Grade: 7th

Enduring Skill 1:

Students will work with two- and three- dimensional shapes to solve problems involving area, surface area, and volume.

Demonstrators and Related Standards:

1. Know the formulas for area and circumference of a circle. (7.G.4)
2. Know two-dimensional figures that result from cross sections of three-dimensional figures. (7.G.3)
3. Solve real-world problems using the formulas for area, volume and surface area. (7.G.6)

Assessment Items:

1. ES 1, Demonstrator 1, Standard (7.G.4)

John wants to pour a round concrete pad underneath his round fire pit. The diameter of the concrete pad is 25 meters and the diameter of the fire pit is 5 meters. Calculate the area of the concrete pad that is showing under the fire pit. Use 3.14 for π. Round all answers to the nearest hundredth.

a. 1884 m^2
b. 471 m^2
c. 62.8 m^2
d. 94.2 m^2

2. ES 1, Demonstrator 1, Standard (7.G.4)

Ian found his glass cup has a circumference of 25.6 cm. What is the radius of the cup? Use 3.14 for π.

a. 8.15 cm
b. 50.37 cm
c. 4.08 cm
d. 80.38 cm

3. ES 1, Demonstrator 1, Standard (7.G.4)

A school bus tire has a radius of 24 in. What is the area of the school bus tire? Use 3.14 for π.

a. 75.36 in^2
b. 150.72 in^2
c. 7234.56 in^2
d. 1808.64 in^2

4. ES 1, Demonstrator 1, Standard (7.G.4)

The new playground was designed to contain two circular play areas. Play area 1 has a diameter of 400 m and play area 2 has a diameter of 600 m.

a. How many meters of fence will be needed to outline both play areas?
b. How much more fencing will be needed for the larger play area than the smaller one?
c. If mulch costs $275 per truck load and it covers 30,000 square feet, how much will it cost to cover the playground in mulch?

5. ES 1, Demonstrator 1, Standard (7.G.4)

The round sculpture an artist created has a circumference of 25.12 feet. What is the sculpture's diameter? Use 3.14 for π.

6. ES 1, Demonstrator 1, Standard (7.G.4)

Sarah wants to put a round carpet under her round ottoman in her sitting room. The diameter of the carpet is 12 meters and the diameter of the ottoman is 4 meters. Calculate how much area of the carpet is left uncovered after putting the ottoman in place? Use 3.14 for π.

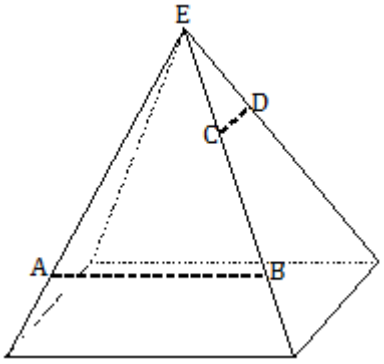
7. ES 1, Demonstrator 1, Standard (7.G.4)

At the circus the motorcyclist is going to jump through a hoop with a circumference of 18.84 feet. What is the radius of the hoop? Use 3.14 for π.

8. ES 1, Demonstrator 2, Standard (7.G.3)

If the right rectangular pyramid is sliced horizontally through *AB*, what shape will result?

a. square
b. trapezoid
c. triangle
d. rectangle



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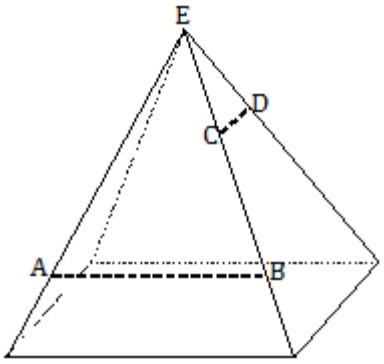
9. ES 1, Demonstrator 2, Standard (7.G.3)

If the right rectangular pyramid is sliced through vertex *E,* perpendicular to the base, what shape will result?

a. square
b. trapezoid
c. triangle
d. rectangle



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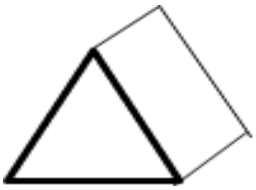
10. ES 1, Demonstrator 2, Standard (7.G.3)

Describe the figure.



11. ES 1, Demonstrator 3, Standard (7.G.6)

The dimensions of an above ground, rectangular pool are 30 ft long, 18 ft wide and 7 ft deep.

a. How much water is needed to fill the pool?

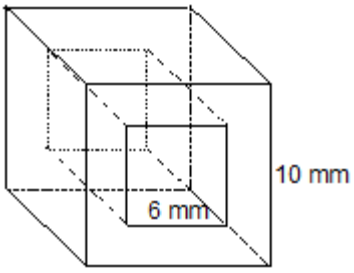
b. If there are 7.48 gal in 1 cubic foot, how many gallons are needed to fill the pool?

c. The owners want to protect the sides and the bottom of the pool with a plastic liner. How many square feet of liner do the owners need to buy?

12. ES 1, Demonstrator 3, Standard (7.G.6)

For his latest design, a jeweler hollows out crystal cube beads (like the one in the diagram) through which to thread the chain of a necklace. If the edge of the crystal cube is 10 mm, and the edge of the square cut is 6 mm, what is the volume of one bead? Make sure to show all calculations.

(Source Available from: https://www.engageny.org)



13. ES 1, Demonstrator 3, Standard (7.G.6)

There is a new right rectangular sandbox at the park. The workers only want to fill it half full. The dimensions for the sandbox are 10 ft long, 6 ft wide and 1 ft tall. Sand is $9.38 per cu ft. How much will it cost to fill the sandbox half full?

14. ES 1, Demonstrator 3, Standard (7.G.6)

A square garage has a perimeter of 76 meters.
How long is each side of the garage?

15. ES 1, Demonstrator 3, Standard (7.G.6)

Erin's dad had a rectangle cement pad poured for a new patio.
The patio is 10 meters long and 7 meters wide. What is its area?

16. ES 1, Demonstrator 3, Standard (7.G.6)

The surface area of a cube is 78 in^2. What is the volume of the cube?

17. ES 1, Demonstrator 3, Standard (7.G.6)

A cup is 20 cm deep and 16 cm wide. How much liquid can the glass hold?

18. ES 1, Demonstrator 3, Standard (7.G.6)

Find the surface area of a wooden music box which is shaped like a cube, given the edge of the box is 2 cm.

