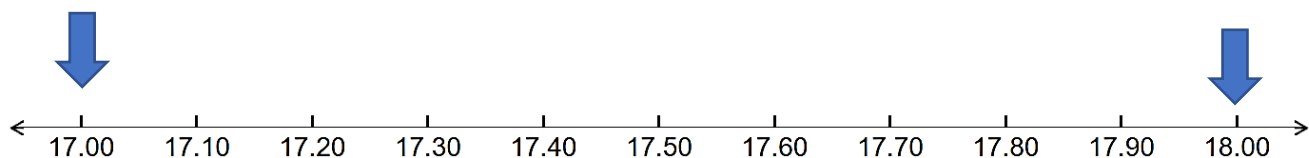
\$0.33



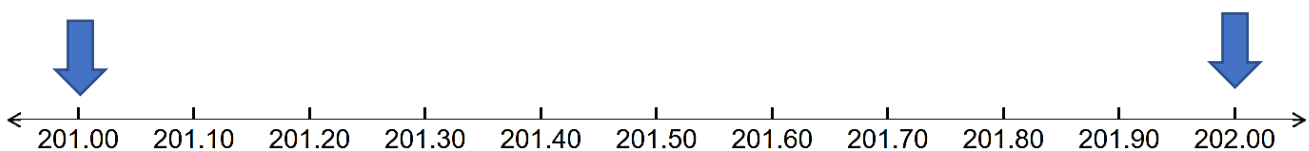
\$12.55



\$17.85



\$201.14



Notice that the numbers at the arrows are \$1.00 apart.

This is called rounding to the nearest dollar.

Rounding to the Nearest Dollar

Example: \$19.50 \$20

1. \$10.51

2. \$0.50

3. \$7.49

4. 39¢

5. \$43.50

6. \$29.99

7. \$99.45

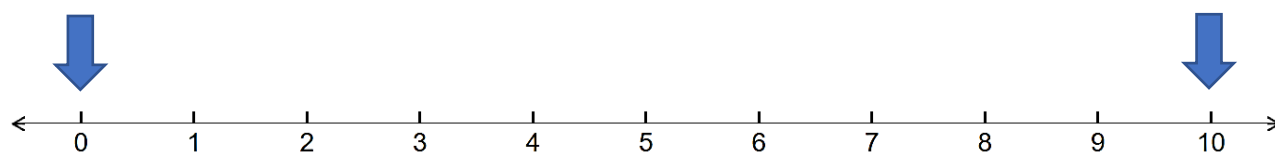
8. \$609.77

9. \$999.51

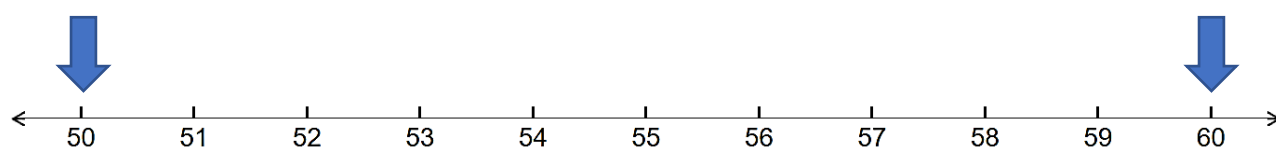
Source: *EMPower book Everyday Number Sense: Mental Math and Visual Models*

Is it Closer to...? Part 2

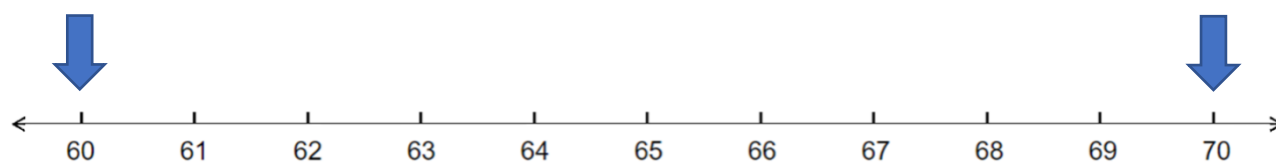
7



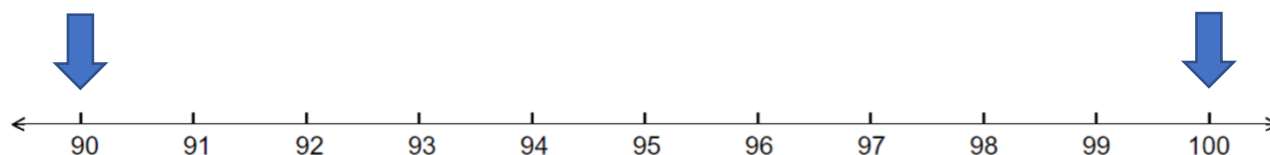
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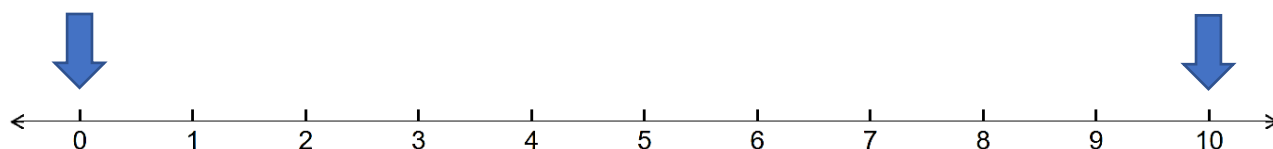
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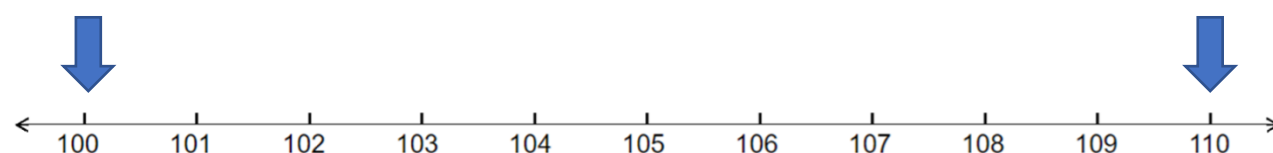
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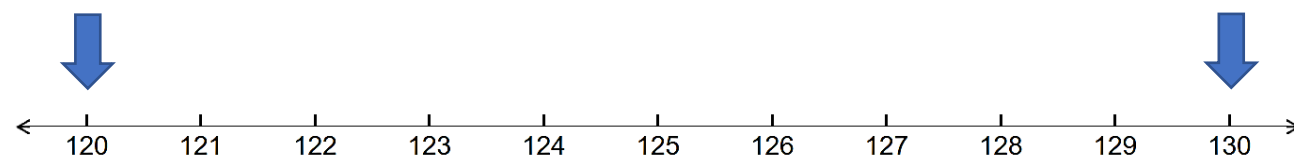
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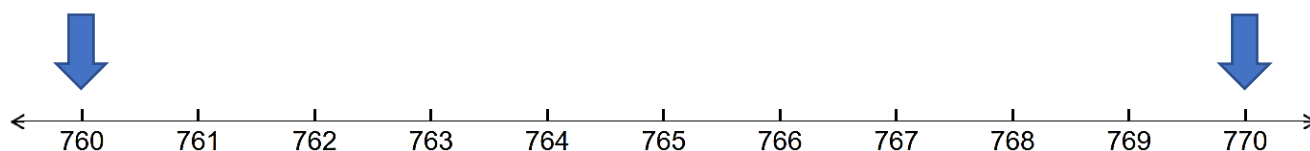
102



124



769



Notice that the numbers at the arrows are 10 apart.

