FLAG MATH

1. The original dimensions of the garrison flag sewn by Mary Pickersgill and flown before and after the battle at Fort McHenry were 30 feet by 42 feet.

 a. What were the dimensions in inches?

 b. What was the area in square feet of the original garrison flag?

2. The original dimensions of the storm flag sewn by Mary Pickersgill were 17 feet by 25 feet.

 a. What were the dimensions in inches?

 b. What was the area in square feet of the original storm flag?

3. Mary Pickersgill used four-hundred yards of woolen bunting to make the garrison flag. Express this amount in feet and inches.

4. The garrison and storm flags were sewn in 1813. How old are they today?

5. Mary Pickersgill and her team used more than one million stitches to sew the garrison flag. Express this as a number and write in scientific notation.

6. The government paid Mary Pickersgill $405.90 for making the garrison flag and $168.54 for making the storm flag.

 a. What was the total cost of the two flags?

 b. How much more did the garrison flag cost than the storm flag cost?

7. The red and white stripes on the garrison flag were all the same height. Examine the picture of the flag and determine the height of each stripe.

 a. Give the height of each stripe in inches.

 b. Give the height of each stripe in feet.

 c. Determine the height of the blue quadrilateral section of the flag:

 inches \_\_\_\_\_\_\_\_\_\_\_\_\_ feet \_\_\_\_\_\_\_\_\_\_\_\_\_\_

 d. Given that the blue section is actually a square, find the area of the square. Express the area in square inches AND in square feet.

 A = \_\_\_\_\_\_\_\_\_\_ in2 A = \_\_\_\_\_\_\_\_\_\_\_ ft2

e. List at least four requirements/characteristics of a square.

f. Determine what percentage of the garrison flag was represented with the blue section. Round to the nearest percentage if necessary. Also express the percentage as a decimal and as a fraction in simplest form.

 \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_

 percent decimal fraction

8. Refer back to #1 to get the area of the original garrison flag.

Over time, the flag deteriorated and people cut off small pieces to give to veterans, government officials and special citizens. By the time the Smithsonian Museum received the flag, more than eight feet of the length of the flag was missing.

 a. What were the new dimensions of the flag?

 b. What was the area of the remaining flag?

 c. What percentage of the original flag has been lost?

 d. *True or False:*  Over two-hundred square feet of the original garrison

 flag was given away over the years.

9. Today, the standard size for a garrison flag for the U.S. Army is 20 feet by 38 feet.

 a. What are these dimensions in inches?

 b. What are these dimensions in meters?

 c. What is the area of this flag in square feet?

 d. What percent of the original Star Spangled Banner flag’s area is the current U.S. Army’s garrison flag area?

 e. What is the percent of change between the areas of these two flags?

10. In 1914, the Smithsonian Museum hired Amelia Fowler to restore the garrison flag. She and 10 needlewomen sewed linen to the back of the flag in an attempt to keep the flag intact as much as possible. She charged the museum a total of $1,243. From this amount, Amelia Fowler had spent $243 on materials and she kept $500 for herself. If the remaining amount was distributed equally among the needlewomen, how much did each woman receive?

11. During the 10-year restoration project that began in 2000, conservators tediously snipped about 1.7 million stitches by hand to remove the linen backing that Amelia Fowler and her needlewomen had sewn to the flag in 1914. Write 1.7 million as a regular number and in scientific notation.

12. In order to get an idea of the size of the original garrison flag, you can use a modern day basketball court. The dimensions of the rectangular court are 94 feet by 50 feet. The garrison flag was approximately one-fourth the size of today’s basketball court.

 a. What is the area of today’s basketball court?

 b. What is one-fourth of the area of the basketball court?

 c. Write a complete sentence comparing the results from parts a and b.

13. When Francis Scott Key saw the garrison flag flying at dawn after the battle at Fort McHenry, he was on a British ship 8 miles down the river. How many nautical miles does this represent? Express your result rounded to the nearest hundredths place, tenths place and whole number.

14. The stars on the garrison flag were five-pointed stars which have rotational symmetry. What is the angle of rotation for a five-pointed star?

15. During the battle at Fort McHenry, the British shot approximately fifteen hundred cannon balls that were each about 190 pounds of cast iron bombs. What was the total amount of cast iron used by the British in this battle?

16. The range of the British rockets was 1 ¾ miles, but the American range was only 1.5 miles. How much more range did the British rockets have than the Americans?

17. Thirteen fragments of the garrison flag have been found and can be seen in places such as the Smithsonian Museum and on location at Fort McHenry. What names can you apply to the number thirteen?

18. The original garrison flag had fifteen stripes and fifteen stars. What names can you apply to the number fifteen?

19. The original garrison flag had 15 stars to represent the original 13 colonies and the next 2 states, Kentucky and Vermont. One of the stars was apparently cut out and given to someone, so now there are only 14 stars on the flag. What percentage of stars remains on the flag?

20. Imagine that each star had been labeled on the back with the name of the colony/state that it represented. Then imagine that you could close your eyes and randomly select one of the stars from the original flag.

 a. What is the probability that you would select a star labeled as one of the original colonies?

 b. What is the probability that you would select a star labeled as one of the new states?

(continue to next page for answers)

ANSWERS

1. a) 360 in by 504 in b) A = 1,260 ft2

2. a) 204 in by 300 in b) A = 425 ft2

3. 1,200 ft 14,400 in

4. 201 years

5. 1,000,000 1.0 x 106

6. a) $574.44 b) $237.36

7. a) flag was 360 inches tall; there were 15 stripes; each stripe is 24 in tall

 b) each stripe is 2 ft tall

 c) blue section is 8 stripes tall 192 in tall 16 ft tall

 d) A = 36,864 in2 A = 256 ft2

 e) (sample answers) opposite sides are parallel

 all four sides are congruent all four angles are right angles (90̊̊ ̊)

 diagonals are congruent

 diagonals are perpendicular

 diagonals bisect each other

 f) about 20% 0.20 1/5

8. a) 30 ft by 34 ft b) A = 1,020 ft2 c) about 19% d) true

9. a) 240 in by 456 in b) 6.096 m by 11.5824 m c) A = 760 ft2

 d) about 60% e) approximately 40% decrease

10. $50 each

11. 1,700,000 1.7 x 106

12. a) A = 4,700 ft2 b) 1,175 ft2

 c) (sample answer) The area of the original flag is slightly larger than

 one-fourth of the rectangular basketball court.

13. 8 miles = 42,240 ft 8 miles = 6.95 nautical miles (hundredths place)

 7.0 nautical miles (tenths place)

 7 (whole number)

14. 72 ̊

15. 285,000 pounds

16. ¼ miles or 0.25 miles

17. whole counting natural integer rational positive real prime

18. whole counting natural integer rational positive real composite

19. 14/15 about 93%

20. a) 13/15 b) 2/15