20. ES 1, Demonstrator 3, Standard (7.G.6)

What is the volume of a regular cylinder whose base has a radius of 18 cm and has a height of 9 cm?

Grade 7

Enduring Skill 2: Students will develop an understanding of drawing inferences about populations based on sampling.

Demonstrators and Related Standards:

1. Use understanding to generate multiple samples for populations. (7.SP.1) (7.SP.2)
2. Use understanding of statistics to gain information of populations by examining the samples of the populations. (7.SP.1) (7.SP.2)
3. Use understanding in comparing populations with measures of variability. (7.SP.3) (7.SP.4)
4. Use understanding to calculate measures of variability for a set of data (mean, mean absolute deviation). (7.SP.3) (7.SP.4)

Assessment Items:

1. **ES 2, Demonstrator 1, Standard (7.SP.1) (7.SP.2)**

   Shannon wants to find out which music group is the most liked by students in her school. Which method of sampling below will produce a random representative sample of the students in her school?

   a. Surveying students in the band class
   b. Surveying students who stay after school for academic practice
   c. Surveying every 10th student who walks in the building in the morning
   d. Surveying every 5th student who goes through the lunch line during 6th grade lunch

2. **ES 2, Demonstrator 1 and Demonstrator 2, Standard (7.SP.1) (7.SP.2)**

   Robin wanted to survey the school to see how they feel about school lunch. She only surveyed the students who were in her grade. Is this a biased sample? Explain your reasoning.

3. ES 2, Demonstrator 1 and Demonstrator 2, Standard (7.SP.1) (7.SP.2)

You want to survey students in your school about their exercise habits. Tell whether the following will give you a random sample. Justify your answer.

a. You select every tenth student on an alphabetical list of students in your school. You survey the selected students in their first period class.

b. At lunchtime, you stand by a vending machine. You survey every student who buys something from the vending machine.

4. ES 2, Demonstrator 1 and Demonstrator 2, Standard (7.SP.1) (7.SP.2)

You and a friend decide to conduct a survey at your school to see whether students are in favor of a new cell phone policy. Your friend stands at the school entrance and asks the opinions of the first 100 students who come to campus on Monday. You obtain a list of all students at the school and randomly select 60 to survey. Your friend finds 34% of his sample in favor of the new cell phone policy, but you find only 16%. Which do you believe is more likely to be representative of the school population? Explain your choice.

5. ES 2, Demonstrator 1 and Demonstrator 2, Standard (7.SP.1) (7.SP.2)

You and a friend decide to conduct a survey at your school to see whether students are in favor of a new dress code policy. Your friend stands at the school entrance and asks the opinions of the first 100 students who come to campus on Monday. You obtain a list of all students at the school and randomly select 60 to survey. Your friend finds 34% of his sample in favor of the new dress code policy, but you find only 16%. Which do you believe is more likely to be representative of the school population? Explain your choice.

6. ES 2, Demonstrator 1 and Demonstrator 2, Standard (7.SP.1) (7.SP.2)

Carol was in charge of putting all of the names of the attendees in a hat. She drew out 37 names to win prizes. Is this sample of attendees likely to be biased? Justify your answer.

7. ES 2, Demonstrator 1 and Demonstrator 2, Standard (7.SP.1) (7.SP.2)
Katie wanted to take a poll on how many people voted in the last election. Katie polled 12 people living in each county in her state. Each county is the same size. Is this sample likely to be biased? Justify your answer.

8. **ES 2, Demonstrator 1 and Demonstrator 2, Standard (7.SP.1) (7.SP.2)**

   Kristina surveyed her two best friend's parents. Is this sample of parents likely to be biased? Justify your answer.

9. **ES 2, Demonstrator 1 and Demonstrator 2, Standard (7.SP.1) (7.SP.2)**

   Emily is a host of a radio talk show. 335 of the 1000 listeners that called in said they were in favor of implementing school uniforms in the city. Is this a random sampling of listeners? Justify your answer.

10. **ES 2, Demonstrator 1 and Demonstrator 2, Standard (7.SP.1) (7.SP.2)**

    Sam talked with an audience at the city council meeting about pit bull ownership. Of the 10 audience members who chose to speak, 2 of them were against the idea of banning pit bulls. Is this sample of audience members likely to be biased? Justify your answer.

11. **ES 2, Demonstrator 1 and Demonstrator 2, Standard (7.SP.1) (7.SP.2)**

    There are four post offices in my city. The offices are located in different parts of the town. Angelica is trying to figure out which post office gets the most business. Angelica guesses that the downtown and the north end post offices are busier because they have larger populations. After comparing the downtown office and the north end office Angelica guesses the downtown office gets more business because the area has more traffic. What could Angelica do to give a more accurate sample of business?

12. **ES 2, Demonstrator 1 and Demonstrator 2, Standard (7.SP.1) (7.SP.2)**

    The scientists keep track of eagles. They put tags on 15 eagles and released them. Later the scientists catch 105 eagles, of which 7 were tagged. What is the best estimate of the eagle population?

13. **ES 2, Demonstrator 1 and Demonstrator 2, Standard (7.SP.1) (7.SP.2)**

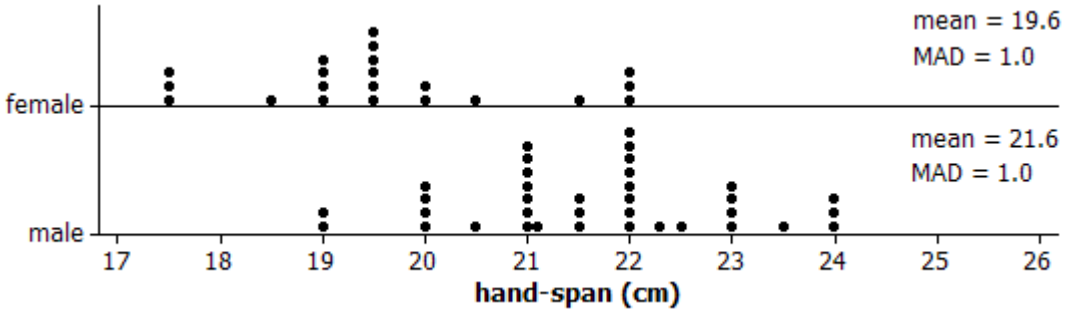
    Tiger sharks are becoming extinct. A group of marine biologists tag 24 tiger sharks and release them. Later, they corral 143 tiger sharks and find that 12 have been tagged. What is the best estimate of the tiger shark population?

