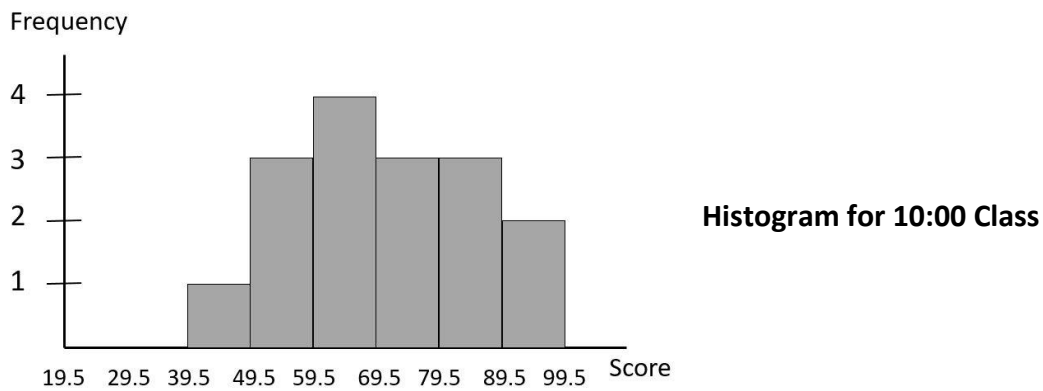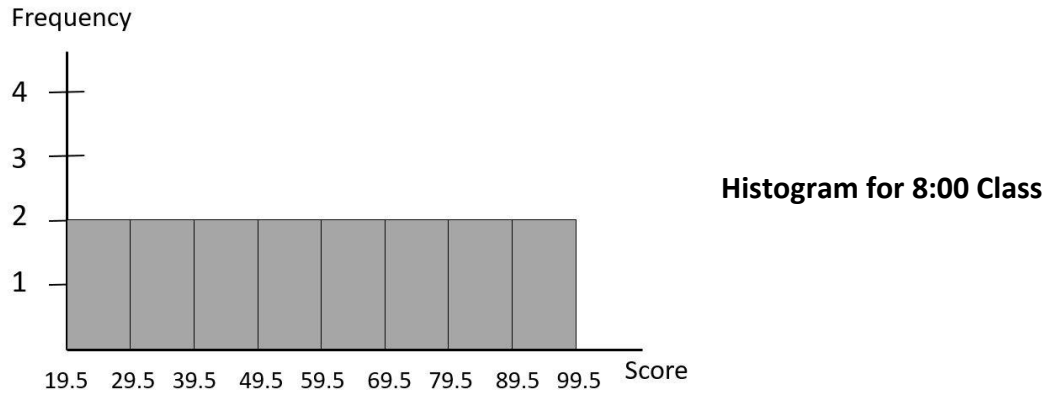1. How many $\frac{2}{3}$ cup servings are in $\frac{3}{4}$ of a cup of yogurt?

   a. $\frac{1}{2}$ b. $\frac{8}{9}$ c. $1\frac{1}{8}$ d. $1\frac{1}{12}$ e. 2

2. If X is 6 more than Y, which of the following is true?

   a. $6 - Y = X$
   b. $Y = 6 + X$
   c. $X + Y = 6$
   d. $Y - X = 6$
   e. $X - Y = 6$

3. On Planet Galactica, common units of distance are alpha, beta, and gamma.
   4 gammas equal 5 betas. 2 betas equal 3 alphas. How many alphas equal 1 gamma?

   a. $1\frac{7}{8}$ b. $\frac{8}{15}$ c. $\frac{5}{6}$ d. $1\frac{1}{6}$ e. $1\frac{5}{6}$

4. $3.0000004\overline{12}$ written as a fraction is

   a. $\dfrac{750,000,103}{250,000,000}$

   b. $\dfrac{2,041,875,281}{680,625,000}$

   c. $\dfrac{300,000,041}{100,000,000}$

   d. $\dfrac{371,250,051}{123,750,000}$

   e. $3.0000004\overline{12}$ cannot be written as a fraction.

