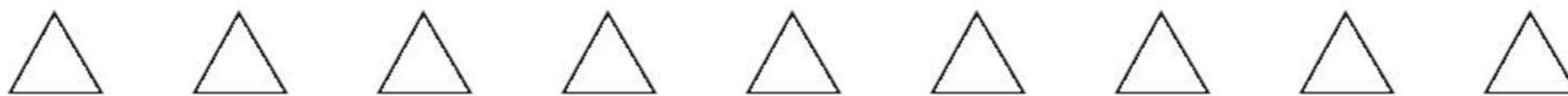


2



2

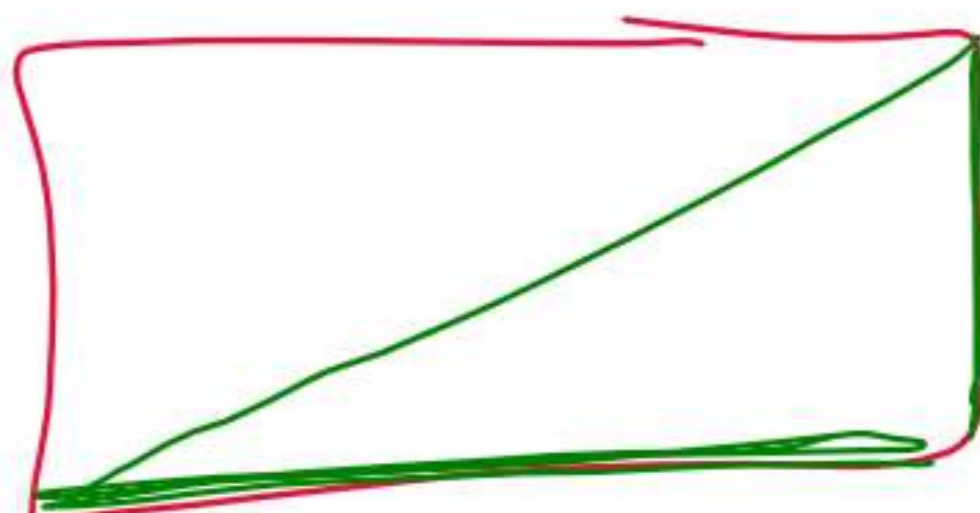
22. Which of the following expressions is equal to  $\sqrt[3]{24}$  ? = 2.88

DO YOUR FIGURING HERE.

- ~~A.~~ 2
- ~~B.~~ 8
- H.**  $2\sqrt[3]{3} = 2.88$
- J.  $2\sqrt[3]{6}$
- K.  $2\sqrt{2}$

23. On a rectangular sheet of paper, Aiko drew a triangle whose base length is the same as the length of the sheet and whose height is the same as the width of the sheet. What is the ratio of the area of the triangle to the area of the rectangular sheet of paper?

- A.  $\frac{1}{4}$
- B.  $\frac{1}{3}$
- C.**  $\frac{1}{2}$
- D. 1
- E. 2



24. Norah invited 4 friends to a table tennis party. Each of the 5 people at the party played every other person exactly 1 time. The table below shows the number of games won by each player except Norah. There were no ties. How many games did Norah win?