14. ES 2, Demonstrator 1 and Demonstrator 2, Standard (7.SP.1) (7.SP.2)

The owner of the aquarium wants to know how many goldfish he currently has in his tank. One of the employees catches 40 goldfish and marks them with paint. Later he catches 320 goldfish and finds 35 are marked with paint. What is the best estimate of the gold fish population in the tank?

15. ES 2, Demonstrator 3, Standard (7.SP.3) (7.SP.4)

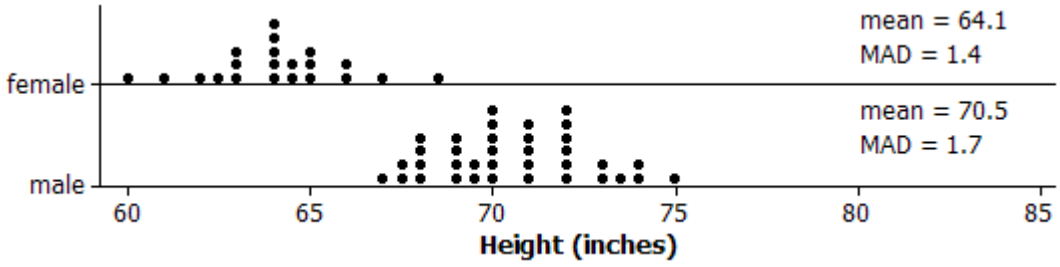
Students in a random sample of 57 students were asked to measure their hand spans (distance from outside of thumb to outside of little finger when the hand is stretched out as far as possible). The graphs below show the results for the males and females.



(Source Available from: https://www.engageny.org)

a. Based on these data, do you think there is a difference between the population mean hand span for males and the population mean hand span for females? Justify your answer.

b. The same students were asked to measure their heights, with the results shown below.



(Source Available from: https://www.engageny.org)

Are these height data more or less convincing of a difference in the population mean height than the hand-span data are of a difference in population mean hand span? Explain.

16. ES 2, Demonstrator 3 and Demonstrator 4, Standard (7.SP.3) (7.SP.4)

Rainforests typically have several rainy days a year. The number of rainy days per month are listed as follows for January through December:

7, 11, 12, 15, 18, 10, 9, 14, 7, 7, 14, 2

a. Calculate the mean, median, mode and range for the number of rainy days per year.

b. If the number of rainy days doubled each month, calculate the mean, median, mode and range for the number of rainy days per year.

c. If the number of rainy days increased by three days each month, calculate the mean, median, mode and range for the number of rainy days per year.

17. ES 2, Demonstrator 3 and Demonstrator 4, Standard (7.SP.3) (7.SP.4)

Tom, Ben and Larry scored 75, 88 and 83 on their tests respectively. The average of their grades was 82. Callie and Lauren scored 92 and 78 respectively. What would Kara need to score on her test to make the girls' average the same as the boys' average?

18. ES 2, Demonstrator 3 and Demonstrator 4, Standard (7.SP.3) (7.SP.4)

A storeowner kept a tally of the sizes of suits purchased in her store. Which measure of central tendency should the storeowner use to describe the average size suit sold? Explain your reasoning.

19. ES 2, Demonstrator 3 and Demonstrator 4, Standard (7.SP.3) (7.SP.4)

The science test grades are posted. The class did very well. All students taking the test scored over 75. Unfortunately, four students were absent for the test and the computer listed their scores as 0 until the test is taken. Assuming that no score repeated more times than the 0's what measure of central tendency would most likely give the best representation of this data?

a. mean
b. median
c. mode
d. range

20. ES 2, Demonstrator 3 and Demonstrator 4, Standard (7.SP.3) (7.SP.4)

Elias wanted to compare the ages of the two basketball teams playing for the championship. Listed is the age of each person on the team.

Team 1:
13, 12, 13, 10, 11, 13, 12, 11

Team 2:
12, 12, 14, 11, 10, 12, 12, 13

What is the average age difference between the two teams?

21. ES 2, Demonstrator 3 and Demonstrator 4, Standard (7.SP.3) (7.SP.4)

Sandra ran souvenir shops at two different casinos. She wanted to compare the mean amount of money she made between the two shops. Each shop has 8 registers. Find the mean for both casinos. She thinks there will be a greater average in the larger casino compared to the smaller one. Is Sandra correct? Explain your reasoning.

Larger casino – number of $ in registers
$55 $47 $36 $25 $50 $75 $63 $60

Smaller casino- number of $ in registers
$58 $36 $85 $76 $52 $70 $75 $80

22. ES 2, Demonstrator 3 and Demonstrator 4, Standard (7.SP.3) (7.SP.4)

Devon is interested in the average word length in the magazines at the dentist office. He took a random sampling of 12 words from Men's Health and a random sampling from Redbook and counted the length of each word. Compare the average word length in both magazines.

Men's Health
3, 7, 5, 2, 4, 3, 1, 6, 4, 8, 2, 3

Redbook
5, 4, 3, 6, 4, 5, 5, 2, 3, 4, 2, 5

Which magazine has the longer word length?

A) Men's Health
B) Redbook

Grade 7

Enduring Skill 3:

Students will develop an understanding of expressions and linear equations.

Demonstrators and Related Standards:

1. Use understanding of properties of operations to generate equivalent expressions. (7.EE.1) (7.EE.2)

2. Use understanding of properties of operations to solve equations and inequalities with one variable. (7.EE.4) (7.G.4) (7.G.5) (7.G.6) (7.RP.2c)

3. Use expressions and equation to solve real-life and mathematical problems. (7.EE.3) (7.EE.4) (7.RP.2c) (7.RP.3) (7.G.4) (7.G.5) (7.G.6)

Assessment Items:

1. **ES 3, Demonstrator 1, Standard (7.EE.1, 7.EE.2)**

   Which equation shows the associative property of multiplication?
   a. $a + b = a \cdot c$
   b. $a \cdot c = c \cdot a$
   c. $a \cdot (c - b) = a \cdot c - a \cdot b$
   d. $a \cdot (c \cdot b) = (a \cdot c) \cdot b$

2. **ES 3, Demonstrator 1, Standard (7.EE.1, 7.EE.2)**

   Which property of multiplication is shown?
   $(3 + 4) \cdot 7 = 7 \cdot 3 + 7 + 4$
   a. associative
   b. zero
   c. distributive
   d. identity

3. **ES 3, Demonstrator 1, Standard (7.EE.1, 7.EE.2)**

All varieties of candy bars are being sold for the fundraiser for $2.50. Kate buys milk chocolate and caramel. Write an equation that represents the total cost, represented by T, of the candy bars if M represents the number of milk chocolate and C represents the number of caramel.

