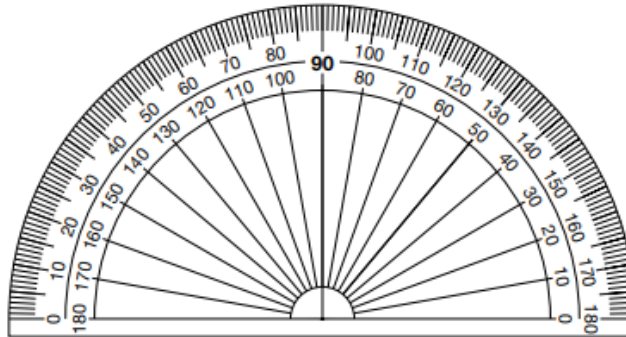


2022-2023 Item and Scoring Samplers

[Mathematics Item and Scoring Sampler 2022–2023 Grade 4](#)

Grade 4 Protractor

The protractor shown below is not intended to be used to measure. It has been included as a representation of the protractors that will be provided for students when they take the test. Due to differences in printers, the protractor in this sampler may not accurately reproduce to scale.



General Description of Scoring Guidelines for Mathematics Open-Ended Items

4— The response demonstrates a *thorough* understanding of the mathematical concepts and procedures required by the task.

The response provides correct answer(s) with clear and complete mathematical procedures shown and a correct explanation, as required by the task. The response may contain a minor “blemish” or omission in work or explanation that does not detract from demonstrating a *thorough* understanding.

3— The response demonstrates a *general* understanding of the mathematical concepts and procedures required by the task.

The response and explanation (as required by the task) are mostly complete and correct. The response may have minor errors or omissions that do not detract from demonstrating a *general* understanding.

2— The response demonstrates a *partial* understanding of the mathematical concepts and procedures required by the task.

The response is somewhat correct with *partial* understanding of the required mathematical concepts and/or procedures demonstrated and/or explained. The response may contain some work that is incomplete or unclear.

1— The response demonstrates a *minimal* understanding of the mathematical concepts and procedures required by the task.

0— The response has no correct answer and *insufficient* evidence to demonstrate any understanding of the mathematical concepts and procedures required by the task for that grade level.

The response may show only information copied from the question.

Special Categories within zero reported separately:

BLK (blank).....Is blank, is entirely erased, or gives a written refusal to respond

OT.....Is off-task

LOE.....Is in a language other than English

IL.....Is illegible

Grade 4 Formula Sheet

Formulas and conversions that you may need on this test are found below.
You may refer back to this page at any time during the mathematics test.

2022
Grade 4

Standard Conversions

1 yard (yd) = 3 feet (ft)

1 foot = 12 inches (in.)

1 pound (lb) = 16 ounces (oz.)

1 gallon (gal) = 4 quarts (qt)

1 quart = 2 pints (pt)

1 pint = 2 cups (c)

Metric Conversions

1 kilometer (km) = 1,000 meters (m)

1 meter = 100 centimeters (cm)

1 kilogram (kg) = 1,000 grams (g)

1 liter (L) = 1,000 milliliters (mL)

Time Conversions

1 year (yr) = 12 months (mo)

1 year = 52 weeks (wk)

1 year = 365 days

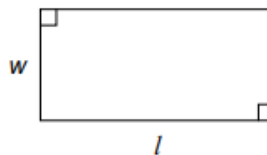
1 week = 7 days

1 day = 24 hours (hr)

1 hour = 60 minutes (min)

1 minute = 60 seconds (sec)

Rectangle



Area = length \times width

$$A = l \times w$$

Perimeter = length + length + width + width

$$P = l + l + w + w$$

Question 1 in this sampler is to be solved without the use of a calculator.

MULTIPLE-CHOICE ITEMS

1. Subtract: $5\frac{2}{5} - 2\frac{1}{5}$
- A. $3\frac{1}{10}$
 - B. $3\frac{1}{5}$
 - C. $3\frac{2}{5}$
 - D. $3\frac{3}{5}$

A calculator is permitted for use in solving questions 2–17 in this sampler.

2. Which number, when written in standard form, shows a digit with a value that is 10 times the 4 in the tens place?
- A. four thousand, three hundred forty-two
 - B. four thousand, four hundred thirty-two
 - C. five thousand, four hundred forty-three
 - D. five thousand, five hundred forty-four
3. When Diana bought her car, it had been driven a total of 42,753 miles. Now her car has been driven a total of 85,437 miles. Which number sentence correctly compares the number of miles the car had been driven when Diana bought it to the number of miles it has been driven since she bought it?
- A. $42,753 < 42,684$
 - B. $42,753 > 42,684$
 - C. $42,753 < 43,324$
 - D. $42,753 > 43,324$

4. There were 1,289 people who attended a concert on Saturday. This is 306 more than the number of people who attended the concert on Wednesday. Which expression can be used to determine the number of people who attended the concert on Wednesday?
- A. $1,289 + 306$
B. $1,289 \div 306$
C. $1,289 \times 306$
D. $1,289 - 306$
5. Ms. Smith wants to replace the floors in her kitchen and her living room. The area of her kitchen floor is 120 square feet, and the area of her living room floor is 98 square feet. The table below shows the prices for different types of floor material Ms. Smith can buy.

