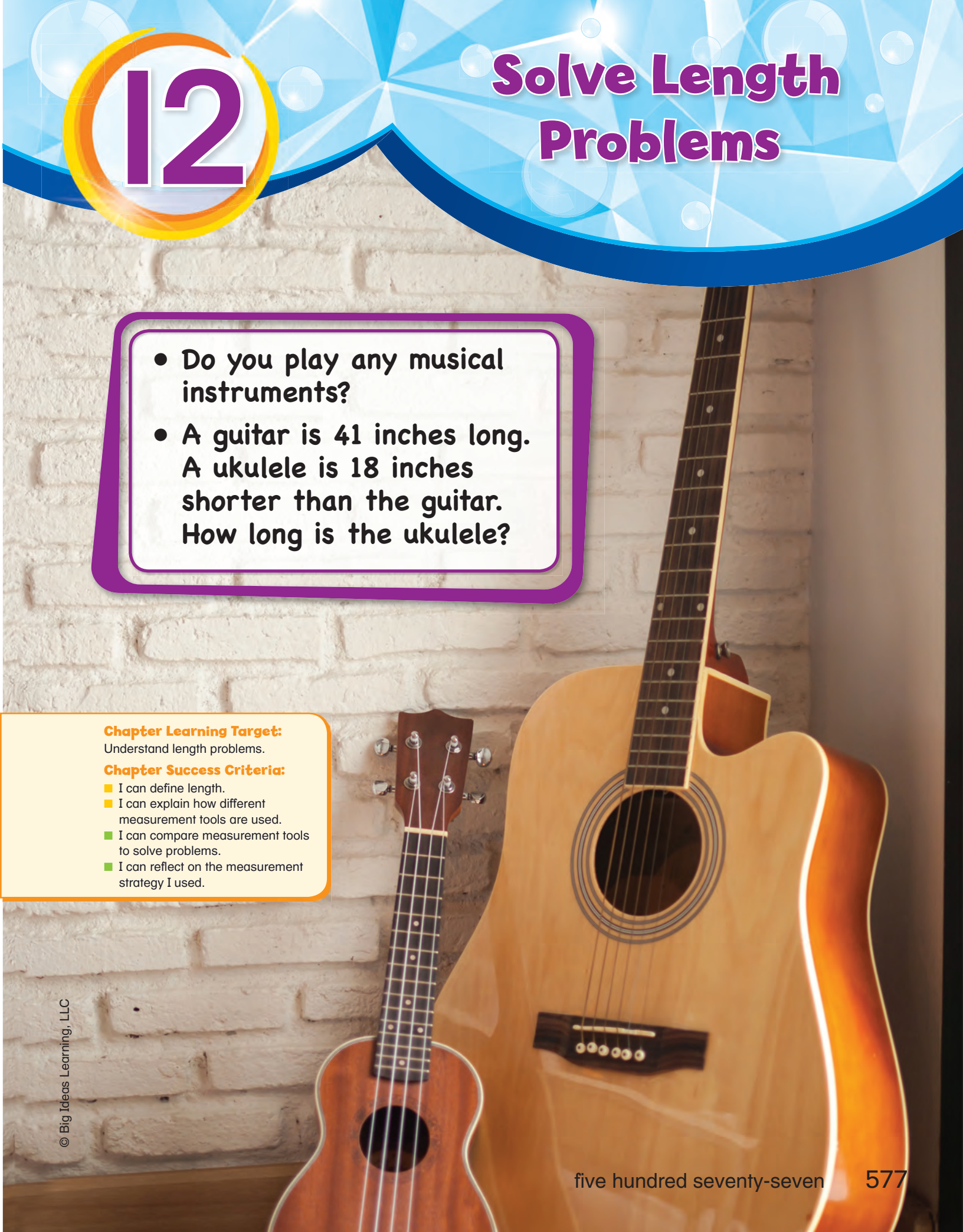
12 Solve Length Problems

- Do you play any musical instruments?
- A guitar is 41 inches long. A ukulele is 18 inches shorter than the guitar. How long is the ukulele?

Chapter Learning Target:
Understand length problems.

Chapter Success Criteria:
- I can define length.
- I can explain how different measurement tools are used.
- I can compare measurement tools to solve problems.
- I can reflect on the measurement strategy I used.



Name _____

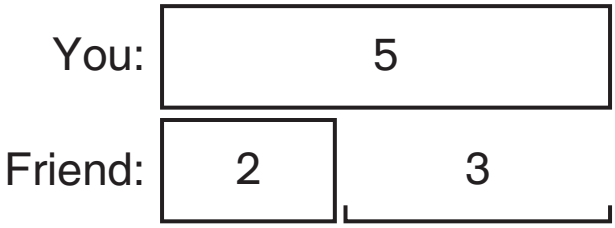
12 Vocabulary

Review Words

bar model
length unit
measure

Organize It

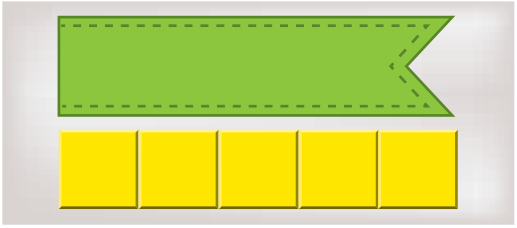
Use the review words to complete the graphic organizer.



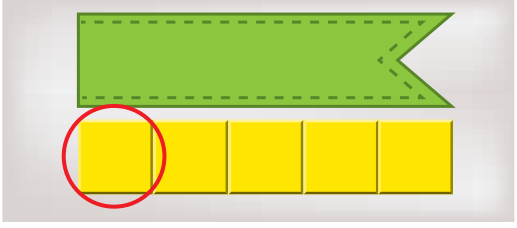
Define It

Match the review word to its model.