This is called rounding to the nearest ten.

Rounding to the Nearest 10

Example: \$19 \$20

1. 46

2. 29

3. 85

4. 91

5. 108

6. 226

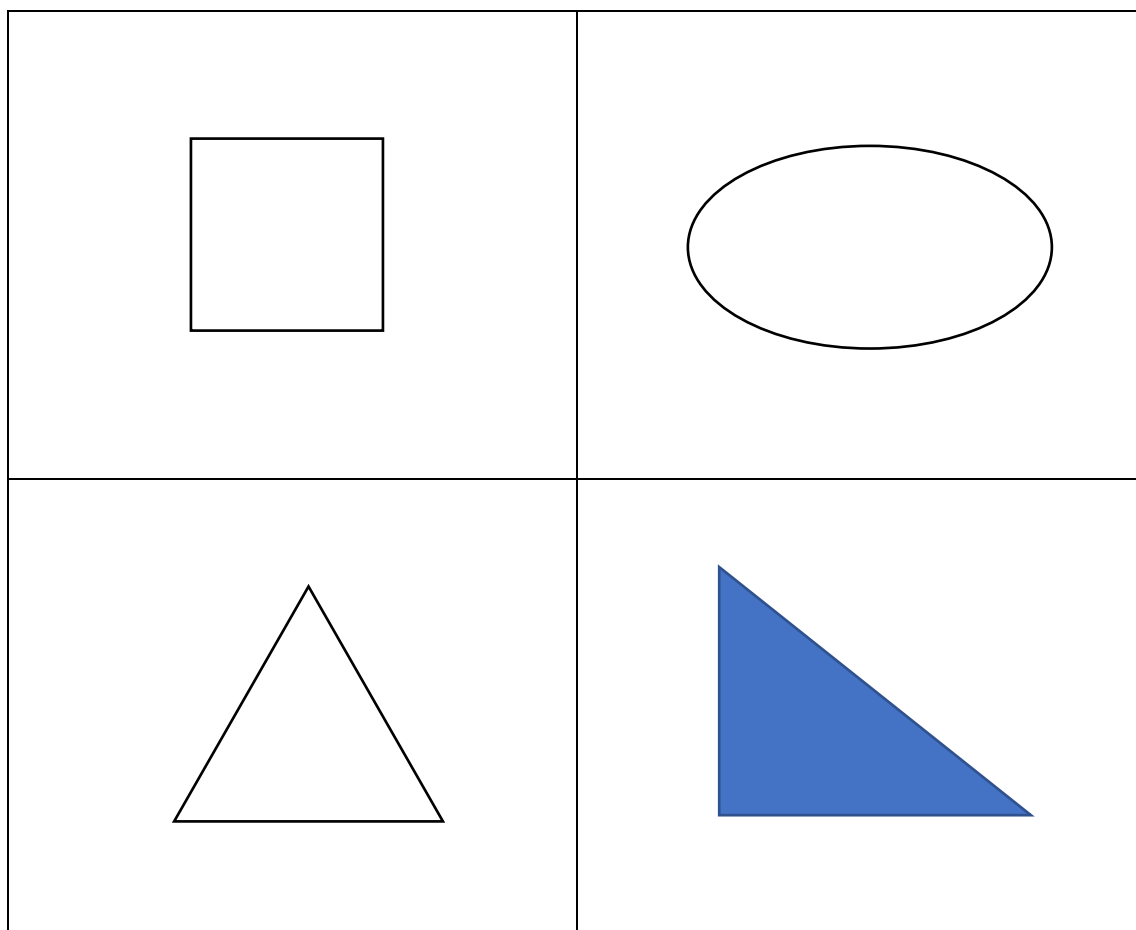
7. 272

8. 391

9. 412

Which One Doesn't Belong? 2

Choose one shape in this picture that you don't think belongs with the rest. Explain why.



Can you pick another shape and give a different reason?

Missing Digits

Fill in the blanks with digits to make the answer closer to 200 than 300.

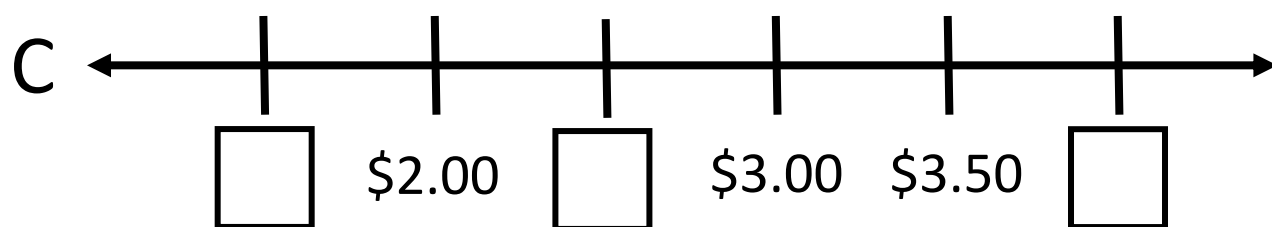
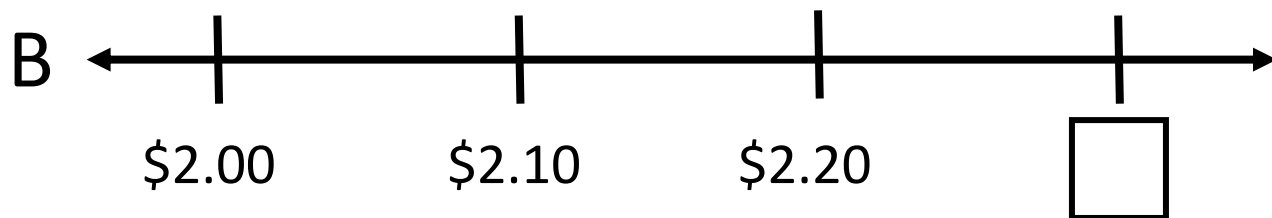
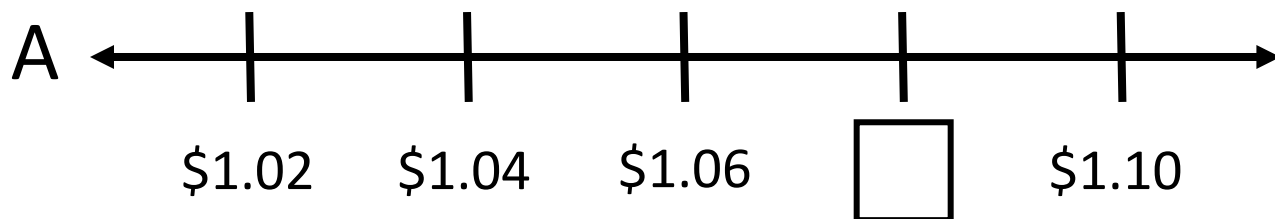
$$4\boxed{}\boxed{} - 1\boxed{}\boxed{}$$



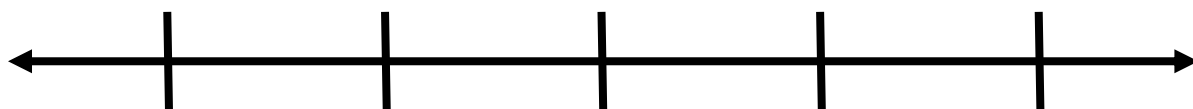
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Number Line Puzzles 2

Fill in the missing numbers.



Create your own number line puzzle below.