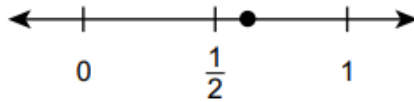
Prices for Floor Material

Material	Price for 1 Square Foot
bamboo	\$8
carpet	\$10
cork	\$6
laminate	\$2
wood	\$7

Ms. Smith decides to put a cork floor in her kitchen and a bamboo floor in her living room. What is the total price for the floor material Ms. Smith decides to buy?

- A. \$1,504
B. \$1,526
C. \$1,548
D. \$3,052

6. The point plotted on the number line below represents a fraction with a denominator of 8.



The fraction is less than $\frac{3}{4}$. What fraction is represented by the point on the number line?

- A. $\frac{1}{8}$
- B. $\frac{3}{8}$
- C. $\frac{5}{8}$
- D. $\frac{6}{8}$
7. Rosa and four of her friends each have some coins. The table below shows the fraction of each friend's coins that are pennies.

Rosa's Friends' Coins

Friend	Fraction of Coins That Are Pennies
Greg	$\frac{4}{12}$
Helen	$\frac{3}{5}$
Isaac	$\frac{4}{8}$
Josie	$\frac{3}{10}$

Rosa has 6 pennies out of a total of 10 coins. Which friend has an equivalent fraction of coins that are pennies to the fraction Rosa has?

- A. Greg
- B. Helen
- C. Isaac
- D. Josie

8. Some fourth-grade students ate a total of $\frac{3}{4}$ of a bag of sunflower seeds. Each student ate the same amount. Which pair of equations could show how the sunflower seeds were equally shared by the students?

- A. $\frac{6}{8} + \frac{6}{8} + \frac{6}{8} = \frac{18}{24}$ and $\frac{18}{24} = \frac{3}{4}$
- B. $\frac{3}{12} + \frac{3}{12} + \frac{3}{12} = \frac{9}{12}$ and $\frac{9}{12} = \frac{3}{4}$
- C. $\frac{6}{8} + \frac{6}{8} + \frac{6}{8} + \frac{6}{8} = \frac{24}{32}$ and $\frac{24}{32} = \frac{3}{4}$
- D. $\frac{3}{12} + \frac{3}{12} + \frac{3}{12} + \frac{3}{12} = \frac{12}{13}$ and $\frac{12}{13} = \frac{3}{4}$

9. Dominic drank $1\frac{2}{10}$ cups of juice for breakfast and 0.4 cup of juice for lunch. How many cups of juice did Dominic drink in all?

- A. 0.55
- B. 0.6
- C. 1.55
- D. 1.6

10. A number sentence comparing two expressions is shown below.

$$0.4 + 0.09 + 0.6 \square 0.4 + 0.9 + 0.6$$

Which symbol should go in the box to correctly complete the number sentence?

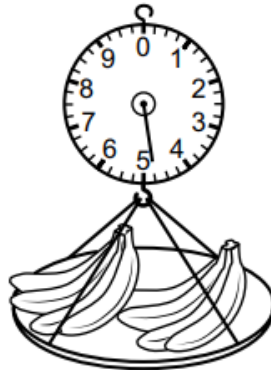
- A. +
- B. =
- C. <
- D. >

11. Tiles are placed into rows. Each tile is $\frac{1}{4}$ foot long. The pattern below shows the total length, in feet, of each row of tiles.

$$\frac{1}{4}, \frac{2}{4}, \frac{3}{4}, 1, 1\frac{1}{4}, 1\frac{2}{4}$$

The pattern continues. How would the pattern be different if each tile was $\frac{1}{2}$ foot long?

- A. The pattern would not be different at all.
- B. Each term in the pattern would be twice as great as it is now.
- C. The pattern would start with the same first term and then skip every other term.
- D. The pattern would follow the same rule, except it would start at 1 instead of $\frac{1}{4}$.
12. The total weight, in pounds, of two bunches of bananas is shown on the scale in the picture below.



One of the bunches of bananas weighs $2\frac{1}{4}$ pounds. How many pounds does the other bunch of bananas weigh?