1. length unit



2. measure



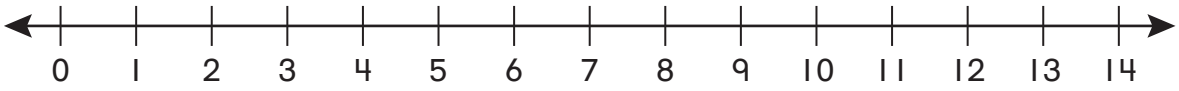
Name _____

12.1 Use a Number Line to Add and Subtract Lengths

Learning Target: Use a number line to solve length word problems.

Explore and Grow

Your goldfish is 4 centimeters long. It grows 6 more centimeters. Use the number line and your ruler to show how long the goldfish is now.



_____ centimeters

MP Repeated Reasoning What is the same about your ruler and the number line? What is different?

_____

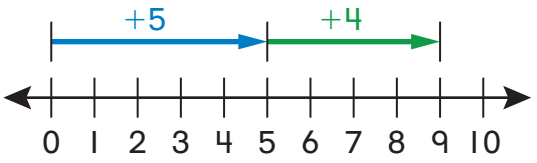
_____

_____

_____

Think and Grow

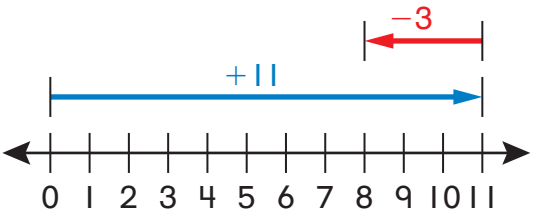
An ant walks 5 centimeters and stops. Then it walks 4 centimeters. How far does the ant walk in all?



5 + 4 = 9

9 centimeters

A paper is 11 inches long. You cut off 3 inches. How long is the paper now?

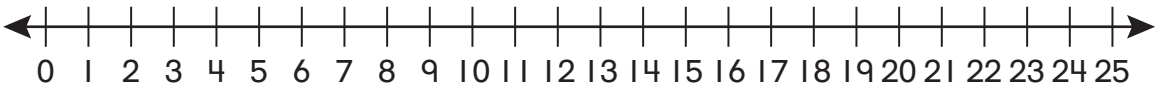


11 − 3 = 8

8 inches

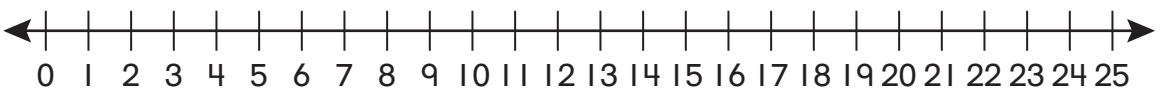
Show and Grow *I can do it!*

1. You swim 15 meters and take a break. Then you swim 10 meters. How many meters do you swim?



____ ◯ ____ = ____ ____ meters

2. A ribbon is 16 yards long. You cut off 7 yards. How long is the ribbon now?

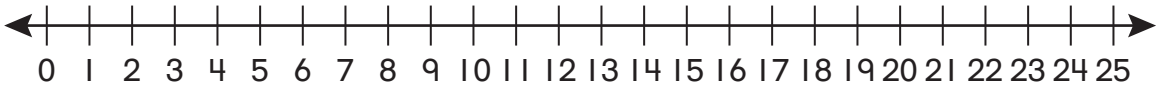


____ ◯ ____ = ____ ____ yards

Name _____

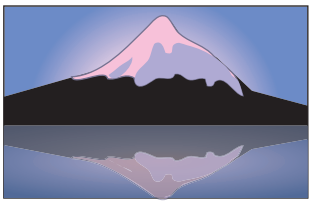
Apply and Grow: Practice

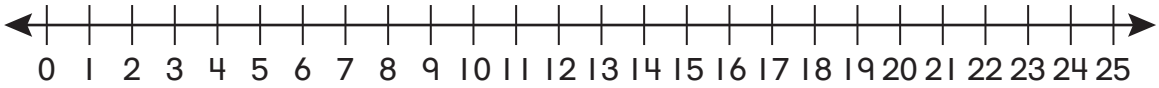
3. A snake is 24 inches long. It sheds 14 inches of its skin. How much skin does it *not* shed?



_____ ◯ _____ = _____ _____ inches

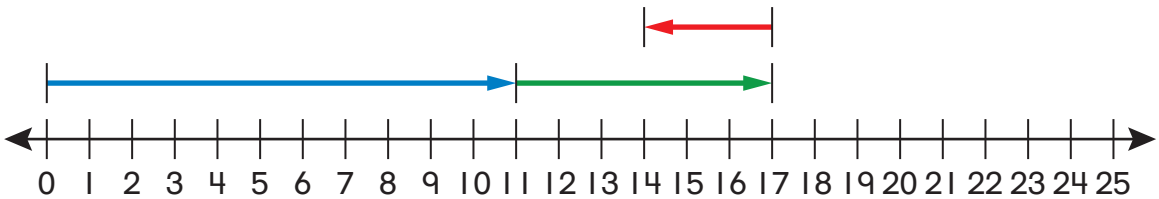
4. A photo is 15 centimeters long. You cut off 3 centimeters from the left and 3 centimeters from the right. How long is the photo now?





_____ ◯ _____ ◯ _____ = _____ _____ centimeters

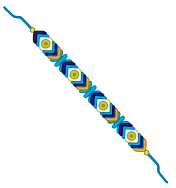
5. MP **Structure** Write an equation that matches the number line.