Name _____ Date _____

Estimation and Number Sense: Part 2, Rounding

Objective	My Progress (Struggling, Learning, Mastery)
I can round to the nearest dollar or the nearest ten dollars.	
I can give a reason why one choice doesn't belong with the group.	
I can keep working on a challenging problem even if I don't understand it right away.	
I can fill in missing numbers on a number line.	

PART 3: Combining**Help me, Mom!**

By Abir Yousef



When I was a small girl, I said, “Mom, please help me with my math homework.” I didn’t have anyone to help me. She cried because she didn’t go to school when she was a girl. This was so hard for me. I practiced by myself for a long time. I feel I am strong in life. Math is important. I did well in math. I remember my teacher in school told me, “In the future, you must study to be an engineer.”

My children like math and they do well too.

Sometimes they tell me, “Mom, please help us.” But I feel sad because it is hard to help them. I need more English. When my children were small, I could teach them math. As they’ve gotten older, some of the problems are too hard. Sometimes, it takes me one hour to find the right answer. Now I learn English to help me in math also. I use math all the time in my life. I want to find a job very fast and math will help.

Abir Yousef is a student at the IRIS Mother & Child ESOL Program in New Haven, CT. She is from Syria, where she studied psychology at Damascus University. When she went to Jordan, she worked for the International Rescue Committee helping refugees. Now she wants to study to be an ultrasound technician in the USA and work part-time because she has seven children. The piece above was published in *The Change Agent*, Issue 47 “Math”, September 2018.

Reflect: What was your experience as a child getting help with math?
What is your experience as an adult helping children with math?

Closest Answer

1. $\$26 + \$18.99 + \$4$

a. \$30

b. \$50

c. \$70

2. $10 + 59 - 19$

a. 70

b. 60

c. 50

3. $79 - 25 + 19$

a. 65

b. 75

c. 85

4. $86 + 13 + 2$

a. 90

b. 100

c. 110

5. $\$24.99 + \$9.99 + \$11.99$

a. \$65

b. \$55

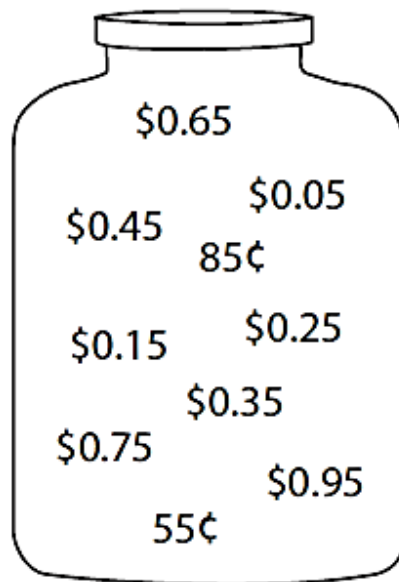
c. \$45

Source: *EMPower book Everyday Number Sense: Mental Math and Visual Models*

How Much Money is in the Jar?



a. Total = _____



b. Total = _____

Write down five combinations that equal one dollar.

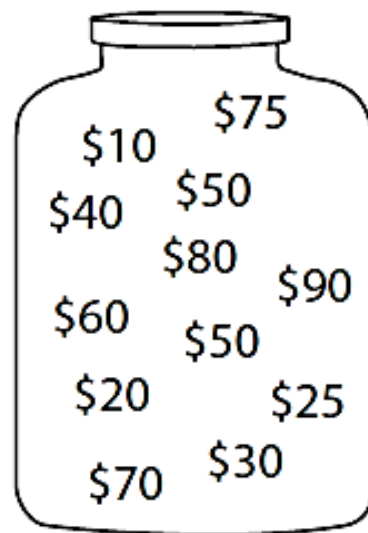
Use mental math to add the following amounts.

$$\$0.10 + \$0.20 + \$0.30 + \$0.40 + \$0.60 + \$0.70 + \$0.80 + \$0.90 =$$

$$\$0.05 + \$0.15 + \$0.25 + \$0.75 + \$0.85 + \$0.95 =$$

Source: *EMPower book Everyday Number Sense: Mental Math and Visual Models*

How Much Money is in the Jar? Larger Amounts



a. Total = _____

b. Total = _____

Write down five combinations that equal \$10.

Use mental math to find the total.

$$\$1 + \$2 + \$3 + \$4 + \$5 + \$6 + \$7 + \$8 + \$9 =$$

$$\$10 + \$20 + \$30 + \$40 + \$50 + \$60 + \$70 + \$80 + \$90 =$$

Source: *EMPower book Everyday Number Sense: Mental Math and Visual Models*

Which One Doesn't Belong? 3

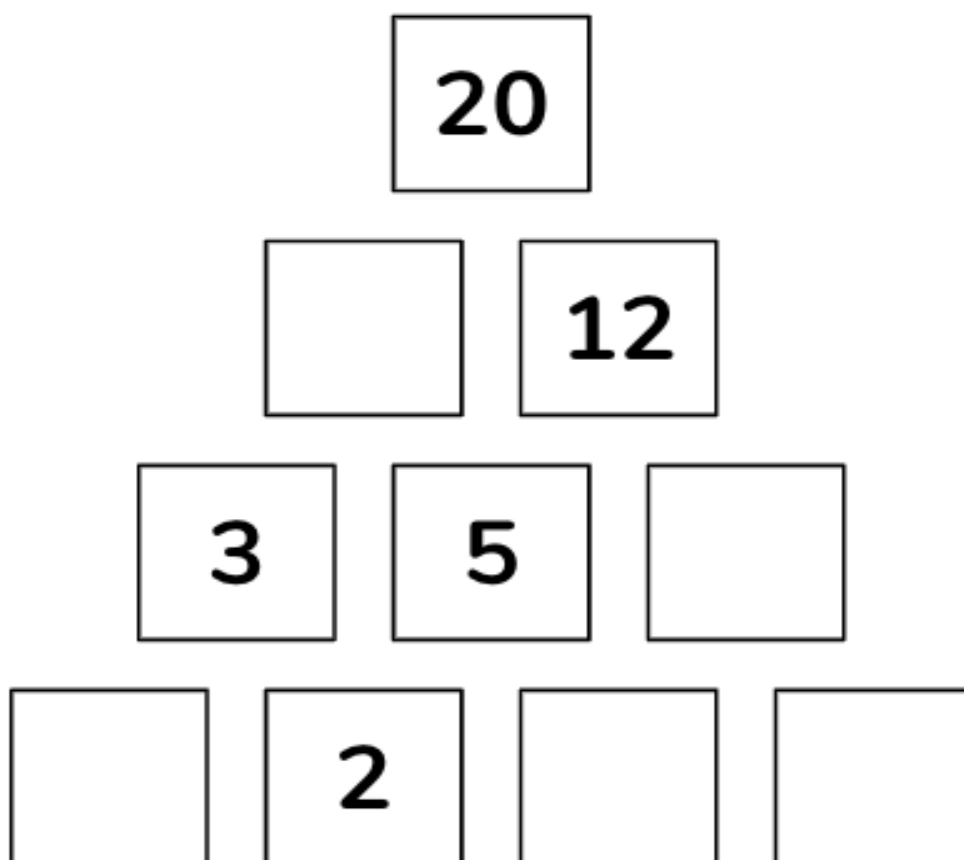
Choose one die in this picture that you don't think belongs with the rest. Explain why.



Can you pick another die and give a different reason?

