



**2021-2022 NSCAS Growth Grade 4
Item Type Sampler
English Language Arts and Mathematics**

Student's Name:

2021-2022



Grade 4 - Item Type Sampler
English Language Arts

Directions:

On the following pages of your booklet are passages and questions for the Grade 4 *Nebraska Student-Centered Assessment System English Language Arts (NSCAS-ELA)* Item Type Sampler.

Read these directions carefully before beginning this item type sampler.

This item type sampler will include several different types of questions. Some questions are based on one or two passages. Multiple choice questions will ask you to select an answer from among four choices. Multiple select questions will ask you to select multiple correct answers from among five or more answer choices. For some questions, there may be two parts, Part A and Part B, where each part has a multiple choice or multiple select question.

For all questions:

- Read each question carefully and choose the best answer.
- You may use scratch paper to make notes.
- Be sure to answer ALL the questions.

When you come to the word STOP, you have finished the Grade 4 NSCAS Growth English Language Arts Item Type Sampler.

ENGLISH LANGUAGE ARTS - ITEM TYPE SAMPLER

The items on this page are not passage-based.

★ 1. Read the paragraph.

[1] Instead of sitting on the couch watching TV or playing video games, we need to get outside and move our bodies. [2] Last night I rode my bike for an hour, and today my leg muscles are sore. [3] Because we have so many exercise choices, we should be able to find something that we like to do. [4] We can bike, swim, play tennis, jog, play basketball, or play soccer. [5] We can also walk to a friend's house instead of asking someone to drive us in a car. [6] Exercise is also good for the heart because it makes the heart work harder. [7] Exercise helps us sleep better at night and gives us more energy during the day. [8] My favorite type of exercise is basketball. [9] We need to make exercise a daily habit that we use for the rest of our lives!

Which **two** sentences should be removed from the paragraph because they do not support the topic? Select **two**.

- A. Sentence 2
- B. Sentence 5
- C. Sentence 6
- D. Sentence 8
- E. Sentence 9

★ 2. Isabelle is writing a research paper about how living things stay alive in desert climates.

Which **two** sentences from a source she found would BEST support the topic? Choose **two**.

- A. A desert is any place that gets 10 inches or less of rain each year.
- B. Some desert animals sleep to stay cool during the day.
- C. Deserts make up one-fourth of the Earth's surface.
- D. Some desert plants have leaves that store water.
- E. Desert temperatures become cold at night.
- F. Some deserts are extremely hot.

The items on this page are not passage-based.

- ★ 3. Which **two** sentences BEST belong in a descriptive paragraph about the Statue of Liberty?
Select **two**.

- A. The Statue of Liberty stands 305 feet tall.
- B. The Statue of Liberty has seven spikes on her crown.
- C. The New York Harbor is home to the Statue of Liberty.
- D. People can get to the Statue of Liberty on a ferry boat.
- E. The Statue of Liberty was a gift from France to the United States.

- ★ 4. Read the sentence Angie wrote in her descriptive paragraph.

I was afraid the **wind** might blow me over.

Which **two** words could Angie add before the word **wind** to help readers better picture the action in the sentence? Choose **two**.

- A. breezy
- B. chilly
- C. gusty
- D. howling
- E. mild
- F. whispering

Boots on the Moon

- 1 Many of us have stood in one spot and gazed at the moon. The moon is about 239,000 miles away from Earth. Most of us will never get there. But twelve people have actually stood on the moon and **gazed** back at Earth. Those people were American astronauts. They were part of the Apollo Program, America’s missions to the moon.

The Apollo Program

- 2 During the 1960s, the United States of America was in a race with other countries to put the first astronaut on the moon. The goal was to land humans on the moon and bring them safely back to Earth. That is how the Apollo Program, also known as Project Apollo, began.
- 3 The Apollo Program ran from 1961 to 1972. The program had many missions. Only 12 of those missions were manned. Most of the early missions orbited the moon. By the year 1969, no one had landed on the moon. But that was all about to change.