4. **ES 3, Demonstrator 1, Standard (7.EE.1, 7.EE.2)**

Ken sells 13 cellphones per hour. Perry sells 16 cellphones per hour. This week Perry sells an additional 20 cellphones. If both Ken and Perry work 40 hours, write and solve the equation to show many cell phones were sold in that particular week.

5. **ES 3, Demonstrator 1, Standard (7.EE.1, 7.EE.2)**

Ellie is a nurse at the local hospital. She gets a 3% raise every year. She made $52,000 in 2015. How much money will she make in 2018?

6. **ES 3, Demonstrator 1, Standard (7.EE.1, 7.EE.2)**

Chris is the manager of the Yummy Time Donut Shop. Chris gets paid $45 per day with a $0.10 commission for each donut sold.

a. Write an expression showing Chris' daily pay rate.

b. How much will Chris make if he sells 236 donuts?

c. How many donuts did he sell if he earns $56.50?

7. **ES 3, Demonstrator 1, Standard (7.EE.1, 7.EE.2)**

Emma's hair is 15 inches long. If her hair grows at a rate of 7% each year, how long will her hair be next year?

8. **ES 3, Demonstrator 1, Standard (7.EE.1, 7.EE.2)**

Given the following expression, $14z + 6$, use factoring to write an equivalent expression.

9. **ES 3, Demonstrator 1, Standard (7.EE.1, 7.EE.2)**

Robert weighs 150 lbs. Every year his weight increases by 8%. What will Robert's weight be next year?

10. ES 3, Demonstrator 2, Standard (7.EE.3)

Joey went to the concession stand during the basketball game. He bought 8 pieces of candy and gum. The candy cost $0.50 and the gum cost $0.20. If Joey spent $2.80, how many of each did he buy?

11. ES 3, Demonstrator 2, Standard (7.EE.3)

What value of *b* makes the sentence true? 5 + (34 + 32) = (b + 50) + 1

12. ES 3, Demonstrator 2, Standard (7.EE.3)

If the product of 6 integers is negative, at most, how many of the integers can be negative?

13. ES 3, Demonstrator 2, Standard (7.EE.3)

Joey and John go to the carnival. Joey plays 6 games and John plays 9. They spend $18.75 total. If the games all cost the same, how much did each game cost?

14. ES 3, Demonstrator 2, Standard (7.EE.3)

Jackson is the all-time leading scorer for his basketball team. He averages 18 points a game and currently has 483 total points. Maddox is the second all-time scorer for the team. He averages 21 points per game and currently has 465 total points. Write an equation and solve for the number games needed for the players to have the same total career points.

15. ES 3, Demonstrator 3, Standard (7.EE.4)

Graph the following inequality. $4a + 3 \leq 19$

16. ES 3, Demonstrator 3, Standard (7.EE.4)

Which of the equations below will answer the following question?
"Think of a number, add 8 and then multiply by 3. My answer is 66."
What was my number? Choose all that apply.

a. $x + 24 = 66$
b. $3x + 8 = 66$
c. $3x + 24 = 66$
d. $3(x + 8) = 66$

17. ES 3, Demonstrator 3, Standard (7.EE.4)

Solve the inequality and graph the solution. $10x > 30$

18. ES 3, Demonstrator 3, Standard (7.RP.3)

Martha bought a pair of shoes for $42. The original price was $85.
What was the percent of discount?

Grade 7

Enduring Skill 4: Students will develop, use, and evaluate probability models.

Demonstrators and Related Standards:

1. Develop an understanding of a probability model to find probabilities of events. (7.SP.5) (7.SP.6) (7.SP.7a) (7.SP.7b)

2. Use lists, tables, tree diagrams, and simulations to find probabilities of compound events. (7.SP.8a) (7.SP.8b) (7.SP.8c)

Assessments Items:

1. **ES 4, Demonstrator 1, Standard (7.SP.5)**

   There are three choices of jellybeans: bubblegum, blueberry and strawberry. If the probability of getting bubblegum is 3/10 and the probability of getting blueberry is 1/5, what is the probability of getting strawberry?

2. **ES 4, Demonstrator 1, Standard (7.SP.5)**

   Olivia has 3 fair coins, she will toss each coin one time. Which of the following best describes the probability that all 3 coins will land with “heads” facing up?
   a. likely
   b. certain
   c. unlikely
   d. impossible

3. **ES 4, Demonstrator 1, Standard (7.SP.5)**

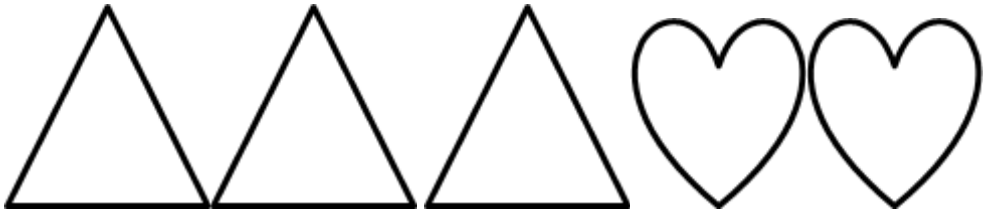
   The pizza shop has 20 pizzas for sale, including 5 dessert pizzas. What is the probability that a randomly selected pizza will be a dessert pizza? Simplify your answer and write it as a fraction or whole number.

4. ES 4, Demonstrator 1, Standard (7.SP.5)

Lisa has 14 pieces of candy in the candy bowl, including 4 pieces of chocolate. If Lisa randomly selects of piece of candy, what is the probability that it will be a piece of chocolate? Simplify your answer and write it as a fraction or whole number.

5. ES 4, Demonstrator 1, Standard (7.SP.5)

Pick a shape at random.



What is the P(triangle)?

6. ES 4, Demonstrator 1, Standard (7.SP.5)

If you roll a six sided die. What is the P(5)?

a. 37.2%
b. 17.8%
c. 21.7%
d. 16.7%

7. ES 4, Demonstrator 1, Standard (7.SP.5)

If you flip a coin what is the P(tails)? Simplify your answer and write as a fraction or whole number.

8. **ES 4, Demonstrator 1, Standard (7.SP.5)**

Shelly is picking out flowers for her bridesmaid bouquets. She chose 12 yellow roses and 4 carnations. What is the probability that a randomly selected flower will be a carnation? Simplify your answer and write as a fraction or whole number.