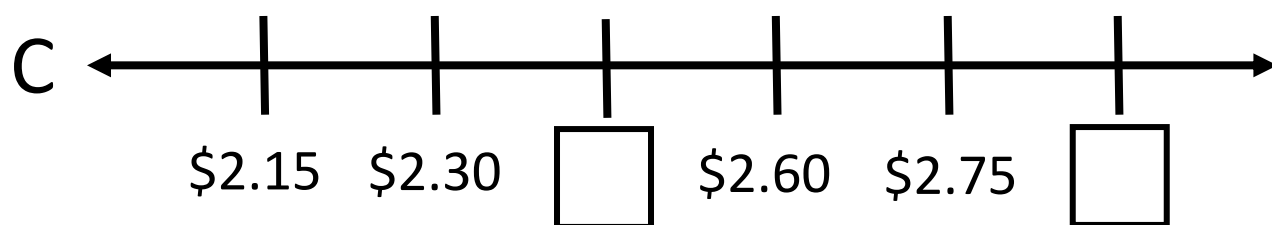
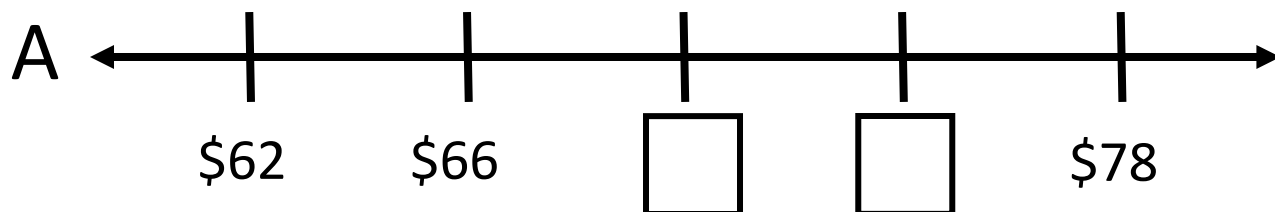
Pyramid Puzzle 3

Each number in the Pyramid is the sum of the two numbers below it. Fill in the missing numbers in the Pyramid. Numbers may repeat.

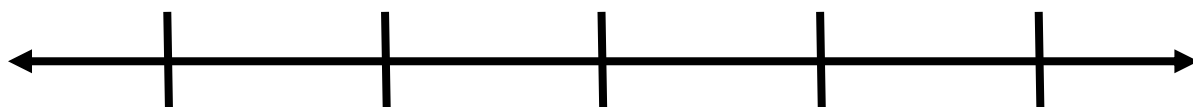


Number Line Puzzles 3

Fill in the missing numbers.



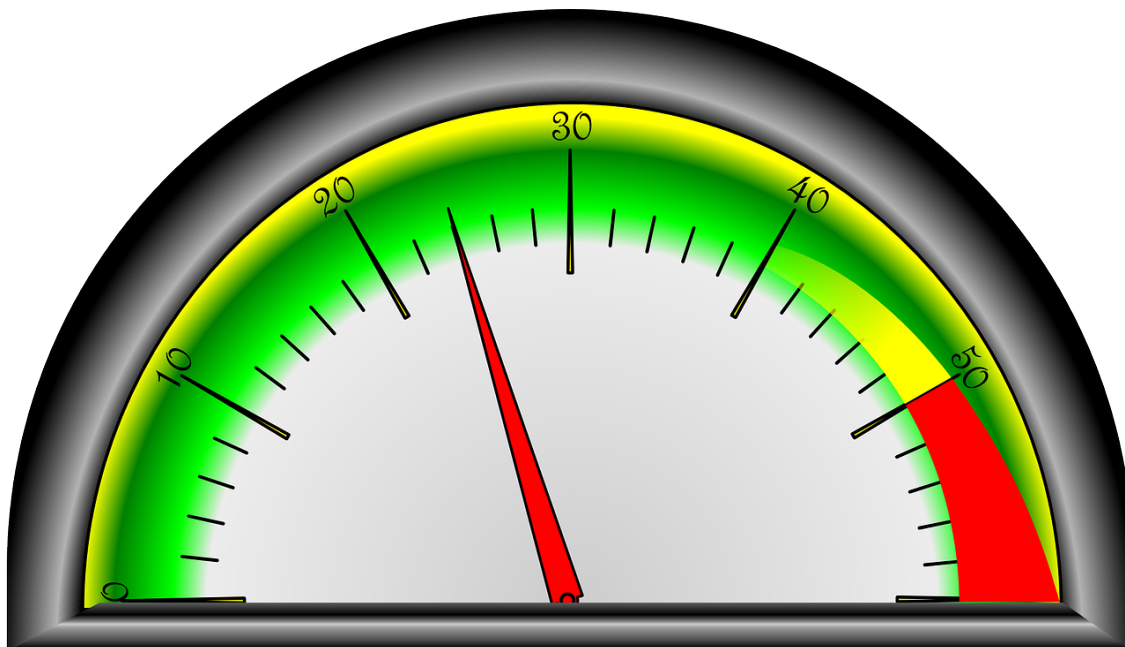
Create your own number line puzzle below.



Name _____ Date _____

Estimation and Number Sense: Part 3, Combining

Objective	My Progress (Struggling, Learning, Mastery)
I can find pairs of numbers that add together easily.	
I can estimate the total when adding several amounts.	
I can explain my strategy for estimating to others.	
I can give a reason why one choice doesn't belong with the group.	
I can keep working on a challenging problem even if I don't understand it right away.	
I can fill in missing numbers on a number line.	

PART 4: Gauges

This is a **gauge**. A gauge is any tool that uses a number line to measure something.

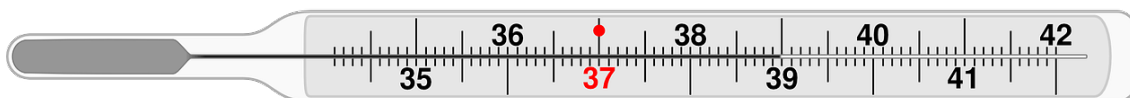
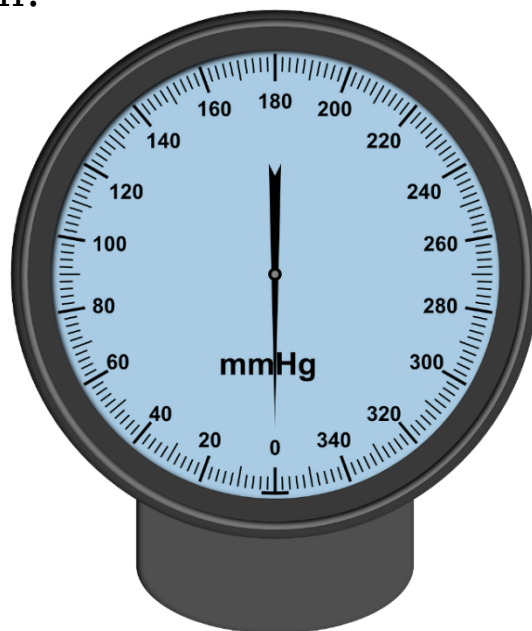
Look closely at the gauge above. What do you notice? What do you wonder?

What do you think this gauge might be measuring?

Examples of Gauges

For each gauge, consider:

- What is the smallest interval worth?
- Which numbers are labelled?
- What are the smallest and largest amounts that this gauge can measure?
- What do you think this gauge would be used for?