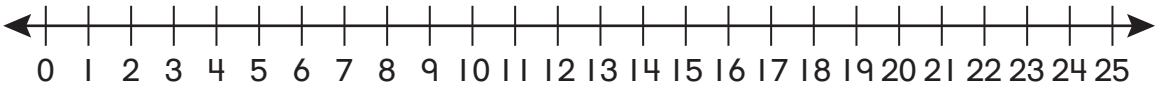
_____ ◯ _____ ◯ _____ = _____

Think and Grow: Modeling Real Life

You want to make a bracelet that is 6 inches long. You make 4 inches before lunch. You make 2 inches after lunch. Did you finish the bracelet?



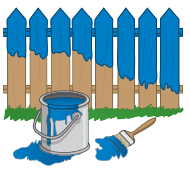
Model:

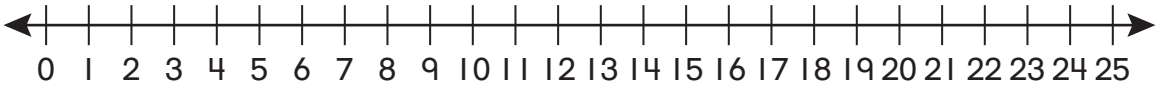


Did you finish? Yes No

Show and Grow *I can think deeper!*

6. You are painting a fence that is 24 feet long. You paint 10 feet on Saturday. You paint 13 feet on Sunday. Did you finish painting the fence?

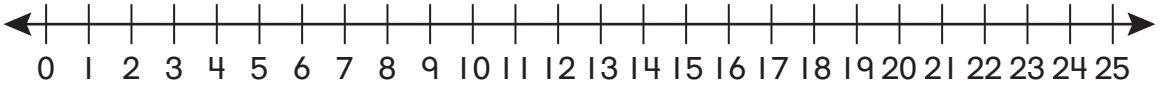




Yes No

---

7. DIG DEEPER! You throw a disc 9 meters. On your second throw, the disc travels 3 meters more than your first throw. How many meters did the disc travel in all?



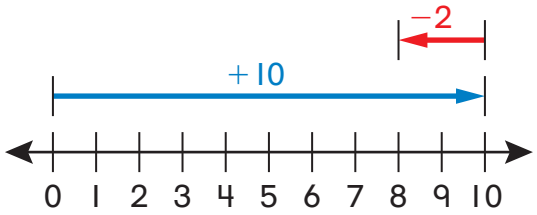
_____ meters

Name _____

Practice 12.1

Learning Target: Use a number line to solve length word problems.

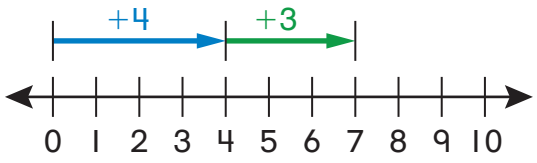
Your hair is 10 centimeters long. You cut off 2 centimeters. How long is your hair now?



10 ⊖ 2 = 8

8 centimeters

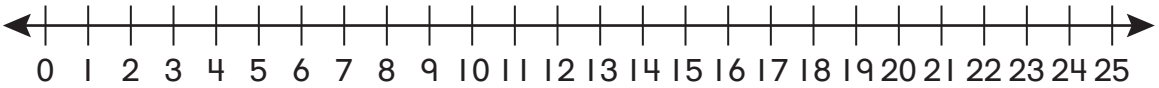
Your paper airplane flies 4 meters. Your friend's airplane flies 3 meters farther. How far did his airplane fly?



4 ⊕ 3 = 7

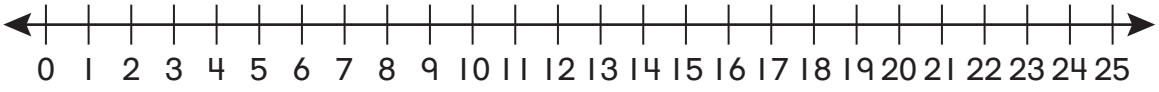
7 meters

1. You kick a ball 13 yards. Your friend kicks it back 9 yards. How far is the ball from you now?



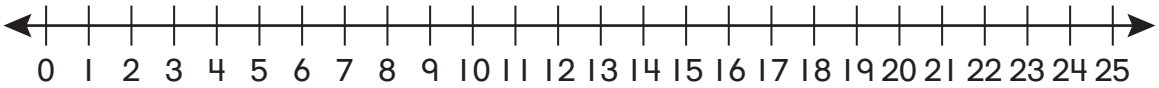
_____ ◯ _____ = _____ _____ yards

2. Your shoelace is 20 inches long. Your friend's is 4 inches longer than yours. How long is your friend's shoelace?

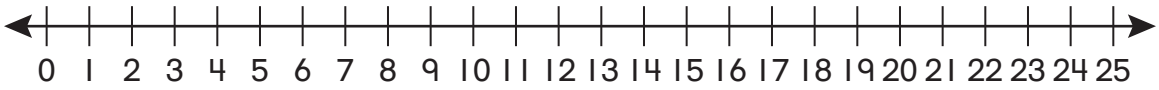


_____ ◯ _____ = _____ _____ inches

3. **Structure** One power cord is 7 feet long. Another power cord is 5 feet long. Use the number line to find the combined length of the power cords.