9. **ES 4, Demonstrator 1, Standard (7.SP.5)**

The literature class watched 2 movies during the school year. Out of 12 students, 4 liked the movie *Of Mice and Men*. What is the probability that a randomly selected literature student likes *Of Mice and Men* best? Write your answer as a fraction or whole number.

10. **ES 4, Demonstrator 1, Standard (7.SP.5)**

Mason went to the fruit market. He came home with 10 pieces of fruit, including 4 peaches. What is the probability of a randomly selected fruit will be a peach?

11. **ES 4, Demonstrator 1, Standard (7.SP.6)**

Each of the 20 students in Mr. Anderson's class flipped a coin ten times and recorded how many times it came out heads.

a. How many heads do you think you will see out of ten tosses?

b. Would it surprise you to see 4 heads out of ten tosses? Explain why or why not.

c. Here are the results for the twenty students in Mr. Anderson's class. Use this data to estimate the probability of observing 4, 5 or 6 heads in ten tosses of the coin. (It might help to organize the data in a table or in a dot plot first.)

Student	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Number of Heads	3	5	4	6	4	8	5	4	9	5	3	4	7	5	8	6	3	6	5	7

(Source: https://www.illustrativemathematics.org/content-standards/7/SP/C/6/tasks/1521)

12. ES 4, Demonstrator 1, Standard (7.SP.6)

In the U.S. and Canada there are several famous groundhogs that are locally celebrated on February 2nd. The first groundhog, however, was recognized in the 1800's in Punxsutawney, Pennsylvania and he was given the name Punxsutawney Phil. Records have been kept on Punxsutawney Phil's predictions since 1887.

Historical Track Record of Punxsutawney Phil 1887–2014

Courtesy of Punxsutawney Groundhog Club

(Source: http://www.yummymath.com/wp-content/uploads/groundhog-day2015.pdf)

Saw Shadow	No Shadow	No Record
101	17	9
More Winter	End of Winter	---

1. What is the frequency in the previous chart of Punxsutawney Phil seeing his shadow?

2. What is the frequency of Phil not seeing his shadow?

3. What is the relative frequency of Phil seeing his shadow?

4. What is the relative frequency of Phil not seeing his shadow?

5. Do you think that Phil will see his shadow this year?

6. How often should Phil see his shadow...
    a. In the next 5 years
    b. In the next 10 years
    c. Over the next 40 years

13. ES 4, Demonstrator 1, Standard (7.SP.6)

A box contains 100 red and white flowers. Kate chooses a flower out of the box, without looking, records the flower, and then places that flower back in the box. Kate has recorded 32 red flowers and 26 white flowers. Using these results, predict the number of red flowers in the box. Write your answer as a percentage.

14. **ES 4, Demonstrator 1, Standard (7.SP.6)**

Larry has a bag that contains 11 apples, 12 bananas, and 7 pears. Larry performs 50 pulls, recording the fruits drawn and placing the pulled fruits back into the bag before the next draw. How many apple draws would be expected if 1000 pulls are conducted? Write your answer as a percentage.

15. **ES 4, Demonstrator 1, Standard (7.SP.6)**

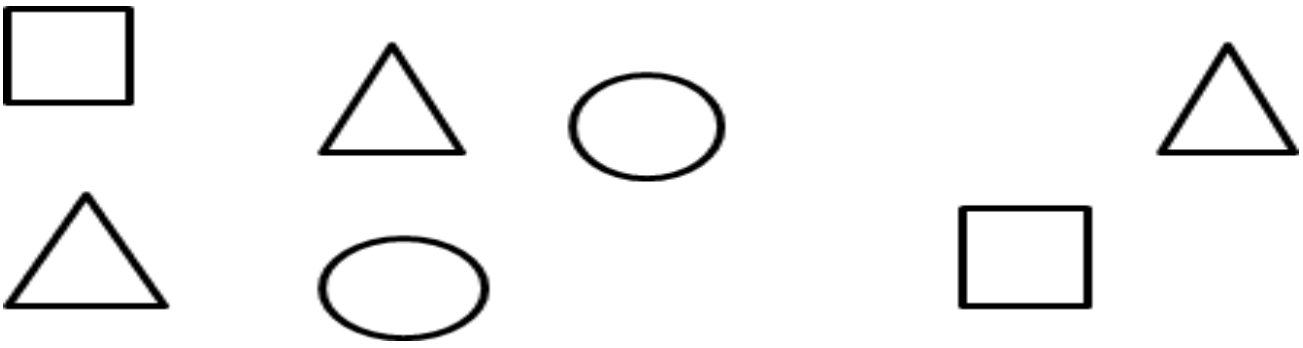
Mary and Kerry want to play Sorry. They want to decide who goes first by throwing a die. They decide to have Mary roll one die first, if she rolls a 3 or less Kerry goes first. If she rolls a 4 or higher, she will go first. What is the relative frequency of a 4 or higher on a single die roll? Write your answer as a percentage.

16. **ES 4, Demonstrator 1, Standard (7.SP.6)**

Henry's mom organized his birthday party. There are 16 cupcakes at the party, 7 of the cupcakes are vanilla. What is the relative frequency probability that a randomly selected cupcake will be a vanilla cupcake? Write your answer as a percentage.

17. **ES 4, Demonstrator 1, Standard (7.SP.6)**

You pick a shape without looking and then put it back. If you do this 7 times, what is the experimental probability of choosing a rectangle?



18. **ES 4, Demonstrator 1, Standard (7.SP.6)**

Two cards are chosen from a deck. What is the probability of getting a red queen and then a black jack without replacing the cards.

Grade 7

Enduring Skill 5: Students will develop an understanding of operations with rational numbers.

Demonstrators and Related Standards:

1. Use understanding of numbers to recognize fractions, decimals and percents as different representations of rational numbers. (7.NS.2d)

2. Use understanding to extend addition, subtraction, multiplication and division to all rational numbers. (7.RP.1) (7.NS.1) (7.NS.2) (7.NS.3) (7.EE.3)

3. Use understanding to explain and interpret rules of negative numbers as they apply to mathematical operations. (7.NS.1) (7.NS.2a) (7.NS.2b) (7.EE.3)

Assessment Items:

1. ES 5, Demonstrator 1, Standard (7.NS.2d)

Stormi noticed that instead of using long division there is a "short-cut" method he can use to find the decimal equivalent of $\frac{119}{250}$.
He calculated $\frac{119}{250} = \frac{119 \text{ x } 4}{250 \text{ x } 4} = \frac{476}{1000} = 0.476$

A. For which of the following fractions listed below will Stormi's strategy also work to find the decimal representation? Show how the strategy works for the ones it will work on.
$\frac{2}{3}, \frac{6}{25}, -\frac{1}{4}, \frac{16}{7}, -\frac{111}{30}$, and $\frac{5}{8}$

B. For which denominators will Stormi's strategy work? Explain.

2. ES 5, Demonstrator 1, Standard (7.NS.2d)

Convert to decimal the following rational number: $\frac{129}{4}$.