- A. $\frac{2}{4}$
- B. 2
- C. $2\frac{2}{4}$
- D. 7

13. Luisa started reading at 12:30. She read for 1 hour and 20 minutes. At what time did Luisa stop reading?

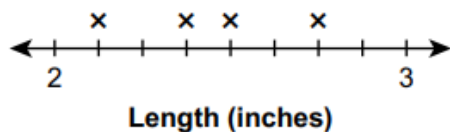
- A. 10 minutes after 1:00
- B. 10 minutes before 2:00
- C. 10 minutes after 2:00
- D. 10 minutes before 3:00

14. The lengths, in inches, of five crayons are listed below.

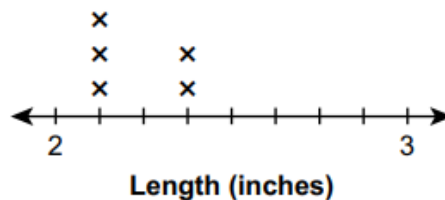
$$2\frac{3}{4} \quad 2\frac{1}{8} \quad 2\frac{1}{2} \quad 2\frac{1}{2} \quad 2\frac{3}{8}$$

Which line plot shows the lengths, in inches, of the five crayons?

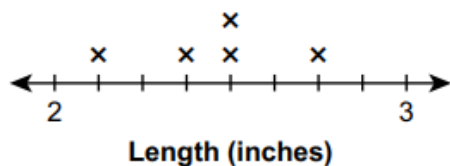
A. **Crayons**



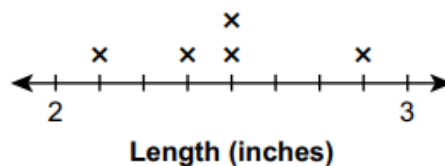
B. **Crayons**



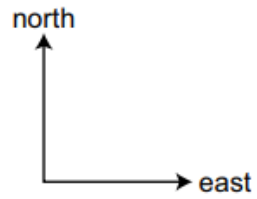
C. **Crayons**



D. **Crayons**

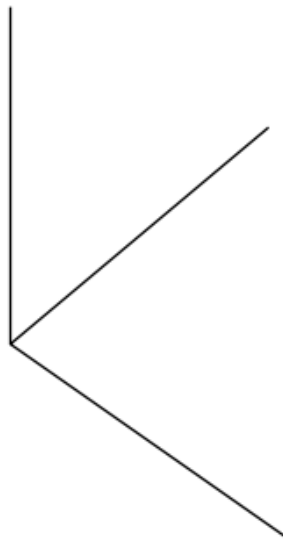


15. Ryan and Tom are standing next to each other. Ryan walks north in a straight line. Tom walks east in a straight line.



What angle is formed by their walking paths?

- A. acute
 - B. obtuse
 - C. right
 - D. straight
16. The diagram below shows three line segments that meet at one point.

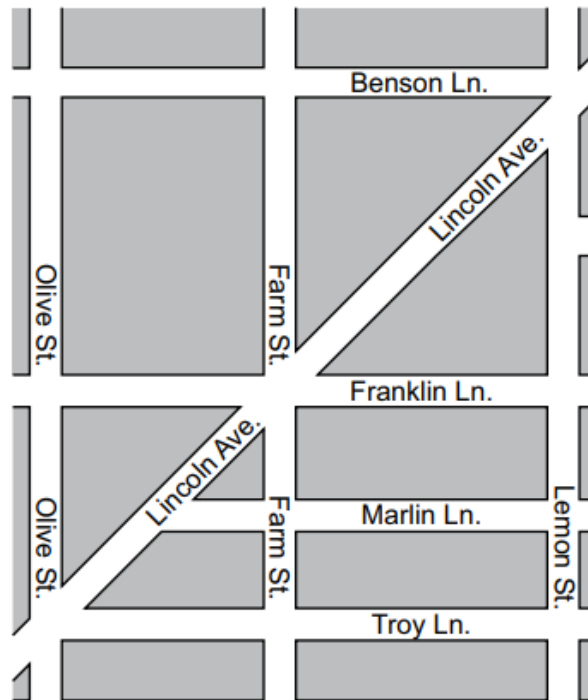


Using your protractor, what is the measure of the obtuse angle created by two of the line segments?

- A. 50°
- B. 75°
- C. 105°
- D. 125°

OPEN-ENDED QUESTION

17. A map is shown below.



There are right triangles shown on the map.

A. List three roads that form a right triangle.

There are roads that run parallel to Troy Ln. shown on the map.

B. List all the roads that run parallel to Troy Ln.

17. **Continued.** Please refer to the previous page for task explanation.

Jack claims that Farm St. is perpendicular to every road it intersects on the map.

C. Which road proves that Jack's claim is **not** correct?

D. Explain why the map does not have a line of symmetry even though it is in the shape of a rectangle.