Apollo 11: The First Moonwalk

- 4 Apollo 11, the sixth manned mission, was the first to land on the moon. The flight crew consisted of three astronauts: Commander Neil Armstrong, Buzz Aldrin, and Michael Collins. For months, the astronauts practiced and prepared. On July 16, 1969, they were ready. Apollo 11 blasted off from Kennedy Space Center. More than 600 million people watched the launch on their televisions. They cheered for the history-making moment.
- 5 Apollo 11 landed on the moon on July 20. Armstrong was the first astronaut to **emerge** from the spacecraft. As he stepped onto the moon’s surface, he said, “That’s one small step for a man, one giant leap for mankind.”
- 6 During this mission, Armstrong and Aldrin explored the moon for 2 hours and 32 minutes. They collected samples, conducted experiments, and took photographs. They used special tools designed for their mission. Because their spacesuits were bulky, it was difficult for the astronauts to move and bend. Special rakes, scoops, hammers, and tubes had long handles that allowed the astronauts to collect rocks and soil without bending.
- 7 Apollo 11 carried the first rock samples back to Earth, but the astronauts left some things on the moon too. They left an American flag, an arm patch from Apollo 1, and a metal sign that read, “Here men from the planet Earth first set foot upon the moon. July 1969 A.D. We came in peace for all mankind.” Apollo 11 returned to Earth on July 24, 1969.

Apollo 12-Apollo 16

- 8 Between 1969 and 1972, America launched five more Apollo missions. During those missions, eight more astronauts put their boots on the moon.
- 9 One mission, Apollo 13, was not able to land on the moon because of an emergency. The astronauts and spacecraft were brought safely back to Earth.

Apollo 17: The Last Moonwalk

- 10** Apollo 17, the twelfth and final mission, lifted off on December 7, 1972. It was the first nighttime liftoff in the history of American space travel. The three-man crew included Commander Eugene Cernan, Harrison Schmitt, and Ronald Evans.
- 11** Apollo 17 landed on the moon on December 11. Cernan and Schmitt climbed out of the spacecraft. When Schmitt’s feet hit the ground, he became the first geologist, or rock scientist, to put boots on the moon.
- 12** Cernan and Schmitt spent a total of 74 hours, 59 minutes, and 40 seconds on the moon. They had a tool that had never been used before—a battery-powered vehicle. The vehicle could carry two astronauts, tools, equipment, and samples. The two astronauts traveled almost 22 miles across the moon’s surface. They brought back more samples than any of the other Apollo missions.
- 13** Apollo 17 left the moon on December 14. As Cernan’s boots left the surface, he said, “As we leave the Moon . . . we leave as we came . . . with peace and hope for all mankind.” The astronauts returned to Earth on December 19, 1972.

After the Apollo Program

- 14** Eugene Cernan was the last person to ever step foot on the moon. No one has put boots on the moon since that December day in 1972.
- 15** All together, the Apollo missions brought back 842 pounds of materials from the moon’s surface. Astronauts collected rocks, pebbles, dirt, sand, and dust from six different places on the moon. These samples helped scientists understand how the solar system formed. Even now, many years later, moon samples are still being shared with scientists and teachers. We may not put any more boots on the moon, but a little bit of the moon now stays on Earth.

ENGLISH LANGUAGE ARTS - ITEM TYPE SAMPLER

5. Which **two** words are synonyms of the word **gazed** in paragraph 1? Choose **two**.

- A. blinked
- B. glanced
- C. looked
- D. noticed
- E. stared

6. In paragraph 5 of *Boots on the Moon*, what is the meaning of the word **emerge**?

- A. land
- B. jump
- C. enter
- D. appear

7. **Read this sentence from paragraph 5.**

“That’s one small step for a man, one giant leap for mankind.”

Why did the author MOST LIKELY quote Neil Armstrong’s words?

- A. The words explain what the astronauts did first.
- B. The words symbolize the importance of the event.
- C. The words reveal what the astronauts wrote on the sign.
- D. The words explain how the accomplishment made the men feel.

ENGLISH LANGUAGE ARTS - ITEM TYPE SAMPLER

8. Which sentence includes the main idea of paragraph 6?
- A. While exploring the moon, two astronauts collected rocks and soil.
 - B. Two astronauts collected samples with special tools for over two hours.
 - C. Two astronauts explored the moon in bulky spacesuits that made work difficult.
 - D. While exploring the moon, two astronauts accomplished several required tasks.
9. Which **two** questions can be answered by reading this passage? Select **two**.
- A. How far is the moon from Earth?
 - B. Where are the moon samples kept?
 - C. When did female astronauts go into space?
 - D. Which other nations sent astronauts to the moon?
 - E. Which mission carried the first rock samples back to Earth?
10. Which sentence is the author's opinion?
- A. Most of us will never get there.
 - B. But twelve people have actually stood on the moon and gazed back at Earth.
 - C. Those people were American astronauts.
 - D. The goal was to land humans on the moon and bring them safely back to Earth.