A. 31.25
B. 31.75
C. 32.25
D. 32.75

3. **ES 5, Demonstrator 1, Standard (7.NS.2d)**

Convert 3/11 to a decimal equivalent using long division. Show your work.

4. **ES 5, Demonstrator 1, Standard (7.NS.2d)**

Divide five by four. Is your answer a rational number? Explain.

5. **ES 5, Demonstrator 1, Standard (7.NS.2d)**

The three seventh grade classes at Sunview Middle School collected the most boxtops for a school fundraiser, and they won a $600 prize to share among all 3 classrooms. Mr. Aceves' class collected 3,760 box tops, Mrs. Baca's class collected 2,301, and Mr. Canyon's class collected 1,855. How should they divide the money so that each class gets the same fraction of the prize money as the fraction of the box tops that each classroom collected?

6. **ES 5, Demonstrator 2, Standard (7.RP.1, 7.NS.1, 7.NS.2, 7.NS.3, 7.EE.3)**

Rover eats 3/4 of a can of cat food each day and Bobo eats 1/2 of a can of cat food each day. Cat food costs $5.00 for three cans. It is only sold in 3 can packs.

A. How much does it cost Carol for a 60-day supply of cat food for her two cats? Show your work.
B. Find the cost of cat food for a 29-day supply, a 30-day supply, and a 31-day supply. Show your work.
C. What do you notice about your answers in Part B?

7. **ES 5, Demonstrator 2, Standard (7.RP.1, 7.NS.1, 7.NS.2, 7.NS.3, 7.EE.3)**

A recipe calls for $2\frac{3}{4}$ cups of flour. You only have a $\frac{1}{4}$ cup measuring cup. How many times will you need to fill the $\frac{1}{4}$ cup measuring cup?

8. ES 5, Demonstrator 2, Standard (7.RP.1, 7.NS.1, 7.NS.2, 7.NS.3, 7.EE.3)

A trail is 13.5 miles long. There are markers every 0.25 miles along the trail, including at the end of the trail. How many markers are there in all? Show your work.

9. ES 5, Demonstrator 2, Standard (7.RP.1, 7.NS.1, 7.NS.2, 7.NS.3, 7.EE.3)

At the beginning of the month, Angela's bank account balance was $217.25. During the month, she made deposits of $49.58 and $105.75 and a withdrawal of $25.45. What was Angela's bank balance at the end of the month?

A. $36.47
B. $87.37
C. $347.13
D. $398.03

10. ES 5, Demonstrator 2, Standard (7.RP.1, 7.NS.1, 7.NS.2, 7.NS.3, 7.EE.3)

What is $-\left(\frac{-27}{5}\right) - \frac{27}{5}$?

A. $\frac{-729}{25}$
B. $\frac{-54}{5}$
C. 0
D. $\frac{54}{5}$

11. ES 5, Demonstrator 2, Standard (7.RP.1, 7.NS.1, 7.NS.2, 7.NS.3, 7.EE.3)

A Street in New Orleans has an elevation of -4 feet above sea level. A child released a balloon from that street. The balloon rose to an elevation of 200 feet above sea level. Which BEST shows the total distance the balloon traveled?

A. | - 4 – 200 |
B. | - 4 + 200 |
C. | - 4 | - | 200 |
D. - | 4 | + | 200 |

12. ES 5, Demonstrator 2, Standard (7.RP.1, 7.NS.1, 7.NS.2, 7.NS.3, 7.EE.3)

Solve $|a - 3| = 12$.

A. $a = -9, a = 15$
B. $a = -9, a = -15$
C. $a = 9, a = -15$
D. $a = 9, a = 15$

13. ES 5, Demonstrator 2, Standard (7.RP.1, 7.NS.1, 7.NS.2, 7.NS.3, 7.EE.3)

Graham's monthly bank statement showed the following deposits and withdrawals:

−$25.20, $52.75, −$22.04, −$8.50, $94.11

If Graham's balance in the account was $47.86 at the beginning of the month, what was the account balance at the end of the month? Show your work.

14. ES 5, Demonstrator 2, Standard (7.RP.1, 7.NS.1, 7.NS.2, 7.NS.3, 7.EE.3)

What is the value of the expression below?

$\frac{3}{8} + (-\frac{4}{5}) + (-\frac{3}{8}) + \frac{5}{4}$

A. 0
B. $\frac{1}{20}$
C. $\frac{9}{20}$
D. $2\frac{4}{5}$

15. ES 5, Demonstrator 2, Standard (7.RP.1, 7.NS.1, 7.NS.2, 7.NS.3, 7.EE.3)

The table shows prices for shoe rental, games, and snacks at the bowling alley. Gina rented a pair of shoes, bowled 3 games, and bought 1 order of nachos. She used a coupon for ½ off the price of her bowling games. What was Gina's total cost before tax was added?

BOWLING ALLEY PRICES

Item	Price
Shoe Rental	**$2.75**
One game of bowling	**$2.50**
Small soda	**$0.95**
Large soda	**$1.50**
Nachos	**$1.75**

A. $5.75
B. $6.00
C. $8.25
D. $12.00

16. ES 5, Demonstrator 2, Standard (7.RP.1, 7.NS.1, 7.NS.2, 7.NS.3, 7.EE.3)

Scientists determined that Antarctica's average winter temperature was -34.44° C. The difference between this temperature and Antarctica's highest recorded temperature was 49.44 degrees. What was Antarctica's highest recorded temperature?

A. −83.88°C
B. −15°C
C. 15°C
D. 83.88°C

17. ES 5, Demonstrator 2, Standard (7.RP.1, 7.NS.1, 7.NS.2, 7.NS.3, 7.EE.3)

Jane and Eric are helping their teacher buy supplies for a research project. Every student will get a bag with 2 pencils and 30 index cards. The teacher gave Jane $17 to buy pencils from the school store. The pencils come in boxes of 12 and cost $1.69 per box. Eric was given $19 to buy index cards at an office supply store. Index cards are sold in packs of 150 cards and cost $2.99 per pack.