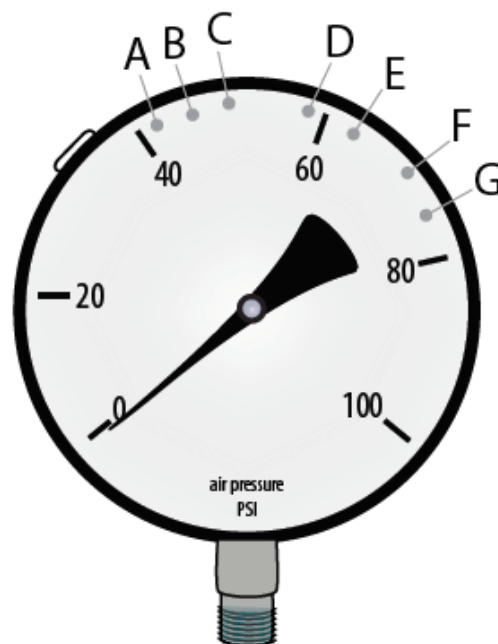


Practice: Reading Gauges

In each case, which lettered point marks the target number?

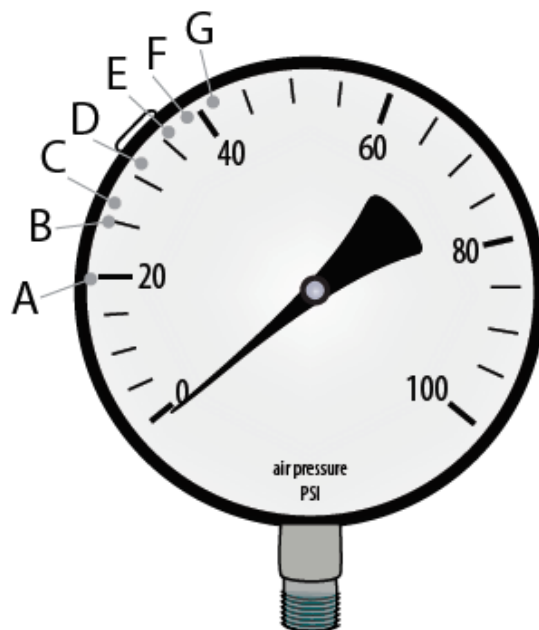
1. Air pressure is measured in pounds per square inch (psi). A mountain bike calls for 46 psi. Circle the letter for that point on the tire pressure gauge.

Explain your reasoning.



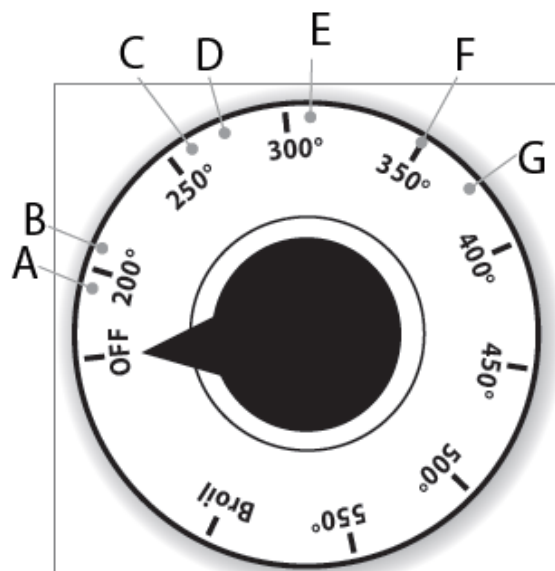
2. When Ray checked his tires, the gauge showed a pressure of 27 psi. Circle the letter for that point on the tire pressure gauge.

Explain your reasoning.



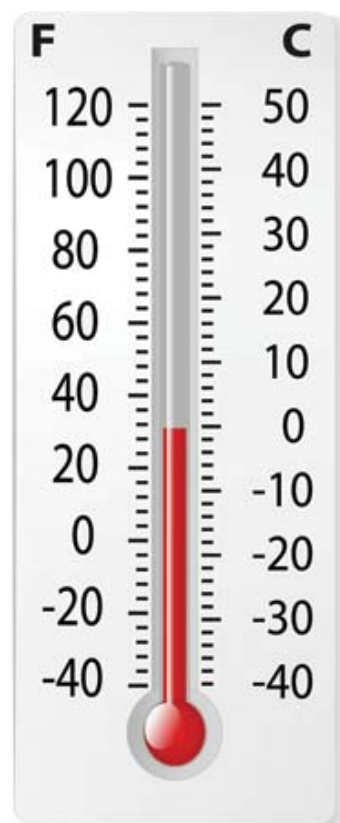
3. The cooking directions stated that the oven needs to be pre-heated to 275 degrees. Circle the letter for that point on the oven thermometer.

Explain your reasoning.



4. What is the temperature shown on this gauge in Fahrenheit degrees? What is the temperature in Celsius degrees?

Explain your reasoning.



Digital Read-out

What is the difference between analog and digital?

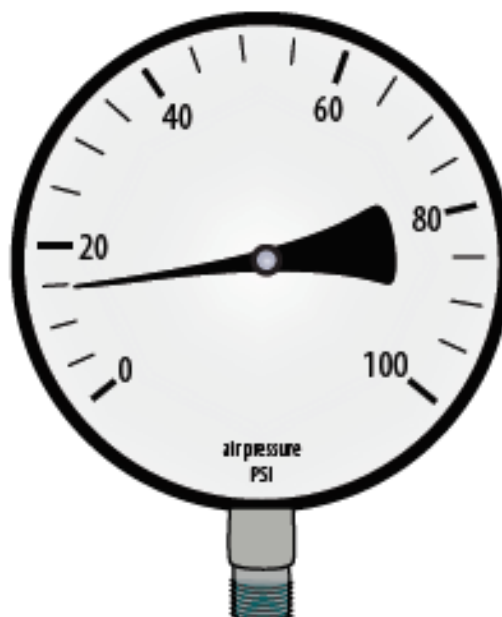


On an analog clock, the hands point to a position to show time.