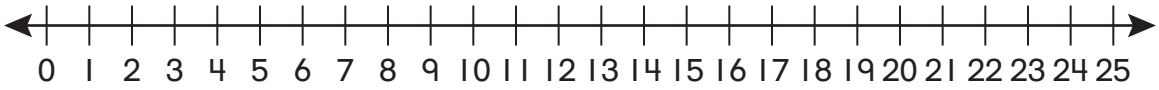


4. **Modeling Real Life** A worker needs to pave a bike path that is 25 feet long. He completes 13 feet on Monday and 11 feet on Tuesday. Did he complete the paving?



Yes No

5. **DIG DEEPER!** You throw a baseball 5 yards. On your second throw, the baseball travels 2 yards more than your first throw. How many yards did the baseball travel in all?



_____ yards

Review & Refresh

Compare.

6. 210 ◯ 200 + 10

7. 532 ◯ 500 + 20 + 3

Name _____

Problem Solving: Length 12.2

Learning Target: Solve *compare* length word problems.

Explore and Grow

How much longer is the red ribbon than the blue ribbon?

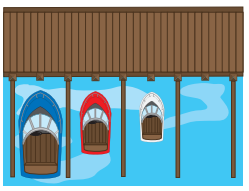
MP Make a Plan
Should you add or subtract to solve? How do you know?

_____ ◯ _____ = _____

_____ inches

Think and Grow

A blue boat is 28 feet long. A red boat is 20 feet long. A white boat is 16 feet long. How much shorter is the white boat than the blue boat?



Think: What do you know? What do you need to find?

Blue boat: 28

White boat: 16 ?

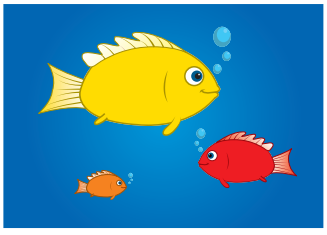
16 + ? = 28 28 − 16 = ?

So, ? = 12.

12 feet

Show and Grow *I can do it!*

1. An orange fish is 10 centimeters long. A yellow fish is 35 centimeters long. A red fish is 19 centimeters long. How much longer is the yellow fish than the red fish?



Yellow fish:

Red fish:

_____ ◯ _____ = _____

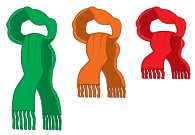
So, ? = _____.

_____ centimeters

Name _____

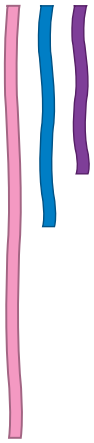
Apply and Grow: Practice

2. A green scarf is 60 inches long. An orange scarf is 45 inches long. A red scarf is 36 inches long. How much longer is the green scarf than the red scarf?



_____ inches

3. DIG DEEPER! A pink ribbon is 90 centimeters long. A purple ribbon is 35 centimeters long. A blue ribbon is 46 centimeters long. How much longer is the pink ribbon than the total length of the purple and blue ribbons?



_____ centimeters

4. MP **Maintain Accuracy** How much taller is Student 3 than the shortest student?

Height (inches)	
Student 1	49
Student 2	48
Student 3	53
Student 4	52

_____ inches

Think and Grow: Modeling Real Life

You hop 27 inches and then 24 inches. Your friend hops 3 inches less than you. How far does your friend hop?

Think: What do you know? What do you need to find?

Model:

_____ inches

Show and Grow *I can think deeper!*

5. You throw a ball 36 feet and then 41 feet. Your friend throws a ball 5 feet farther than you. How far does your friend throw the ball?

_____ feet

6. DIG DEEPER! A black horse runs 53 meters and then 45 meters. A brown horse runs 62 meters and then 31 meters. Which horse ran the longer distance in all? How many more meters did the horse run?

Black horse Brown horse

_____ more meters

Name _____

Practice 12.2

Learning Target: Solve *compare* length word problems.

You are 43 inches tall. Your friend is 45 inches tall. Your cousin is 61 inches tall. How much taller is your cousin than you?

Think: What do you know? What do you need to find?

Cousin: 61

You: 43 ?

43 + ? = 61 61 − 43 = ?

So, ? = 18.

18 inches

1. The distance to the principal's office is 24 yards. The distance to the bathroom is 15 yards. The distance to your teacher's desk is 2 yards. How much farther away is the principal's office than the bathroom?

Principal's office: _____

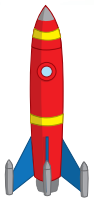
Bathroom: _____

_____ ◯ _____ = _____

So, ? = _____.

_____ yards

2. MP **YOU BE THE TEACHER** You launch a rocket 63 meters. Your friend launches it 28 meters, and your cousin launches it 86 meters. Your cousin says that he launches the rocket 58 meters farther than you. Is he correct? Explain.



_____

_____

3. MP **Modeling Real Life** You create a drawing that is 15 centimeters long and then add on 7 more centimeters. Your friend creates a drawing that is 3 centimeters longer than yours. How long is your friend's drawing?

_____ centimeters

4. DIG DEEPER! A frog hops 36 inches and then 22 inches. A toad hops 14 inches and then 43 inches. Which animal hopped the longer distance in all? How many more inches did the animal hop?

Frog Toad

_____ more inches

Review & Refresh

5.

635 + 10 = ____

635 + 100 = ____

6.

824 + ____ = 924

824 + ____ = 834

7.

309 + ____ = 409

309 + ____ = 319

Name _____

12.3 Problem Solving: Missing Measurement

Learning Target: Solve length word problems to find missing measurements.

Explore and Grow

You and your friend each have a piece of yarn. The total length of both pieces is 16 centimeters. Use a ruler to measure your yarn. Then draw your friend's yarn.

MP **Communicate Clearly** Explain how you found the length of your friend's yarn.