ENGLISH LANGUAGE ARTS - ITEM TYPE SAMPLER

11. How does the organizational structure used by the author help readers understand the information?
- A. By using categories, the author has made comparisons between the astronauts.
 - B. By describing the Apollo missions, the author has revealed which mission was most important.
 - C. By using main ideas and details, the author has explained how scientists got a rocket to the moon.
 - D. By explaining the events of each time period, the author has provided the history of the Apollo program.

12. **This question has two parts. Answer Part A, and then answer Part B.**

Part A

What was the author's purpose for writing *Boots on the Moon*?

- A. to persuade readers to research space travel
- B. to warn readers that astronauts have to take risks
- C. to teach readers about the history of moon missions
- D. to entertain readers with tales about the moon missions

Part B

Which evidence from the passage BEST supports the answer to Part A?

- A. The Apollo Program ran from 1961 to 1972.
- B. "We came in peace for all mankind."
- C. All together, the Apollo missions brought back 842 pounds of materials from the moon's surface.
- D. We may not put any more boots on the moon, but a little bit of the moon now stays on Earth.

The Smile Experiment

- 1 Mason stared out his bedroom window at the Alaskan village. Everything looked so strange. Across the street, the houses floated on wooden poles because people could not dig deep **foundations** in the frozen earth. In the distance, the thin blue line of the Arctic Ocean spanned the horizon.
- 2 Mason could see the airport too. Its buildings looked like tiny toy blocks tossed on the grassy, flat tundra. Small bush airplanes regularly landed at the airport. They brought supplies and mail to the village as well as passengers.
- 3 Mason and his parents had arrived a few days ago from Nebraska. Mason had lived in the Midwest his entire life, but this year, his mom and dad were teaching at the village school. Mason had not been excited about the plan. Nothing in this place looked comfortable or familiar. Plus, his friends back home in Nebraska had joined a basketball team and an invention club.
- 4 “Mason!” Mom called from the kitchen. “It’s time for school.”
- 5 “I’m coming,” Mason replied. Heaving a sigh, he glanced at the calendar on his desk and purposefully drew an X through the day’s date. He had eight months and 27 days to go before he returned home.
- 6 “There’s no basketball team here,” Mason mumbled as he tramped into the kitchen.
- 7 “Then try a different activity,” Dad suggested.
- 8 “You’ll find things to do,” Mom added with a calm, certain voice as she opened the front door. Mason followed her out, but he did not share her opinion.
- 9 At school, Mason’s glum mood enveloped him as he sat at his desk. Before classes began, Gwen **ventured by** and offered an uncertain hello. Mason mumbled a reply. Then he opened his notebook, dropped his head, and studied his spelling words.
- 10 For the rest of the day, Mason focused on his schoolwork. If his assignments were finished, his mom would let him call his best friend Gary from back home.
- 11 Suddenly, Mason’s science teacher, Mr. Lee, made an announcement that caught Mason’s attention. He was giving the whole class a special assignment. His words sent groans rippling through the room.
- 12 “This is an easy assignment,” Mr. Lee promised as he passed out smiley face stickers.
- 13 “When you leave today, please wear this sticker,” Mr. Lee directed with twinkling eyes. “Smile at everyone you meet. Try to smile when you are feeling tired, bored, or bothered too. Scientists say smiling is good for our health, and we are going to test their theory. We’ll talk about the results tomorrow.”