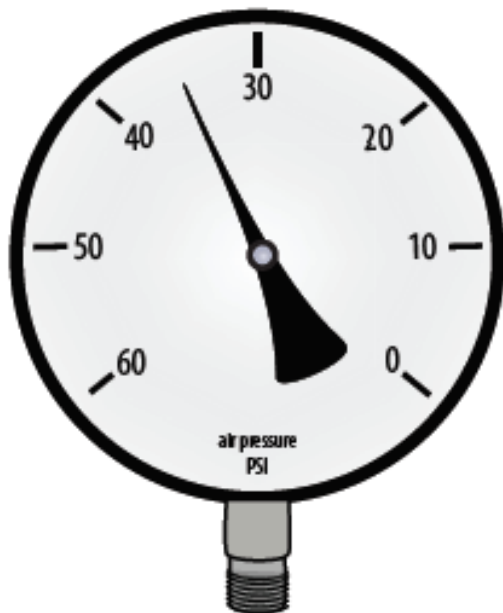


A digital clock describes time with digits, or numbers

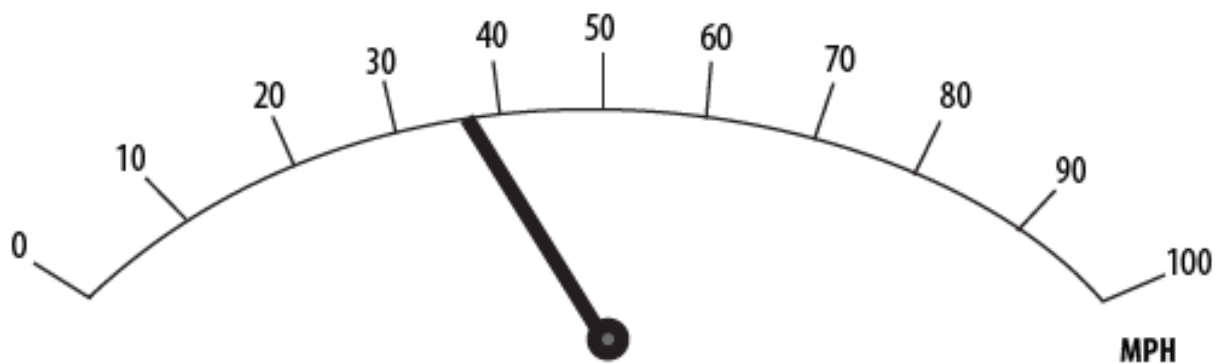
1. Digital Read-out: _____



2. Digital Read-out: _____



3. Digital Read-out: _____



Source: *EMPower book Everyday Number Sense: Mental Math and Visual Models*

Which One Doesn't Belong? 4

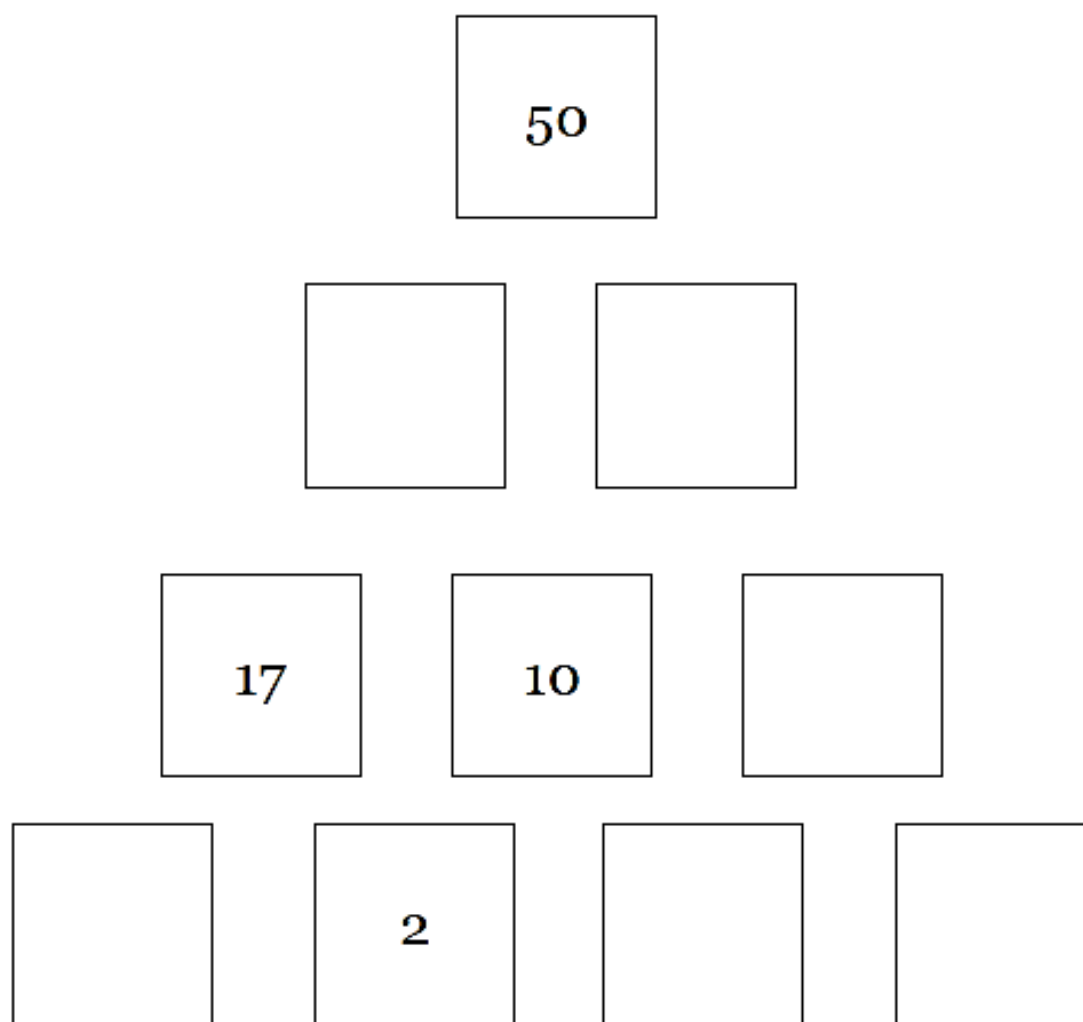
Choose one number in this picture that you don't think belongs with the rest. Explain why.

1	5
45	150

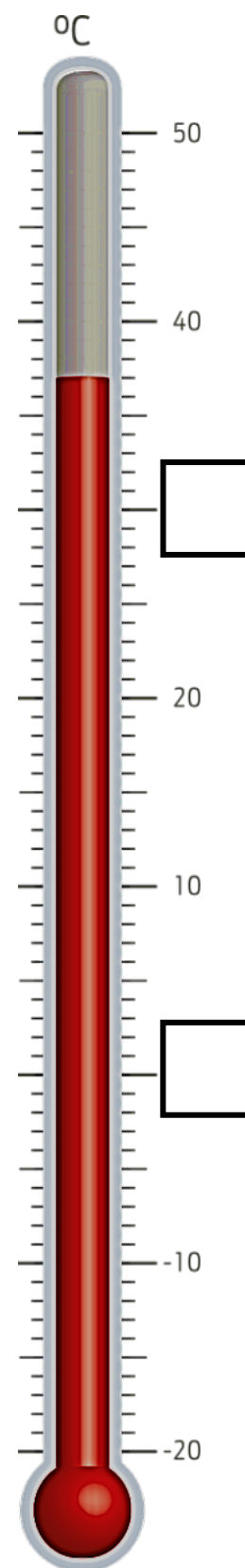
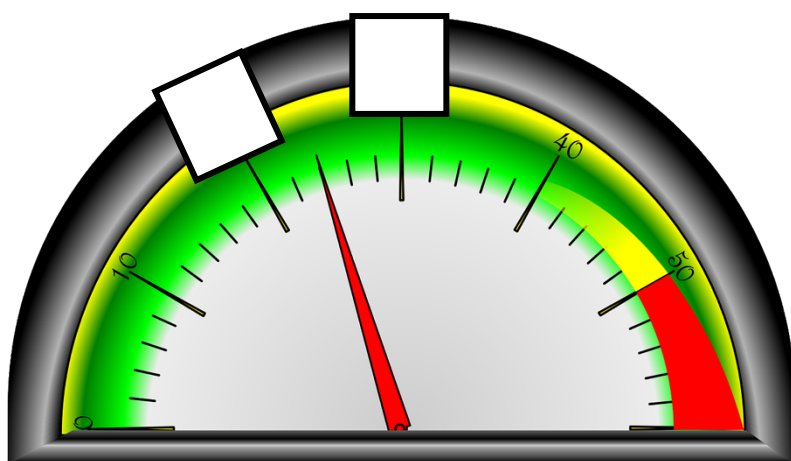
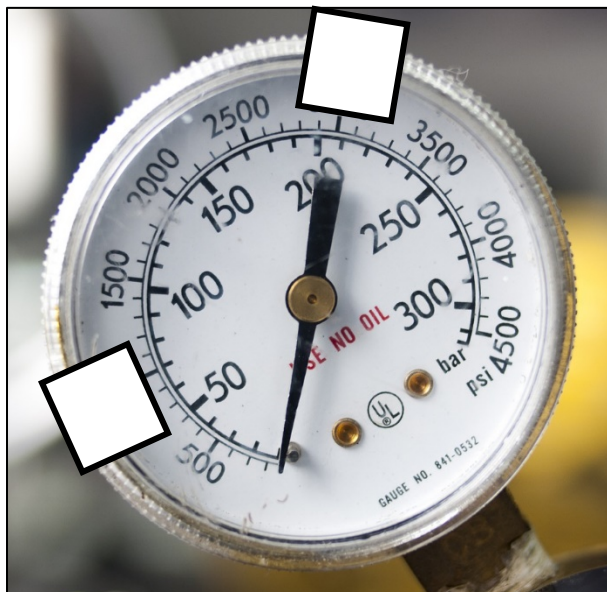
Can you pick another number and give a different reason?