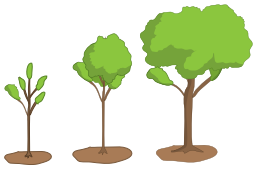
_____

_____

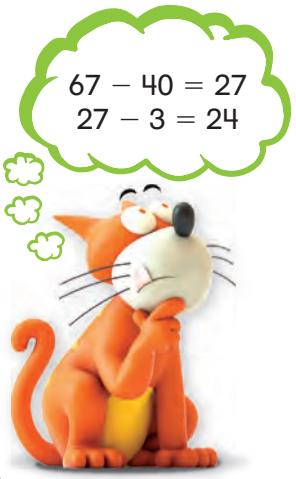
_____

Think and Grow

A tree is 43 inches tall. After 1 year, the tree is 67 inches tall. How many inches did the tree grow?



Think: What do you know? What do you need to find?



43 + ? = 67

Think of 67 − 43 = ?.

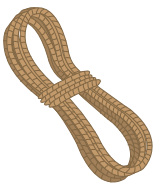
40	3

So, ? = 24.

24 inches

Show and Grow *I can do it!*

1. A rope is 31 meters long. You cut a piece off. Now the rope is 14 meters long. How much rope did you cut off?



_____ ○ _____ = _____

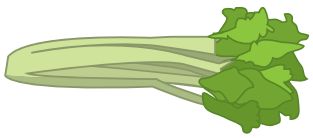
So, ? = _____.

_____ meters

Name _____

Apply and Grow: Practice

2. A celery stalk is 20 centimeters long. You cut off the leaves. Now it is 13 centimeters long. How much did you cut off?



_____ centimeters

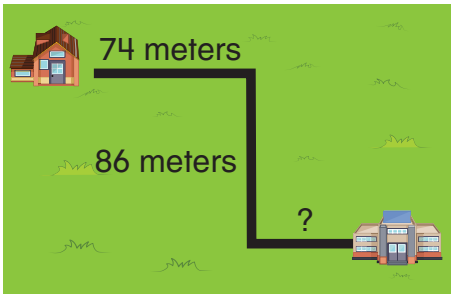
3. Descartes walked some and then ran 39 yards. He went a total of 75 yards. How far did he walk?

_____ yards

4. Your coat zipper is 18 inches long. The zipper gets stuck at 11 inches. How much of the zipper will *not* zip?

_____ inches

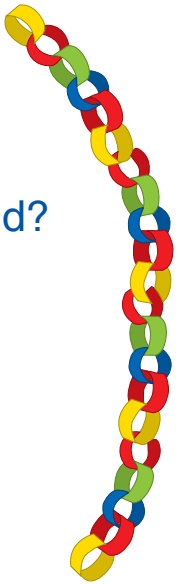
5. MP **Number Sense** The path to school is 181 meters long in all. How long is the missing part of the path?



_____ meters

Think and Grow: Modeling Real Life

You make a paper chain that is 8 feet long. You add 7 feet of chain to the end. Then 6 feet of the chain breaks off. How long is the chain now?



Think: What do you know? What do you need to find?

_____ feet

Show and Grow *I can think deeper!*

6. You build a tower that is 48 centimeters tall. You add 34 centimeters to the tower height. Your tower breaks and 29 centimeters fall off. How tall is your tower now?

_____ centimeters

7. A football team is 78 yards away from scoring. They gain 15 yards on the first play and 21 yards on the second play. How far is the team from scoring now?

_____ yards

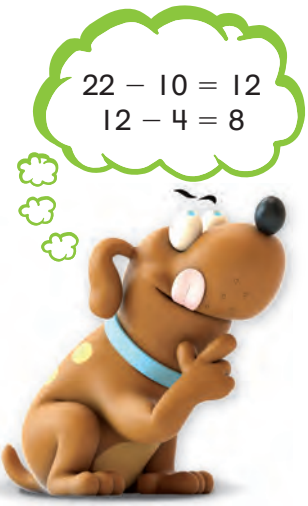
Name _____

Practice 12.3

Learning Target: Solve length word problems to find missing measurements.

Last year your turtle was 14 centimeters long. Now it is 22 centimeters long. How much did it grow?

Think: What do you know? What do you need to find?



14 + ? = 22

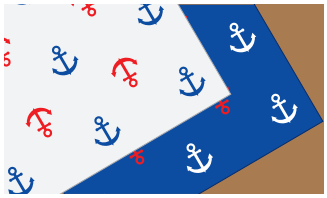
Think of 22 − 14 = ?.

10	4

So, ? = 8.

8 centimeters

1. A piece of fabric is 36 inches long. Another piece is 18 inches long. What is the total length of both pieces of fabric?

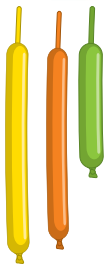


_____ inches

2. A rose is 61 centimeters long. You cut off some of the stem. Now it is 48 centimeters long. How much did you cut off?

_____ centimeters

3. **Maintain Accuracy** Newton's balloon is 18 inches long. Descartes's balloon is 23 inches long. Your friend's balloon is 12 inches long. Which sentences are true?



Newton's balloon is 6 inches longer than your friend's.

Your friend's balloon is 11 inches longer than Descartes's.

Descartes's balloon is 5 inches longer than Newton's.

---

4. **DIG DEEPER!** A branch is ♥ feet long. You cut ♦ feet off. The branch is now ● feet long.

Which equation models the problem?

♥ + ♦ = ● ● − ♦ = ♥

♥ − ♦ = ● ● + ♥ = ♦

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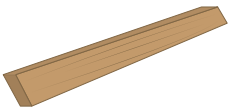
5. **Modeling Real Life** A piece of wood is 16 feet long. You cut off 6 feet, but it is still too long. You cut off 2 more feet. How long is the piece of wood now?