ENGLISH LANGUAGE ARTS - ITEM TYPE SAMPLER

- 14 As the last bell rang, Mason slapped the sticker on his shirt. He rushed to get his backpack and bumped into Gwen. When she flashed him a smile, Mason remembered the new assignment. He forced the corners of his mouth into a grin, but it felt awkward.
- 15 However, Liam saw Mason’s grin and took a timid step in his direction. “Would you like to come to my house with Gwen?” Liam asked. “You can meet my puppy, Snowball.”
- 16 This time, it was much easier for Mason to push a smile across his face. “Sure,” he agreed. “Let me ask my mom.”
- 17 A few minutes later, Mason walked down the gravel road with Liam and Gwen. When their classmate Joseph joined them, Mason remembered to give him a generous smile too.
- 18 Joseph’s eyebrows shot up at the sight. After a pause, he entertained Mason with stories about fish camp. Before long, everyone was laughing and talking.
- 19 At Liam’s home, Snowball rushed to greet the visitors. The puppy tumbled around their legs and tugged at their shoelaces. When Mason bent down, Snowball leaped into his arms and began chewing on the smiley face sticker on his shirt.
- 20 “Don’t ruin his smile,” Liam told Snowball, “or his face might turn into a storm cloud again. Then people might think he doesn’t want to make new friends.”
- 21 Startled, Mason thought about Liam’s words as he cuddled Snowball. His chilly behavior was building a thorny fence around him. It was not easy for anyone to approach a prickly person. However, his smile was like a big open gate. His new friends felt confident walking through it to reach him.
- 22 “I’m keeping my smile,” Mason assured Liam.
- 23 Gwen asked Mason if he would like to meet her Uncle Amos. He was skilled at drumming and telling stories. Then Joseph invited Mason to fish camp next summer.
- 24 Mason eagerly agreed. Hopefully, there would be enough days on his calendar to try everything.

13. **This question has two parts. Answer Part A, and then answer Part B.**

Part A

Read this sentence from the story.

“Across the street, the houses floated on wooden poles because people could not dig deep **foundations** in the frozen earth.”

What is the meaning of the word **foundations** as it is used in this sentence?

- A. houses that are on a cliff
- B. something that cannot go in a cold area
- C. part of a building that goes underground
- D. something that is balanced on something else

Part B

Which words from the story provide the clues to the meaning of the word in Part A?

- A. across the street
- B. houses floated
- C. dig deep
- D. frozen earth

14. **Read this sentence from the passage.**

“Before classes began, Gwen **ventured by** and offered an uncertain hello.”

What means the same as **ventured by** as it is used in this sentence?

- A. ignored rudely
- B. walked quickly
- C. studied carefully
- D. approached bravely

ENGLISH LANGUAGE ARTS - ITEM TYPE SAMPLER

15. Which question can be answered after reading the first paragraph of the story?

- A. How far is Mason from the airport?
- B. Why are houses built on poles in Alaska?
- C. How does Mason feel about living in Alaska?
- D. Where did Mason live before he came to Alaska?

16. From whose point of view is the story told?

- A. Dad's
- B. Mason's
- C. Mom's
- D. Mr. Lee's

17. **Read this sentence from the story.**

“Don’t ruin his smile,” Liam told Snowball, “or his face might turn into a storm cloud again.”

Why does the author use the phrase “turn into a storm cloud again” in this sentence?

- A. to paint a picture in the mind of the reader
- B. to explain why the dog likes to be around Mason
- C. to help the reader know what bad weather is like
- D. to show the reader why Mason dislikes his new home

18. **This question has two parts. Answer Part A, and then answer Part B.**

Part A

What is Mason's attitude at the beginning of the story?

- A. He is sad.
- B. He is tired.
- C. He is grumpy.
- D. He is worried.

Part B

Which evidence from the text supports the answer in Part A?

- A. Mason stares out his window.
- B. Mason mumbles to his parents.
- C. Mason focuses on his schoolwork.
- D. Mason rushes to get his backpack.

19. What did the science experiment show Mason?

- A. Science projects can be fun.
- B. Every place you live can be a nice place.
- C. Teachers will help you make new friends.
- D. Smiling makes people more willing to talk to you.

ENGLISH LANGUAGE ARTS - ITEM TYPE SAMPLER

20. What are **two** reasons why Mason is unhappy in his new home? Select **two**.

- A. He misses the invention club.
- B. He does not like living near an airport.
- C. He likes houses that are built on poles.
- D. His old friends had joined a basketball team.
- E. He does not like having to go to science class.



**THIS IS THE END
OF THIS CONTENT SECTION**

**Please wait for your Proctor to instruct you to
move on to the next content section of the sampler.**

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2021-2022



**Grade 4 - Item Type Sampler
Mathematics**

Directions:

On the following pages of your booklet are questions for the Grade 4 *Nebraska Student-Centered Assessment System Mathematics (NSCAS-M)* Item Type Sampler.

Read these directions carefully before beginning this item type sampler.

This item type sampler will include several different types of questions. Multiple choice questions will ask you to select an answer from among four choices. Multiple select questions will ask you to select multiple correct answers from among five or more choices. For some questions, there may be two parts, Part A and Part B, where each part has a multiple choice or multiple select question. These questions will be found in your item type sampler.