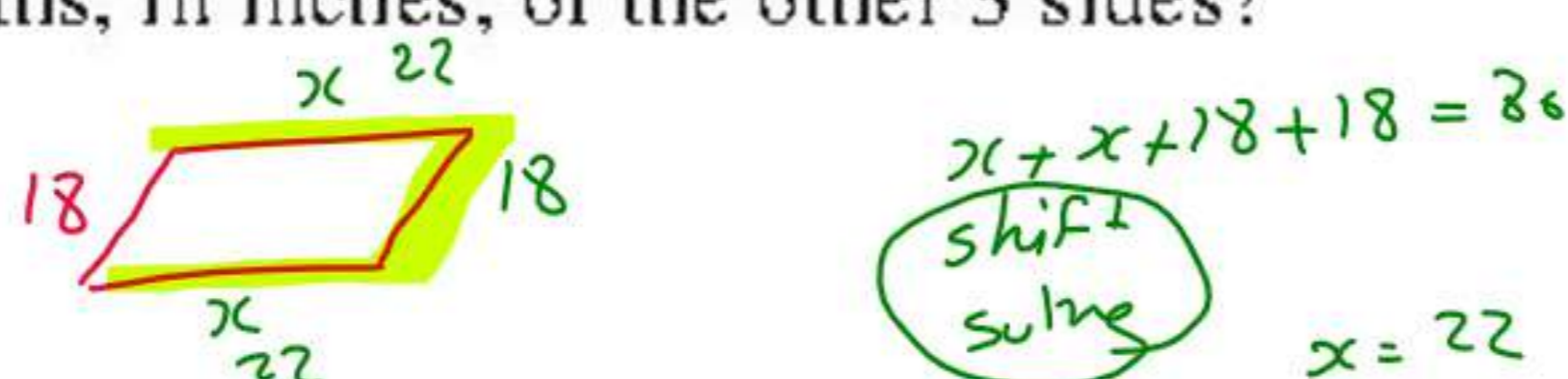
Player	Games won
Collier	2
Evangeline	1
Gabe	1
Norah	?
Maria	3

- E. 0
- G. 1
- H. 2
- J.** 3
- K. 4

$10 - 7 = 3$

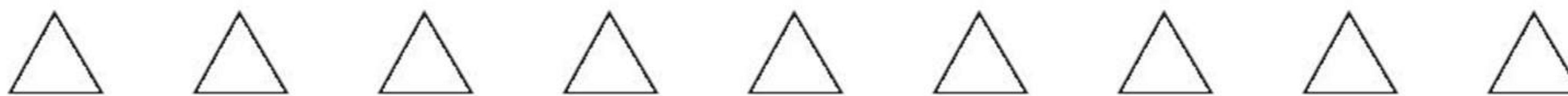
25. A **parallelogram** has a perimeter of 80 inches, and 1 of its sides measures 18 inches. If it can be determined, what are the lengths, in inches, of the other 3 sides?

- A. 18, 18, 26
- B. 18, 13, 13
- C.** 18, 22, 22
- D. 18, 31, 31
- E. Cannot be determined from the given information



GO ON TO THE NEXT PAGE.