_____ feet

Review & Refresh

6.

$$\begin{array}{r} 371 \\ +\ 158 \\ \hline \end{array}$$

7.

$$\begin{array}{r} 672 \\ +\ 287 \\ \hline \end{array}$$

8.

$$\begin{array}{r} 520 \\ +\ 386 \\ \hline \end{array}$$

Name _____

Practice Measurement Problems 12.4

Learning Target: Solve length word problems.

Explore and Grow

Newton's piece of string is 24 centimeters long. He gives Descartes 12 centimeters of the string. How long is the string that Newton has left? Draw a picture and write an equation to solve.

_____ ◯ _____ = _____

_____ cm

Maintain Accuracy Compare the lengths of string. Is one longer, or are they the same length? Explain.

_____

_____

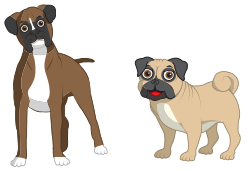
_____

_____

_____

Think and Grow

Your dog is 51 centimeters tall. Your friend's dog is 18 centimeters shorter than your dog. How tall is your friend's dog?



One Way:

Your dog: 51

Your friend's dog: ? 18

? + 18 = 51

51 − 18 = ?

So, ? = 33.

Another Way:

51 − 18 = ?

51 − 18 = ?

10 8

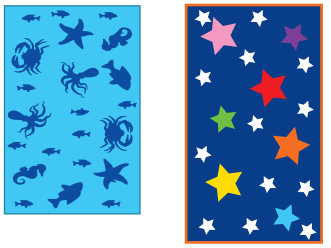
1 7

So, ? = 33.

33 centimeters

Show and Grow *I can do it!*

1. Your blanket is 66 inches long. Your friend's blanket is 9 inches longer than yours. How long is your friend's blanket?



_____ ◯ _____ = _____

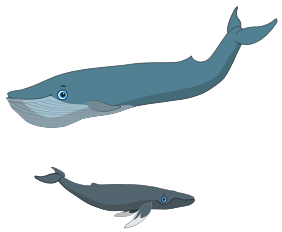
So, ? = _____.

_____ inches

Name _____

Apply and Grow: Practice

2. A blue whale is 31 meters long. A humpback whale is 16 meters long. How much longer is the blue whale than the humpback whale?



_____ meters

3. Newton runs 450 meters. Descartes runs 25 meters less than Newton. How far do they run in all?

_____ meters

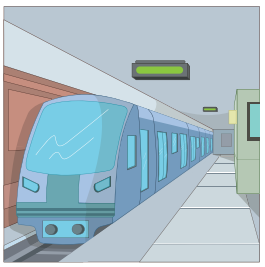
4. MP **Reasoning** Solve the problem below two different ways.

You want to read 100 books during the school year. You read 25 books in the fall and 54 books in the winter. How many books do you still need to read?

_____ books

Think and Grow: Modeling Real Life

A yellow subway train is 18 meters longer than a blue subway train. The yellow subway train is 92 meters long. How long is the blue subway train?



Equation:

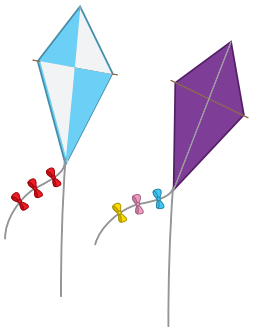
_____ meters

Show and Grow *I can think deeper!*

5. A brown rabbit hops 24 inches less than a white rabbit. The brown rabbit hops 48 inches. How many inches does the white rabbit hop?

_____ inches

6. Your kite string is 47 yards long. You tie 6 yards of string to the end. Now your kite string is 21 yards longer than your friend's kite string. How long is your friend's kite string?



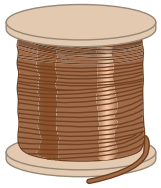
_____ yards

Name _____

Practice 12.4

Learning Target: Solve length word problems.

You need 56 centimeters of wire for a science project. You have 73 centimeters of wire. How much do you need to cut off?



One Way:

Wire you have: 73

Wire you need: 56 ?

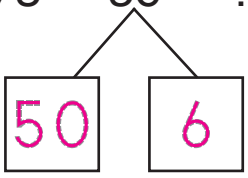
56 + ? = 73

73 − 56 = ?

So, ? = 17.

Another Way:

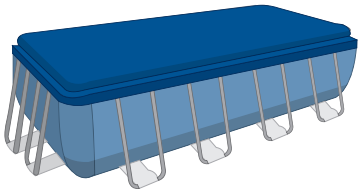
73 − 56 = ?



So, ? = 17.

17 centimeters

1. A swimming pool is 28 feet long. The pool cover is 32 feet long. How much longer is the pool cover?

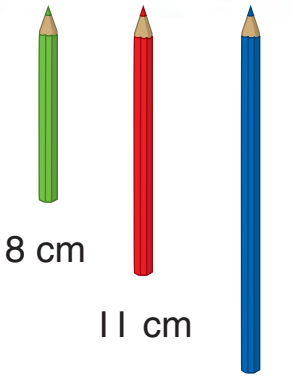


_____ ◯ _____ = _____

So, ? = _____.

_____ feet

2. **Writing** Write and solve a word problem about the colored pencils.



_____

_____

_____

3. **Modeling Real Life** You cast out your fishing line 14 yards less than your friend. Your friend casts out her line 33 yards. How many yards do you cast out your fishing line?