For all questions:

- Read each question carefully and choose the best answer.
- You may use scratch paper to solve the problems.
- The Mathematics Reference Sheet is provided in the back of the Mathematics section. You may refer to this page at any time during the sampler.
- You may not use a calculator on this sampler.
- Be sure to answer ALL the questions.

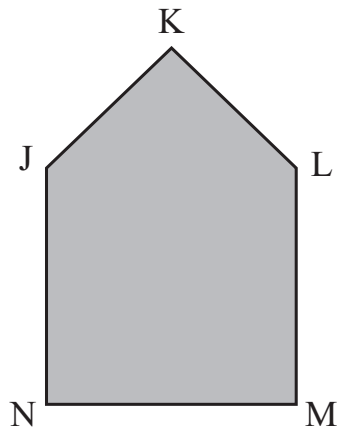
When you come to the word STOP, you have finished the Grade 4 NSCAS Growth Mathematics Item Type Sampler.

MATHEMATICS - ITEM TYPE SAMPLER

1. What is the standard form of forty-five and nine tenths?
 - A. 45.009
 - B. 45.09
 - C. 45.9
 - D. 45.910

2. Oscar has **9** pumpkins. Libby has **p** fewer pumpkins than Oscar. Which expression represents the number of pumpkins Libby has?
 - A. **$9 + p$**
 - B. **$9 - p$**
 - C. **$p + 9$**
 - D. **$p - 9$**

3. Use the figure below to answer the question.



Which line segment is perpendicular to line segment JN?

- A. line segment JK
 - B. line segment KL
 - C. line segment LM
 - D. line segment MN
4. What is $4\frac{3}{10} + 8\frac{5}{10}$?

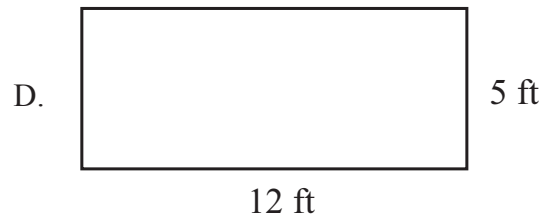
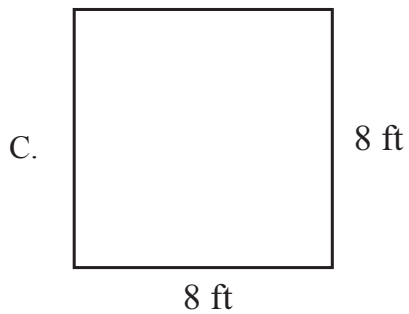
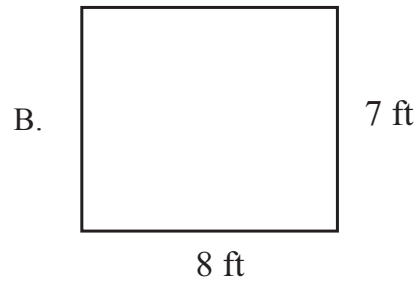
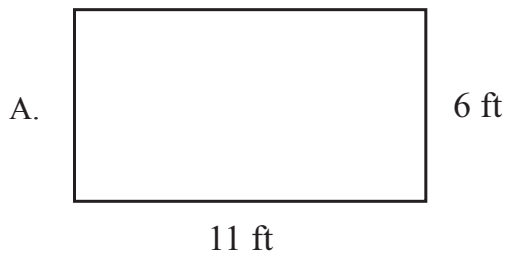
- A. $12\frac{8}{100}$
- B. $12\frac{15}{100}$
- C. $12\frac{8}{20}$
- D. $12\frac{8}{10}$

MATHEMATICS - ITEM TYPE SAMPLER

5. Which **three** numbers have a remainder when divided by 3?

- A. 547
- B. 846
- C. 1,254
- D. 3,766
- E. 4,256
- F. 8,916

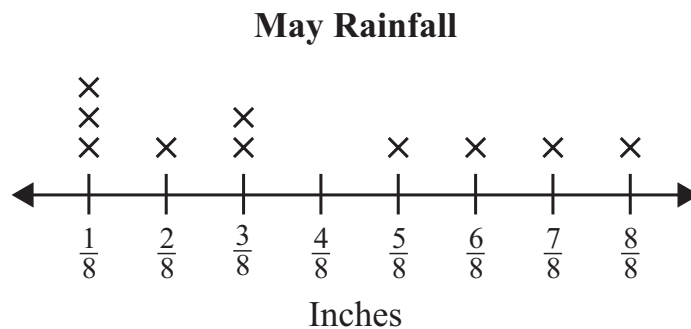
6. Which figure has the greatest area?