Pyramid Puzzle 4

Each number in the Pyramid is the sum of the two numbers below it. Fill in the missing numbers in the Pyramid. Numbers may repeat.



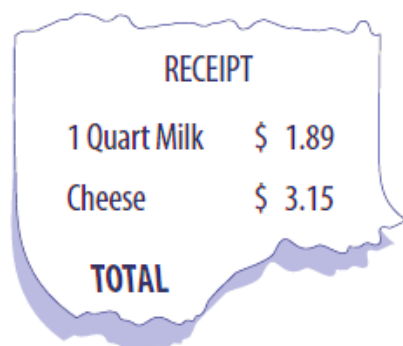
Gauge Puzzles



Extension: Math in Line

Do they have enough money? How do you know?

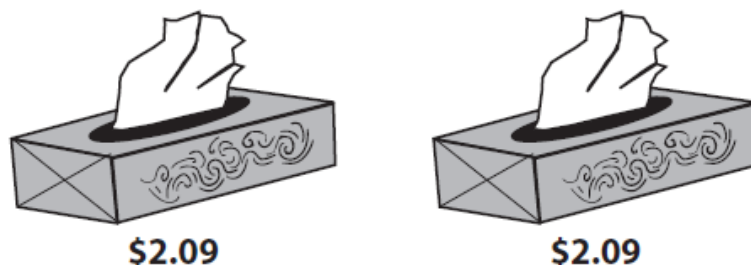
1. I have \$5. Do I have enough?



2. Sara has \$10. She wants to buy three loaves of bread.



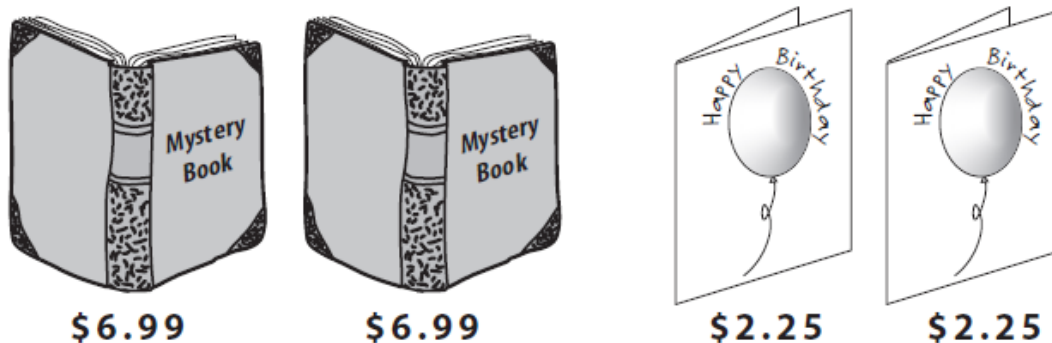
3. Daniel has \$5. He wants to buy two boxes of tissues.



4. Jerry has \$25. He wants to buy 4 shirts.



5. Olga has \$20. She wants to buy two books and two cards.



Source: *EMPower book Everyday Number Sense: Mental Math and Visual Models*

Name _____ Date _____

Estimation and Number Sense: Part 4, Gauges

Objective	My Progress (Struggling, Learning, Mastery)
I can read a gauge.	
I can give a reason why one choice doesn't belong with the group.	
I can keep working on a challenging problem even if I don't understand it right away.	
I can fill in missing numbers on a number line.	

PART 5: Equations

These are equations.

$$12 + 3 = 15$$

$$1 = 20 - 19$$

$$10 + 5 = 6 + 9$$

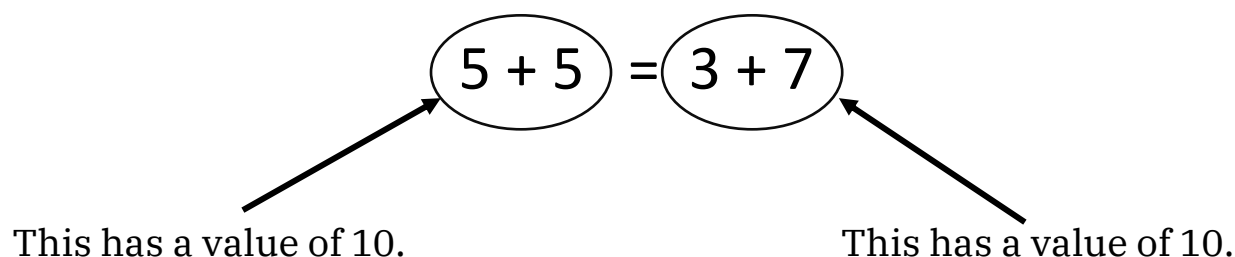
$$0 + 3 + 1 = 2 + 2 - 0$$

What do they have in common?

What is different? Do any of them surprise you?

What is an Equation?

An **equation** is a math sentence. It says that both sides of the equal sign have the same value.



Equations can look like this, with a single number on one side:

$$10 + 5 = 15$$

$$15 = 8 + 7$$

or like this, with operations on both sides:

$$5 + 10 = 8 + 7$$

$$2 + 5 = 9 - 2$$

All of these are true equations, since both sides of the equals sign have the same value.

Make it True

1. Add addition signs and an equal sign to make an equation that is true for each set of numbers below.

Example: 5 + 4 = 2 + 1 + 6

a. 12 3 6 1 10 10

b. 28 19 3 24 20

c. 2 19 8 3 24 2

d. 35 3 19 12 0 7

e. 32 16 8 4 2 1 1

Source: *EMPower book Everyday Number Sense: Mental Math and Visual Models*

Check Both Sides of the Equal Sign

$$9 + 7 = 10 + 6$$

$$12 + 7 = 10 + 9$$

$$6 + 18 = 4 + 20$$

$$35 + 97 = 32 + 100$$

$$297 + 438 = 300 + 435$$

What's going on in these equations?

Write another equation that follows this pattern.

Source: *EMPower book Everyday Number Sense: Mental Math and Visual Models*

Fast Actions with 10 or 100

When you add ten, pay attention to the tens place.

$$\underline{4}89 + 10 = 4\underline{9}9$$

When you add 100, pay attention to the hundreds place.

$$\underline{4}89 + 100 = \underline{5}89$$

1. If you add \$100 to \$568, you get _____.
2. If you add \$10 to \$283, you get _____.
3. If you add \$100 to \$283, you get _____.
4. If you add \$10 to \$650, you get _____.
5. If you add \$100 to \$650, you get _____.
6. If you add \$10 to \$396, you get _____.
7. If you add \$100 to \$396, you get _____.
8. If you add \$10 to \$969, you get _____.

Source: *EMPower book Everyday Number Sense: Mental Math and Visual Models*

Fast Actions with 9 or 90

Fill in the missing numbers. Look for a pattern.