_____ yards

4. **Modeling Real Life** Your nightstand is 24 inches tall. You put a 20-inch lamp on it. Now your nightstand and lamp are 19 inches taller than your bed. How tall is your bed?

_____ inches

Review & Refresh

5. Write the number in expanded form and word form.

645

_____ + _____ + _____ _____

6. Write the number in standard form and word form.

800 + 60 + 2

_____ _____

Name _____

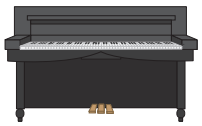
Performance Task 12

1. A recorder is 1 foot long. A clarinet is 24 inches long. Which instrument is longer? How much longer is the instrument?

Recorder Clarinet

_____ inches

2. A piano has 27 more keys than a keyboard. There are 52 white keys and 36 black keys on a piano.



a. How many keys are on the the keyboard?

_____ keys

b. The number of black keys on the piano is equal to the number of white keys on the keyboard. How many black keys are on the keyboard?

_____ black keys

3. A drum set has drums and cymbals on stands.

a. The cymbals are 77 centimeters from the ground. You raise the stand 18 centimeters. The cymbals are now 23 centimeters higher than one of the drums. What is the height of the drum?

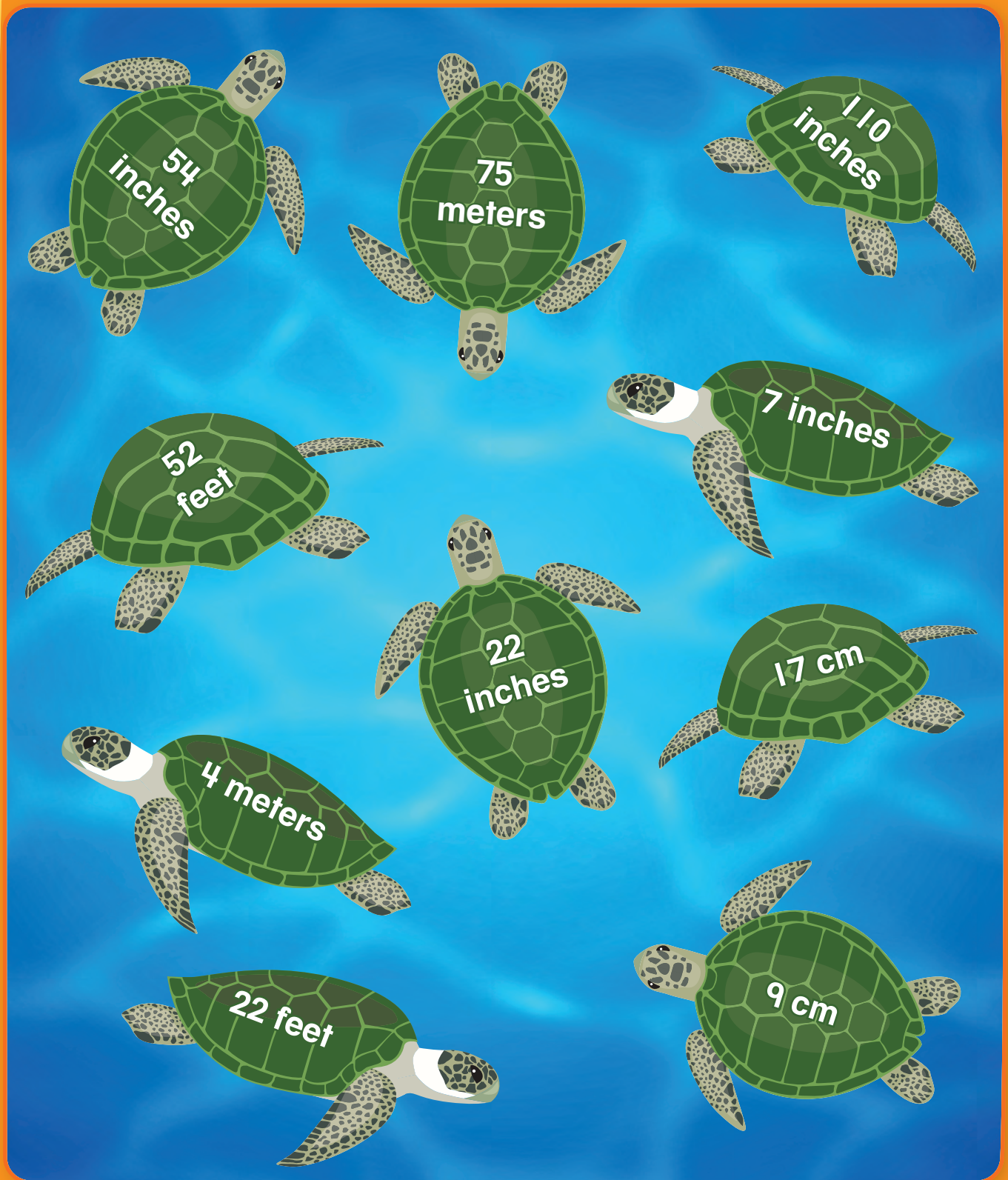
_____ centimeters

b. Another drum is 60 centimeters from the ground. You raise it 12 centimeters. Are both drums the same height?

Yes No

Draw and Cover

To Play: Players take turns. On your turn, pick a Draw and Cover Card and solve. Then cover the sea turtle that has the answer. Continue playing until all sea turtles are covered.