7. Which fraction is equivalent to the decimal **0.43** ?

- A. $\frac{43}{100}$
- B. $\frac{4}{3}$
- C. $4\frac{3}{100}$
- D. $4\frac{3}{10}$

8. Use the line plot below to answer the question.



The line plot shows the amount of rainfall, in inches, for **10** different days in May. What was the total amount of rainfall in May?

- A. 4 inches
- B. $3\frac{5}{8}$ inches
- C. $4\frac{5}{8}$ inches
- D. 7 inches

MATHEMATICS - ITEM TYPE SAMPLER

9. A school is ordering shelves for a teacher. The teacher has 17 math books, 18 science books, and 19 reading books. Each shelf holds 8 books.

Part A

How many shelves does the teacher need?

- A. 5 shelves
- B. 6 shelves
- C. 7 shelves
- D. 8 shelves

Part B

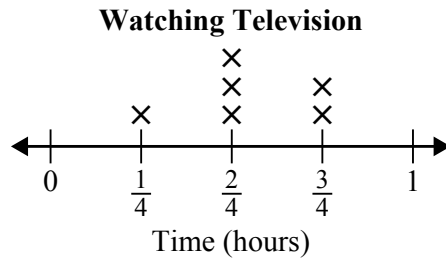
The teacher puts 8 books on each shelf except for the last shelf. How many books are on the last shelf?

- A. 7 books
- B. 6 books
- C. 4 books
- D. 0 books

10. Which set is ordered from least to greatest?

- A. $\frac{8}{9}$, $\frac{1}{2}$, $\frac{3}{4}$, $\frac{1}{10}$
- B. $\frac{1}{10}$, $\frac{3}{4}$, $\frac{1}{2}$, $\frac{8}{9}$
- C. $\frac{1}{10}$, $\frac{1}{2}$, $\frac{3}{4}$, $\frac{8}{9}$
- D. $\frac{8}{9}$, $\frac{1}{10}$, $\frac{3}{4}$, $\frac{1}{2}$

11. Manuel is allowed to watch **5** hours of television each week. The time Manuel spent watching television for six days is shown in the line plot.



How many hours of television can Manuel watch on the last day of this week?

- A. $1\frac{3}{4}$ hours
 - B. $2\frac{3}{4}$ hours
 - C. $3\frac{1}{4}$ hours
 - D. $3\frac{1}{2}$ hours
12. Which number is a multiple of 4?
- A. 30
 - B. 38
 - C. 42
 - D. 48

MATHEMATICS - ITEM TYPE SAMPLER

13. What is the value of y in the number sentence?

$$y - 9 = 7$$

- A. 2
- B. 16
- C. 17
- D. 63

14. Which shapes ALWAYS have two pairs of parallel sides? Select **three** shapes.

- A. square
- B. rhombus
- C. trapezoid
- D. rectangle
- E. quadrilateral

15. Which comparison is true?

- A. $4.09 > 4.50$
- B. $2.31 > 2.18$
- C. $5.23 < 5.14$
- D. $6.80 < 6.29$

16. The table shows how far Mark rode his bike each day for three days.

Bike Riding

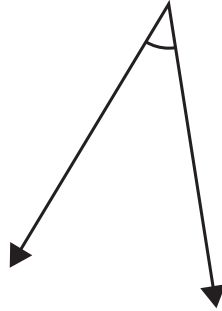
Day	Distance (miles)
Monday	$\frac{7}{10}$
Tuesday	$\frac{2}{10}$
Wednesday	$\frac{4}{10}$

What is the total distance Mark rode his bike?

- A. $\frac{5}{10}$ of a mile
- B. $\frac{9}{10}$ of a mile
- C. $1\frac{3}{10}$ miles
- D. $1\frac{13}{10}$ miles

MATHEMATICS - ITEM TYPE SAMPLER

17. Use the protractor tool to measure the angle below.



What is the measure of the angle?