5. Mr. Green's 8 o'clock and 10 o'clock 6th grade math classes each have 16 students. Mr. Green gave the same test to each class on April 1, 2020. Histograms showing the result for each class follow.

Frequency

Histogram for 8:00 Class

Frequency

Histogram for 10:00 Class

Which statement is true?

a. The median score in the 8:00 class was greater than the median score in the 10:00 class, but the variability of the scores was less in the 8:00 class than in the 10:00 class.

b. The median score in the 8:00 class was greater than the median score in the 10:00 class, and the variability of the scores was more in the 8:00 class than in the 10:00 class.

c. The median score in the 8:00 class was less than the median score in the 10:00 class, and the variability of the scores was less in the 8:00 class than in the 10:00 class.

d. The median score in the 8:00 class was less than the median score in the 10:00 class, but the variability of the scores was more in the 8:00 class than in the 10:00 class.

e. It is impossible to tell from the histogram which class had the highest median score and which class had the most variability in the scores.

6. Which of the following statements is not true?
   a. Every square is a rhombus.
   b. There is a rhombus that is also a rectangle.
   c. Every rhombus is a parallelogram.
   d. Every rectangle is a parallelogram.
   e. There is a square which is not a rectangle.

7. A quadrilateral has vertices at the following points in the coordinate plane:
   $(2,3), (-4,3), (-4,-1), (2,-1)$ What is the perimeter of the quadrilateral?

   a. 12 units
   b. 16 units
   c. 18 units
   d. 20 units
   e. 24 units

8. Here is some information about two rational numbers: One is 7 more than the other, and it is also 5 times the other.   What is the largest of the two numbers?

   a. $7\frac{3}{5}$ b. $8\frac{3}{4}$ c. $8\frac{4}{5}$ d. $9\frac{1}{4}$ e. $9\frac{3}{4}$

9. Below is the net for a three-dimensional solid.   What is the solid?
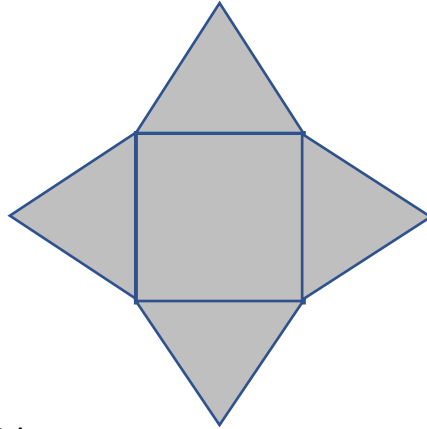
a. Cube
b. Triangular Prism
c. Square Prism
d. Cone
e. Square Pyramid

10. Sandra's mother has agreed to help her purchase a video game. For every $4 that Sandra contributes, her mother will contribute $3. The game costs $84. How much will Sandra's mother contribute?

a. $21   b. $28   c. $36   d. $38   e. $48

11. At stop 1, one-third of the people on a large double-decker bus get off. Then at stop 2, one-half of those still remaining after the first stop get off. Then at stop 3, three-fourths of those still remaining after the second stop get off. This leaves 27 people on the bus. How many were on the bus originally?

a. 96   b. 108   c. 216   d. 243   e. 324

12. Sam's yard is twice as big as Ron's yard, but Sam mows his yard in two-thirds of the time it takes Ron to mow his yard. Which of the following statements is true?
a. Sam mows $4\frac{1}{3}$ times as fast as Ron mows.
b. Sam mows 3 times as fast as Ron mows.
c. Sam mows $2\frac{2}{3}$ times as fast as Ron mows.
d. Sam mows twice as fast as Ron mows.
e. Sam mows $1\frac{1}{3}$ times as fast as Ron mows.