A. Jane buys as many boxes of pencils as she can afford. Eric buys as many packages of index cards as he can afford. How many complete bags of supplies can they make?

B. Each bag contains two pencils and 30 index cards. How much will each bag cost? Give your answer to the nearest cent.

18. ES 5, Demonstrator 2, Standard(7.RP.1, 7.NS.1, 7.NS.2, 7.NS.3, 7.EE.3)

Anne's family is driving to her uncle's house. The family travels 383.5 miles between 10:15 a.m. and 4:45 p.m.

A. What is an equation that Anne can use to determine their average rate of travel for the day, R, in miles per hour?

B. Calculate the family's average rate of travel for the day. Round your answer to the nearest tenth.

C. Anne tells her family, "It's a good thing we traveled as fast as we did. If our rate had been 50 miles per hour, we wouldn't have gotten to his house until about…". If their average rate had been 50 miles per hour, what time would have Anne's family arrived at her uncle's house?

19. ES 5, Demonstrator 3, Standard (7.NS.1, 7.NS.2a, 7.NS.2b, 7.EE.3)

Two numbers represented by *a* and *b* are the same distance from 0 on the number line. Which of these results in a sum of 0.

A. $2a - 2b$
B. $2a + 2b$
C. $2a + b$

D. $a + 2b$

20. ES 5, Demonstrator 3, Standard (7.NS.1, 7.NS.2a, 7.NS.2b, 7.EE.3)

Which of the following is equivalent to 2(93 + 13 + (-93))?

A. 2(0)
B. 2(1)
C. 2(13)
D. 2(-13)

21. ES 5, Demonstrator 3, Standard (7.NS.1, 7.NS.2a, 7.NS.2b, 7.EE.3)

If the associative property of addition were applied to the expression below, what might be the resulting expression?

(4 + 2 +7) + (1 + 3 + 10)

A. (7 + 1 + 4) + (2 + 3 + 10)
B. (7 – 1 – 4) + (2 – 3 – 10)
C. (1 + 3 + 10) – (4 + 2 + 7)
D. (4 – 2 – 7) + (1 – 3 – 10)

22. ES 5, Demonstrator 3, Standard (7.NS.1, 7.NS.2a, 7.NS.2b, 7.EE.3)

The expression 5(3 + 7 + 2) – 6(13 + 9 + 8) is rewritten as 5(2 + 7 + 3) – 6(9 + 13 + 8). What property was used?

A. Commutative Property of Multiplication
B. Commutative Property of Subtraction
C. Commutative Property of Addition
D. Associative Property of Addition

23. ES 5, Demonstrator 3, Standard (7.NS.1, 7.NS.2a, 7.NS.2b, 7.EE.3)

In the first week of a fundraiser, Kyler sold 11 magazines. In the second week, he did not sell any magazines. Which property of real numbers is demonstrated by the equation 11 + 0 = 11?

A. Associative Property of Addition
B. Commutative Property of Addition
C. Identity Property of Addition

D. Distributive Property

Grade 7
Enduring Skill 6:

Develop understanding of proportional relationships.

Demonstrators and Related Standards:

1. Use understanding to solve single and multi-step problems from the real world. (7.RP.1) (7.RP.2) (7.EE.3) (7.G.1)

2. Use understanding to solve a wide variety of percent problems. (7.RP.3) (7.EE.3)

3. Use understanding to solve problems about scale drawings. (7.G.1)

4. Use understanding to graph proportional relationships, and understand unit rate as an informal measure of slope. (7.RP.2)

5. Use understanding to distinguish proportional relationships from others. (7.RP.2)

Assessment Items:

1. **ES 6, Demonstrator 1, Standard (7.RP.1, 7.RP.2, 7.EE.3, 7.G.1)**

   Jack and Jill were at track practice. The track is 2/5 kilometer around. Jack ran 1 lap in 2 minutes. Jill ran 3 laps in 5 minutes. How many minutes does it take Jill to run 1 kilometer?

2. **ES 6, Demonstrator 1, Standard (7.RP.1, 7.RP.2, 7.EE.3, 7.G.1)**

   Alex and his family were driving to his grandma's for the holidays. He looked at his watch during a portion of the trip and it was 11:15 am. At 1:25 pm Alex's mother told him they traveled 80 miles in the last 2 hours. Alex's dad said the entire trip was 1200 miles. How many hours will it take to complete the trip?

3. **ES 6, Demonstrator 1, Standard (7.RP.1, 7.RP.2, 7.EE.3, 7.G.1)**

Travis and Jennifer made a cross-country motorcycle trip. Travis drove 325 miles in 5 hours. Jennifer took 6 ½ hours to travel the same distance as Travis. Provide the average speeds in miles per hour for both Travis and Jennifer.

4. **ES 6, Demonstrator 1, Standard (7.RP.1, 7.RP.2, 7.EE.3, 7.G.1)**

George is planning a trip from Los Angeles to Chicago in her car. Use the table below to show how far in a mile Mary can go for each gallon of gas she uses.

Gallons	2	4	6		10	12
Miles	52		156	208		

5. **ES 6, Demonstrator 1, Standard (7.RP.1, 7.RP.2, 7.EE.3, 7.G.1)**

Josh bought 15 gallons of gas at $3.23 a gallon. What is the total amount of money Josh spent on gas?

6. **ES 6, Demonstrator 1, Standard (7.RP.1, 7.RP.2, 7.G.1)**

Are these ratios equivalent?

3 large pizzas for every 8 medium pizzas

4 large pizzas for every 11 medium pizzas

7. **ES 6, Demonstrator 1, Standard (7.RP.1, 7.RP.2, 7.EE.3, 7.G.1)**

Tommy made dough for 15 pizzas in 3 hours. How much dough can he make for the pizzas in 6 hours?

8. **ES 6, Demonstrator 1, Standard (7.RP.1, 7.RP.2, 7.EE.3, 7.G.1)**

Jazlyn learned 3 dances over a period of 3 weeks in dance class. After vacation, Jazlyn learned 19 dances over a period of 19 weeks in dance class. How many dances does Jazlyn learn per week?

9. **ES 6, Demonstrator 1, Standard (7.RP.1, 7.RP.2, 7.EE.3, 7.G.1)**

The face painting class will cost $15 if it has 5 attendees. In contrast, if the class has 6 attendees, it will cost $18. What is the cost per attendee?