1. a. $65 + 10 =$ _____

b. $65 + 9 =$ _____

2. a. $137 + 10 =$ _____

b. $137 + 9 =$ _____

3. a. $89 + 10 =$ _____

b. $89 + 9 =$ _____

4. a. $406 + 10 =$ _____

b. $406 + 9 =$ _____

5. a. $665 + 10 =$ _____

b. $665 + 9 =$ _____

6. a. $198 + 10 =$ _____

b. $198 + 9 =$ _____

7. What is a fast way to add nine to any amount with mental math?

8. a. $650 + 100 =$ _____

b. $650 + 90 =$ _____

9. a. $437 + 100 =$ _____

b. $437 + 90 =$ _____

10. a. $809 + 100 =$ _____

b. $809 + 90 =$ _____

11. a. $916 + 100 =$ _____

b. $916 + 90 =$ _____

12. What is a fast way to add 90 to any amount with mental math?

Source: *EMPower book Everyday Number Sense: Mental Math and Visual Models*

Which One Doesn't Belong? 5

Choose one equation in this picture that you don't think belongs with the rest. Explain why.

$5 + 10 = 15$	$15 = 10 + 5$
$7 + 8 = 10 + 5$	$15 = 15$

Can you pick another equation and give a different reason?

Make it Equal

Directions: Using the digits 1 to 9 at most one time each, place a digit in each box to create a true statement.

$$\square = \square + \square = \square + \square + \square$$



Source: <https://www.openmiddle.com/> - Molly Rawding

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Adding Two-Digit Numbers Given One

Directions: Using the digits 0 to 9 at most one time each, fill in the boxes to make a true equation.

$$\boxed{}\boxed{} + 53 = \boxed{}\boxed{}$$

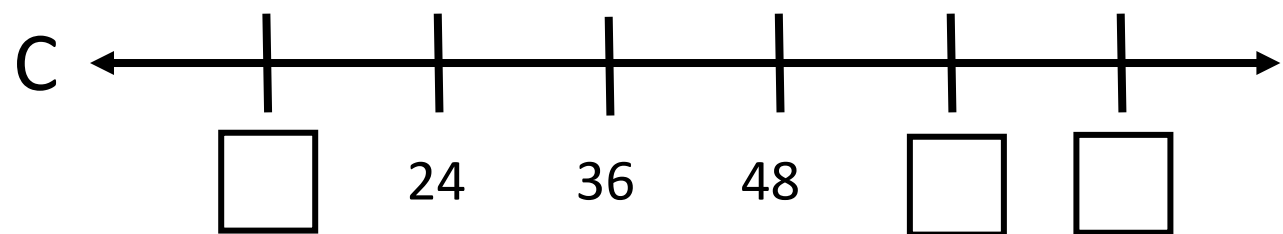
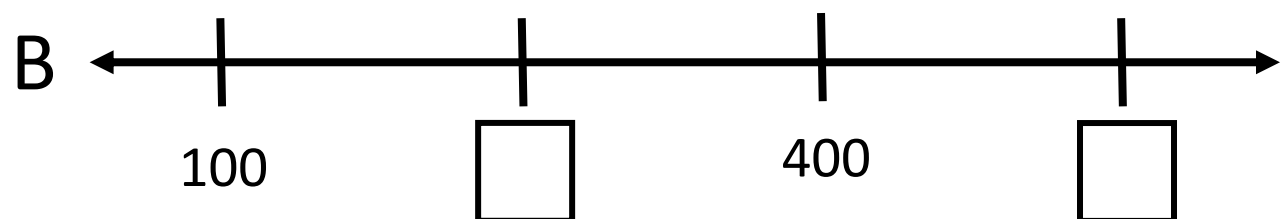
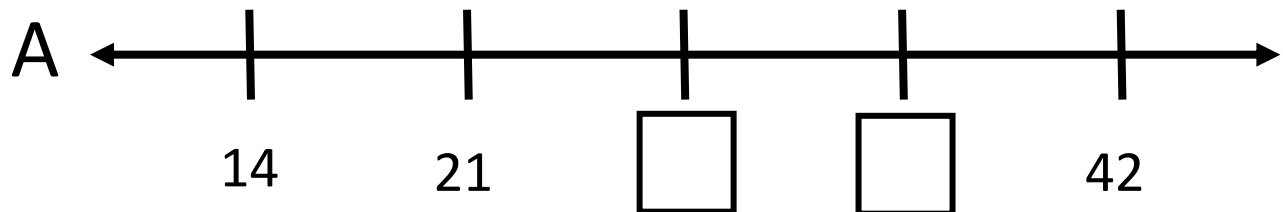


Source: <https://www.openmiddle.com/> - Robert Kaplinsky

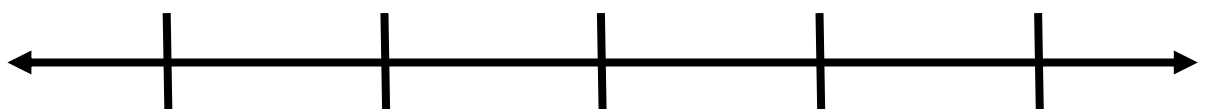
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Number Line Puzzles 5

Fill in the missing numbers.



Create your own number line puzzle below.



Name _____ Date _____

Estimation and Number Sense: Part 5, Equations

Objective	My Progress (Struggling, Learning, Mastery)
I can write a true equation.	
I can give a reason why one choice doesn't belong with the group.	
I can keep working on a challenging problem even if I don't understand it right away.	
I can fill in missing numbers on a number line.	

Test Practice

1. At his clothing stall in the flea market, Brian sold a suit for \$4.95, a sweater for \$3.95, and a winter coat for \$14.95. Which of the following is closest to the total amount of his sales?
 - (a) \$20
 - (b) \$25
 - (c) \$30
 - (d) \$35
 - (e) \$40

2. Mariana sells used furniture at a flea market. She sold a desk for \$19, two chairs for \$7 each, and a table for \$18. Which of the following is closest to the total amount of her sales?
 - (a) \$30
 - (b) \$35
 - (c) \$40
 - (d) \$45
 - (e) \$50

3. Alicia borrowed money for lunch from her brother every day last week. He loaned her \$7.55 on Monday, \$5.40 on Tuesday, \$6.75 on Wednesday, \$4.25 on Thursday, and \$6.50 on Friday. About how much money did Alicia borrow from her brother?
- (a) \$28
 - (b) \$31
 - (c) \$33
 - (d) \$34
 - (e) \$36
4. Wade bought a used bike for \$26. When he got it home, he realized it was too small for him. He found someone to buy it from him for \$15. Wade did which of the following from buying and selling the bike?
- (a) Lost about \$10
 - (b) Gained about \$10
 - (c) Lost about \$15
 - (d) Gained about \$15
 - (e) None of the above

Source: *EMPower book Everyday Number Sense: Mental Math and Visual Models*

Estimation and Number Sense Quiz (Parts 1-3)

1. Estimate a total.

a) $\$11.88 + \18.00

b) $\$4.00 + \$8.95 + \$5.75$

2. Round to the nearest dollar.

a) $\$3.68$

b) $\$56.13$

3. Round to the nearest \$10.

a) $\$23$

b) $\$247$

4. You have \$20. Do you have enough to buy these items?
Show how you know.

Ground Beef for \$8.79

Rolls for \$3.05

Macaroni Salad for \$6.99

5. Add these numbers. Explain or show your strategy.

a) $3 + 5 + 5 + 7 + 2 + 4 + 6 + 8$

b) $25 + 10 + 60 + 40 + 75 + 90$

Estimation and Number Sense Quiz (Parts 4-5)

6. This is a speedometer. How fast is the car going?

How do you know?



7. Are the following equations true or false? For each one, explain why.

a) $5 = 3 + 2$

b) $5 + 7 = 12 + 1$

c) $5 + 6 = 12$

d) $3 + 2 = 5 + 1 = 6$

Blank Number Lines