13. The largest gear in the picture has 12 teeth, and the smallest gear has 8 teeth. As the large gear is turned, the small gear turns also. The large gear is turned repeatedly, producing the data in the table below.
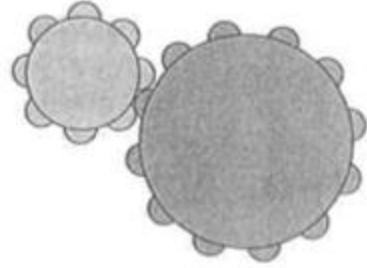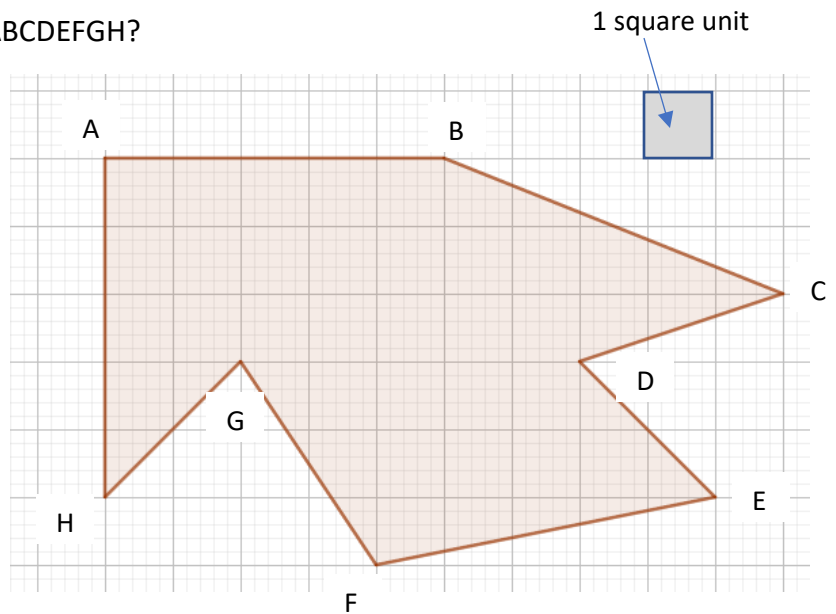
Number of turns of the large gear	Number of turns of the small gear
2	3
4	6
6	9
8	12
10	15
12	18
14	21

When the number of turns of the large gear is 5112, what will be the number of turns of the small gear?
a. 3408
b. 3832
c. 7667
d. 7668
e. 7671

14. What is the area of polygon ABCDEFGH?
a. 39 square units
b. 40 square units
c. 41 square units
d. 48 square units
e. 49 square units

1 square unit

15. Sally walks for 30 minutes. For the first 5 minutes, she walks at a constant speed. For the next 5 minutes she walks one and a half times as fast as she walked during the first 5 minutes. Then during the next 10 minutes she walks twice as fast as she walked in the first 5 minutes. For the next five minutes she walks one and a half times as fast as she walked during the first 5 minutes. Then for the last 5 minutes she walks the same speed as she walked for the first 5 minutes. Sally walked a mile in all. How fast did she walk during the first 5 minutes? Give your answer in miles per minute.

a. $\dfrac{1}{30}\ \dfrac{miles}{minute}$

b. $\dfrac{1}{35}\ \dfrac{miles}{minute}$

c. $\dfrac{1}{40}\ \dfrac{miles}{minute}$

d. $\dfrac{1}{45}\ \dfrac{miles}{minute}$

e. $\dfrac{1}{50}\ \dfrac{miles}{minute}$

16. A right circular cylinder has a volume of 100 cubic centimeters. Another right circular cylinder has the same height, but the radius of the base is twice the radius of the base of the first cylinder. What is the volume of the other cylinder?

Right circular cylinder

a. 200 cubic centimeters
b. 300 cubic centimeters
c. 400 cubic centimeters
d. 200 π cubic centimeters
e. 350 π cubic centimeters
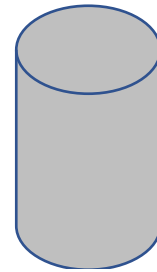
17. Simplify $\dfrac{\left(a^7\right)^6}{\left(a^4\right)^2 \cdot \left(a^3\right)^4}$