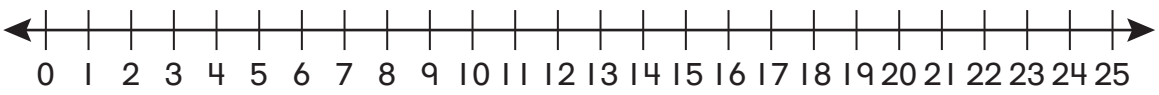


Name _____

Chapter Practice 12

12.1 Use a Number Line to Add and Subtract Lengths

1. You throw a ball 12 yards. Your friend throws it back 8 yards. How far is the ball from you now?



_____ ◯ _____ = _____ _____ yards

12.2 Problem Solving: Length

2. Your cat's first collar was 6 inches long. Now your cat has a collar that is 13 inches long. Your puppy's collar is 11 inches long. How much longer is your cat's collar now?

Collar now:

First collar:

_____ ◯ _____ = _____

So, ? = _____.

_____ inches

12.3 Problem Solving: Missing Measurement

3. You must be 54 inches tall to ride a rollercoaster. At 8 years old, you were 48 inches tall. You grow 3 inches the next year. How much more do you still need to grow to be able to ride the roller coaster?

_____ inches

---

4. MP **Maintain Accuracy** A car tire is 61 centimeters tall. A truck tire is 84 centimeters tall. A monster truck tire is 167 centimeters tall. Which sentences are true?

The car tire is 23 centimeters taller than the truck tire.

The truck tire is 83 centimeters shorter than the monster truck tire.

The monster truck tire is 106 centimeters taller than the car tire.

12.4 Practice Measurement Problems

5. A kangaroo jumps 24 feet. A frog jumps 19 feet less than the kangaroo. How far does the frog jump?

_____ feet

---

6. A store owner wants to add on to the parking lot to make it 38 meters long. It is currently 21 meters long. How many meters does the store owner want to add?

_____ meters

Name _____

Cumulative Practice 1–12

1. Which expressions have a sum less than 12?

- ◯ 5 + 3
- ◯ 4 + 6
- ◯ 1 + 0
- ◯ 7 + 8

2. Find each difference.

8 0 0 − 4 9 5	5 0 2 − 1 7 8	3 5 0 − 1 7 6

3. A blue sailboat is 44 feet long. A white sailboat is 36 feet long. A green sailboat is 22 feet long. Which sentences are true?

- ◯ The blue sailboat is 8 feet longer than the green sailboat.
- ◯ The green sailboat is 14 feet shorter than the white sailboat.
- ◯ The green sailboat is 22 feet shorter than the blue sailboat.
- ◯ The blue sailboat is 12 feet longer than the white sailboat.

4. What is the value of the underlined digit?

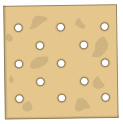
$7\underline{3}9$

- ◯ 3 ones
- ◯ 3 hundreds
- ◯ 3 tens
- ◯ 300

5. Use mental math to solve.

$403 - 10 =$ _____	$898 - 100 =$ _____
$640 - 10 =$ _____	$204 - 10 =$ _____
$843 -$ _____ $= 833$	_____ $- 100 = 731$

6. The cracker is about 2 inches long. What is the best estimate of the length of the cracker box?



- ◯ 3 inches
- ◯ 10 inches
- ◯ 16 inches
- ◯ 5 inches

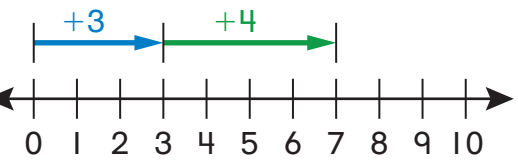
7. You take 14 pictures on Friday. You take 20 more on Saturday. Your friend takes 34 pictures in all on Friday and Saturday. How many pictures did you and your friend take in all?

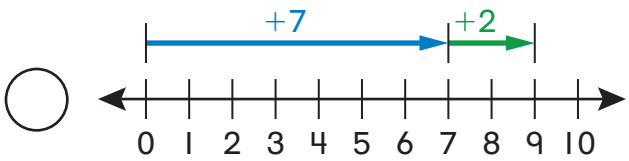
- ◯ 34 pictures
- ◯ 58 pictures
- ◯ 24 pictures
- ◯ 68 pictures

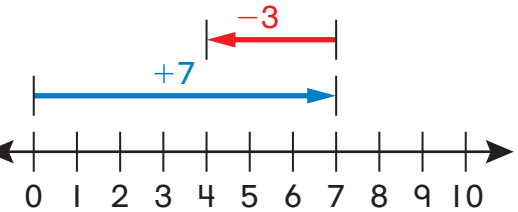
8. Which expressions are equal to 245 + 386?

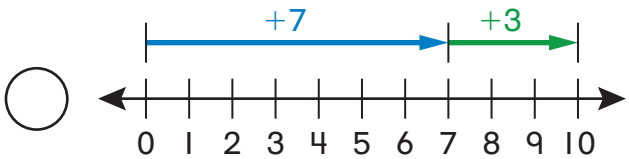
- ◯ 631
- ◯ 500 + 130 + 11
- ◯ 200 + 300 + 40 + 80 + 5 + 6
- ◯ 500 + 120 + 5

9. Newton runs 7 yards, takes a break, and runs 3 more yards. Which number line shows how many yards Newton runs?

◯ 

◯ 

◯ 

◯ 

10. Find the sum.

$$\begin{array}{r} 54 \\ 63 \\ 10 \\ +\ 27 \\ \hline \end{array}$$

◯ 154 ◯ 164

◯ 144 ◯ 155

11. Find each difference.

80 − 53 = ?

79 − 13 = ?

90 − 32 = ?

64 − 40 = ?

12. Complete the sentences using *centimeters* or *meters*.

A teacher's desk is about 2 _____ long.

A paper clip is about 8 _____ long.

A carrot is about 12 _____ long.

A boat is about 20 _____ long.