10. **ES 6, Demonstrator 2, Standard (7.RP.3, 7.EE.3)**

If the sales tax rate is 10% and Kate buys a candy bar for $1, how much tax will she pay?

11. **ES 6, Demonstrator 2, Standard (7.RP.3, 7.EE.3)**

What is the sale price of a pair of shoes that originally cost $15.74, if the shoes are 50% off?

12. **ES 6, Demonstrator 2, Standard (7.RP.3, 7.EE.3)**

Walmart is running an ad for 25% off iPods. The original price of the iPod is $103.50. How much is the iPod after the sale?

13. **ES 6, Demonstrator 2, Standard (7.RP.3, 7.EE.3)**

If you buy a sweater for $25 this weekend and see the same sweater the next weekend but now it is 30% off. How much would you have saved if you bought the sweater next weekend?

14. **ES 6, Demonstrator 2, Standard (7.RP.3, 7.EE.3)**

T-shirts are on sale for 25% off. The sale price is $18.75. What was the original price of the t-shirts?

15. **ES 6, Demonstrator 2, Standard (7.RP.3, 7.EE.3)**
Rick bought his wife a diamond ring. The store purchased the ring for $650 and marked up the price 100%. If the sales tax is 10% how much did Rick pay total for the ring?

16. **ES 6, Demonstrator 2, Standard (7.RP.3, 7.EE.3)**

Donna has $250 in her savings account. The savings account earns 15% interest per year. If the interest is not compounded, how much interest will she earn in one year?

17. **ES 6, Demonstrator 2, Standard (7.RP.3, 7.EE.3)**

The furniture store bought a coffee table for $40 and sold it for a 50% markup. If Ted makes 10% commission, how many coffee tables will Ted have to sell to make $30?

18. **ES 6, Demonstrator 2, Standard (7.RP.3, 7.EE.3)**

John took his friends out to dinner. The bill came to $100. If the tax is 9% and John gave the waiter $120, how much change should John get back?

19. **ES 6, Demonstrator 2, Standard (7.RP.3, 7.EE.3)**

Please solve. $40\% \ of \ \_\_\_\_\_ = 54$

20. **ES 6, Demonstrator 2, Standard (7.RP.3, 7.EE.3)**

Please solve. $70\% \ of \ \_\_\_\_\_ = 161$

21. **ES 6, Demonstrator 2, Standard (7.RP.3, 7.EE.3)**

Mel paid $25 for his dinner. The tax is 10%. Mel also gave the waiter a $5 tip. If Mel gives the waiter a $100 bill, how much change does Mel get back?

22. ES 6, Demonstrator 3, Standard (7.EE.3, 7.G.1)

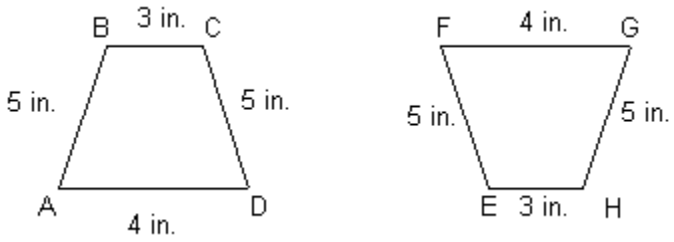
Mark's best friend's house is 9 kilometers away from his house. On a map of the area the houses are 3 centimeters away. What scale does the map use?
1 centimeter = ? kilometers

23. ES 6, Demonstrator 3, Standard (7.EE.3, 7.G.1)

Rick is a pizza delivery driver. The house he is delivering to is 6 miles away. How far apart is the pizza restaurant and the customer's home on a map with a scale of 1 inch = 2 miles?

24. ES 6, Demonstrator 3, Standard (7.EE.3, 7.G.1)

Are the shapes congruent?

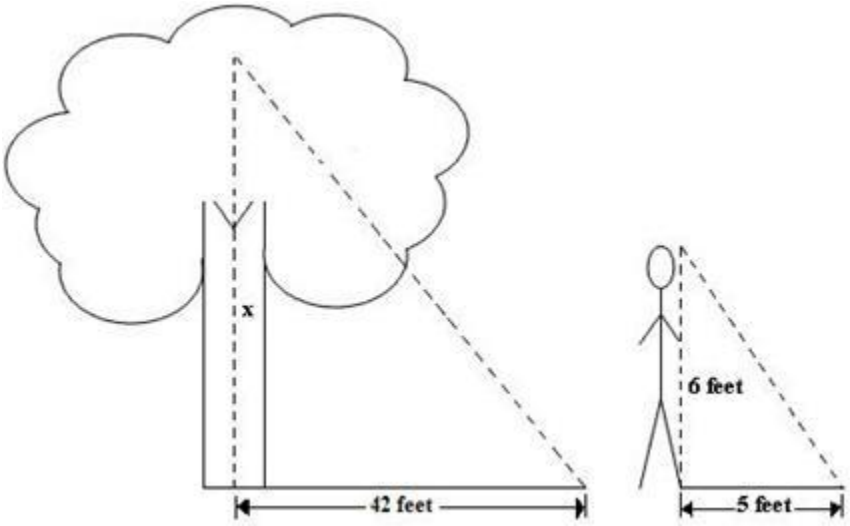


25. ES 6, Demonstrator 3, Standard (7.EE.3, 7.G.1)

Steve and his friend are going on a long distance bike ride. The two will be traveling from their hometown to a town due south. On a map the towns are 93 centimeters apart. What is the actual distance between the two cities if the scale of the map is 1 centimeter = 1 kilometer?

26. ES 6, Demonstrator 3, Standard (7.EE.3, 7.G.1)

A man, who has a height of 6 feet, casts a shadow that is 5 feet long. How tall is a tree that casts a shadow that is 42 feet long?



27. ES 6, Demonstrator 3, Standard (7.EE.3, 7.G.1)

A 5 foot tall person has a femur that is about 15 inches long. If a group of make believe people are 6 inches tall, what is the length of the make believe person's femur? Imagine that the make believe people have similar body's as humans.

28. ES 6, Demonstrator 3, Standard (7.EE.3, 7.G.1)

If a square has a side length of 5 in and the dimensions are tripled, which of following statements about the square will be true?

a) The new perimeter will be .33 of the original perimeter.
b) The new perimeter will be 2 times the original perimeter.
c) The new perimeter will be 3 times the original perimeter.
d) The new perimeter will be .5 times the original perimeter.