a. 1
b. a
c. a^{22}
d. a^{29}
e. $\dfrac{1}{a^7}$

18. What is the 1000ᵗʰ number in the sequence: 2, 5, 8, 11, 14, 17, 20, 23… ?

    a. 2,996
    b. 2,999
    c. 3,000
    d. 3,002
    e. 3,003

19. Raj leaves his home at 7:00 a.m. and walks until 7:30 a.m. The graph below shows his distance from home at each instant of the 30 minute walk.
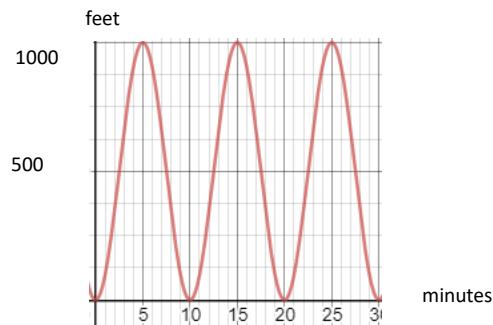
Consider the following statements.
    i.   The furthest Raj got from home was 1000 feet.
    ii.   Raj walked a total of 6000 feet.
    iii.   Raj ended up at home at the end of his 30 minute walk.
    iv.   Raj walked up three hills.

Which must be true?
    a. All must be true.
    b. Only i, iii, iv must be true.
    c. Only i, ii, iii must be true.
    d. Only ii, iii, iv must be true.
   e. Only i and iii must be true

20. Mrs. Huang has 31 yards of fabric. It takes $\frac{3}{5}$ yard of fabric to make a flag. Which of the following statements is true?
    a. Mrs. Huang can make 52 flags.
    b. Mrs. Huang can make 51 flags and will have 2/3 yard off fabric left over.
    c. Mrs. Huang can make 51 flags and will have 2/5 yard of fabric left over.
    d. Mrs. Huang can make 19 flags.
    e. Mrs. Huang can make 18 flags and will have 3/5 yard of fabric left over.

21. An outfit consists of a shirt and pants, with optional vest. If there are 7 choices of shirts, 6 choices of pants, and 3 choices of vests (red, blue, green), how many outfits are possible?

    a. 168
    b. 126
    c. 156
    d. 133
    e. 16

22. Cocoa drink is made by mixing milk and cocoa powder. Pictured below are two identical sized thermos containers, each having some cocoa drink in them.   Both drinks were made using the same kind of milk and the same kind of cocoa powder.
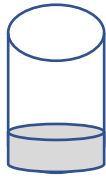

Thermos A   Thermos B

However, the cocoa drink in Thermos A has a stronger cocoa taste than the cocoa drink in Thermos B. Which of the following statements must be true?

    a. More cocoa powder went into thermos A than into thermos B.
    b. More milk went into thermos B than into thermos A.
    c. One of the statements a) or b) must be true, but we don't know which.
    d. The ratio of the amount of cocoa powder to the amount of milk in thermos A is higher than the ratio of the amount of cocoa powder to the amount of milk in thermos B.
    e. The ratio of the amount of milk to the amount of cocoa powder in thermos A is higher than the ratio of the amount of milk to the amount of cocoa powder in thermos B.

23. Mr. Kaplan's salary increases by 5 percent each year.   If his salary for 2016 was $60,000, what will his salary for 2021 be?

    a. $80,406
    b. $78,000
    c. $76,577
    d. $75,000
    e. $72,930

24. If the quadrilateral below is reflected about the y-axis and then the result reflected about the x-axis, what will be coordinates of the image of point A?
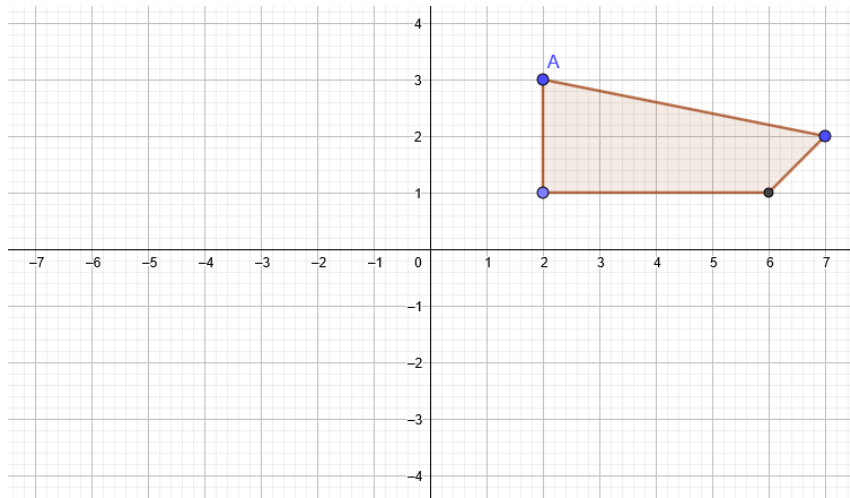
a. $(-2, -3)$
b. $(-3, -2)$
c. $(-2, 3)$
d. $(3, -2)$
e. $(2, -3)$