- A. 35°
- B. 40°
- C. 45°
- D. 50°

18. Use the table to answer the questions.

Day of Week	Hours of Exercise
Sunday	$\frac{2}{4}$
Monday	$\frac{3}{4}$
Tuesday	$\frac{3}{4}$
Wednesday	$\frac{1}{4}$
Thursday	$\frac{2}{4}$
Friday	$\frac{2}{4}$
Saturday	$\frac{4}{4}$

Part A

What is the BEST scale for a line plot of the data in the table?

- A. $\frac{1}{4}$
- B. $\frac{1}{2}$
- C. 1
- D. 4

Part B

How many Xs should be above $\frac{2}{4}$ on the line plot?

- A. 1
- B. 2
- C. 3
- D. 4

MATHEMATICS - ITEM TYPE SAMPLER

19. Jordan wants to buy doughnuts for his friends. There are **12** doughnuts in each box. Jordan needs **48** doughnuts total.

Jordan uses the equation $12n = 48$. What does n represent in this equation?

- A. the number of boxes
- B. the cost of the doughnuts
- C. the number of doughnuts in all
- D. the number of doughnuts in each box

20. What is the product of 18×24 ?

- A. 108
- B. 128
- C. 432
- D. 632



NSCAS NEBRASKA STUDENT-CENTERED ASSESSMENT SYSTEM

Mathematics Reference Sheet

Shape	Area	Circumference	Key	
Circle	$A = \pi r^2$	$C = \pi d = 2\pi r$	b = base	l = length
Triangle	$A = \frac{1}{2}bh$	Perimeter	h = height	w = width
Rectangle	$A = l \times w$	$P = 2l + 2w = 2(l + w)$	B = area of base	s = side length
Square	$A = s \times s$	$P = s + s + s + s$	H = height of triangular prism	
Trapezoid	$A = \frac{1}{2}h(b_1 + b_2)$		s_1, s_2, s_3 are the lengths of each side of the triangular base	
Parallelogram	$A = bh$		d = diameter	r = radius
Use 3.14 for π .				

3 – Dimensional Shape	Volume	Surface Area				
Rectangular Prism	$V = lwh = Bh$	$SA = 2lw + 2lh + 2wh = 2B + 2lh + 2wh$				
Triangular Prism	$V = \frac{1}{2}lwh = Bh$	$SA = bh + (s_1 + s_2 + s_3)H = 2B + (s_1 + s_2 + s_3)H$				
Cone	$V = \frac{1}{3}\pi r^2 h$	<table border="1" style="width: 100%;"> <thead> <tr> <th>Percent Change</th> </tr> </thead> <tbody> <tr> <td>$\% \text{ change} = \frac{\text{difference in amount}}{\text{original amount}}$</td> </tr> <tr> <th>Pythagorean Theorem</th> </tr> <tr> <td>$c^2 = a^2 + b^2$</td> </tr> </tbody> </table>	Percent Change	$\% \text{ change} = \frac{\text{difference in amount}}{\text{original amount}}$	Pythagorean Theorem	$c^2 = a^2 + b^2$
Percent Change						
$\% \text{ change} = \frac{\text{difference in amount}}{\text{original amount}}$						
Pythagorean Theorem						
$c^2 = a^2 + b^2$						
Cylinder	$V = \pi r^2 h$					
Sphere	$V = \frac{4}{3}\pi r^3$					

Standard Units	Metric Units
Conversions – Length	
1 foot (ft) = 12 inches (in.)	1 centimeter (cm) = 10 millimeters (mm)
1 yard (yd) = 3 feet (ft) = 36 inches (in.)	1 meter (m) = 100 centimeters (cm)
1 mile (mi) = 1,760 yards (yd) = 5,280 feet (ft)	1 meter (m) = 1,000 millimeters (mm)
	1 kilometer (km) = 1,000 meters (m)
Conversions – Volume	
1 cup = 8 fluid ounces (fl oz)	1 liter (l) = 1,000 milliliters (ml)
1 pint (pt) = 2 cups	1 liter (l) = 1,000 cubic centimeters (cu. cm)
1 quart (qt) = 2 pints (pt)	
1 gallon (gal.) = 4 quarts (qt)	
Conversions – Weight/Mass	
1 pound (lb) = 16 ounces (oz)	1 gram (g) = 1,000 milligrams (mg)
1 ton = 2,000 pounds (lb)	1 kilogram (kg) = 1,000 grams (g)