25. Mrs. Allen gave a test in her 9:00 a.m. 6th grade math class of 12 students. Below is a box and whisker plot of the scores on this test. Which of the following sets of test scores could not have occurred?
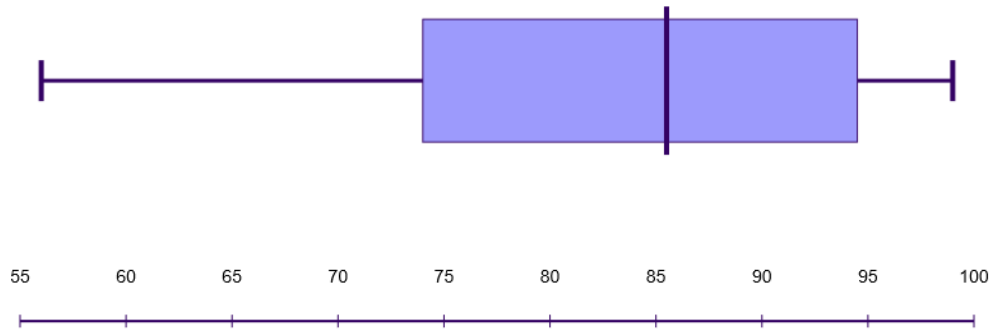
a. 56, 66, 70, 78, 82, 83, 88, 90, 92, 97, 99, 99

b. 56, 68, 68, 78, 82, 82, 82, 90, 92, 97, 99, 99

c. 56, 56, 70, 78, 82, 83, 88, 90, 92, 97, 97, 99

d. 56, 56, 70, 78, 78, 83, 88, 88, 92, 97, 99, 99

e. 56, 57, 70, 78, 82, 83, 88, 90, 92, 97, 99, 99

26. Of the numbers listed below, which is the greatest distance from 0 on the number line?

$$\frac{79}{100}, \quad \frac{-4}{5}, \quad \frac{-98}{99}, \quad \frac{100}{129}, \quad \frac{78}{79}$$

a. $\dfrac{79}{100}$

b. $\dfrac{-4}{5}$

c. $\dfrac{-98}{99}$

d. $\dfrac{100}{129}$

e. $\dfrac{78}{79}$

27. On Planet Galactica, two measures of temperature are degrees Frands and degrees Crands. The relationship between degrees Crands (C) and degrees Frands (F) is

$C = \frac{2}{3}(F - 6)^2 - \left(\frac{F^3}{3} + 2\right)$. If the temperature is 24 degrees Frands, how many degrees Crands is it?

a. -4394
b. -4250
c. -4618
d. 4394
e. 4250

28. Consider the following statements.

    i. $|a| > |b|$
    ii. $-a > -b$
    iii. $-a + b > 0$

Which of these statements are always true, provided a and b are integers and $a > b$?

a. i, ii, iii
b. Only ii and iii
c. Only i
d. Only i and ii
e. None

29. The greatest common divisor of two numbers is 9 and the least common multiple is 108. Which of these could be the difference in the numbers?

   a. 9
   b. 18
   c. 27
   d. 36
   e. 45

30. Bellsouth Mobility charges $10 for cell phone service each month regardless of the number of calls made. In addition, it charges 2 cents per call. If C is the number of calls made in a month and B is the phone bill (in dollars) for that month, which equation represents B in terms of C?

   a. $B = 10 + 2C$
   b. $B = 10 + .02C$
   c. $B = 2 + 10C$
   d. $C = 10 + .02B$
   e. $B = .02(C + 10)$