2

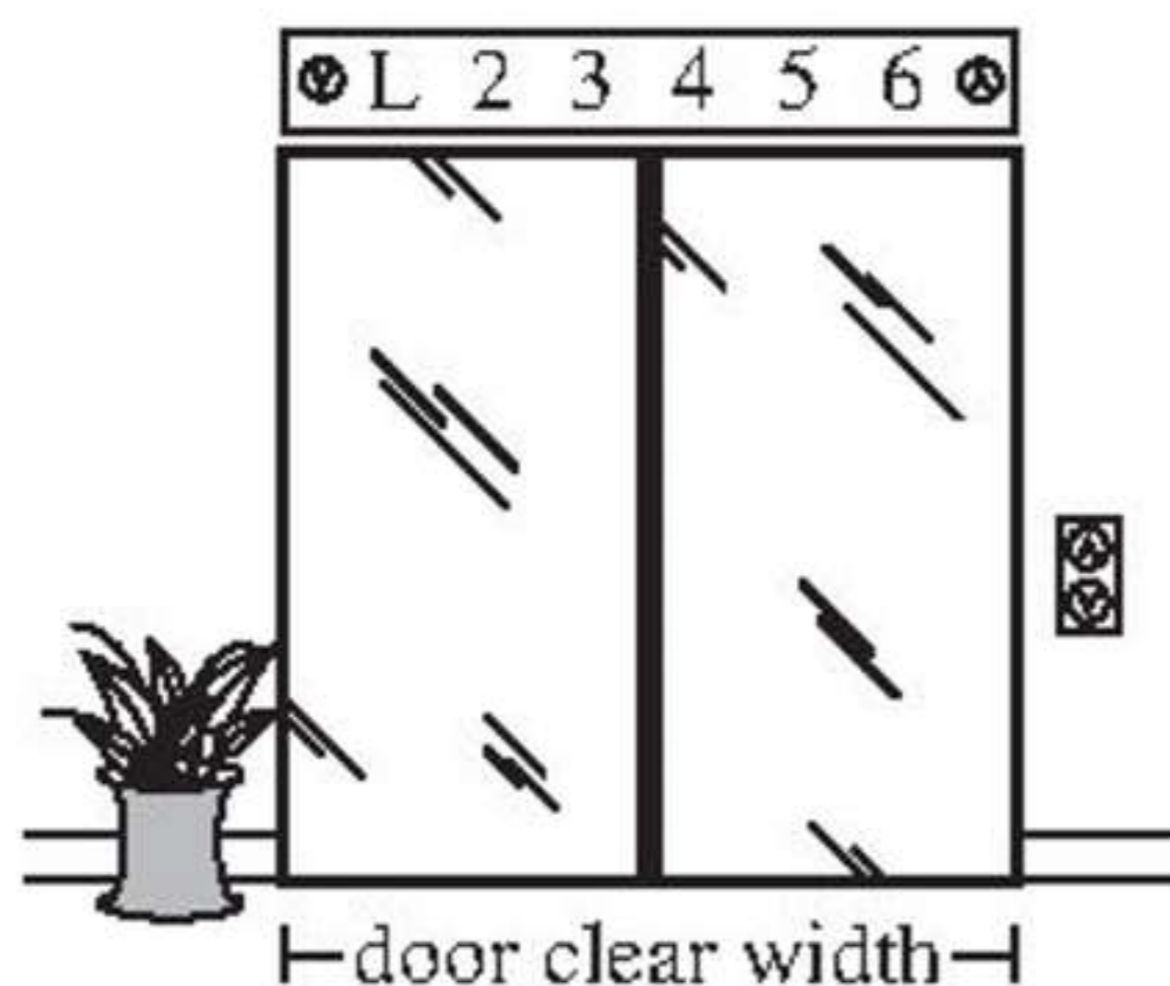


2

DO YOUR FIGURING HERE.

Use the following information to answer questions 26–28.

The 2010 ADA Standards for Accessible Design require that elevator cars with centered doors, like the one shown below, have a **minimum door clear width of 42 inches**. They also require a minimum number of wheelchair spaces in 1 assembly area, such as a classroom, based on the number of seats in the assembly area, as the table below indicates.



Number of seats in 1 assembly area	Minimum number of wheelchair spaces
4 to 25	1
26 to 50	2
51 to 150	4
151 to 300	5
301 to 500	6

26. Door clear widths, in **feet**, of 5 elevator cars with centered doors built before 2010 are listed below.

3.5, 3.6, 3.8, **3.2, 2.8**

**How many** of the elevator cars do **NOT** meet the 2010 ADA standard for minimum door clear width?

- F. 1
- G. 2**
- H. 3
- J. 4
- K. 5

$42 \div 12 = 3.5$

$1 \text{ yard} = 3 \text{ ft}$   
 $1 \text{ ft} = 12 \text{ inches}$

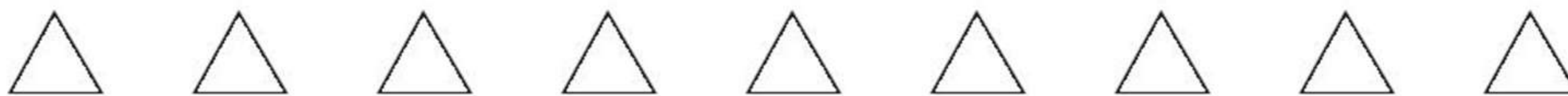
27. An elevator car with centered doors has a door clear width that is **8% wider than** the minimum distance required by the 2010 ADA standard. Which of the following distances, in inches, is closest to the door clear width of the elevator car?

- A. 43
- B. 45**
- C. 50
- D. 62
- E. 76

$1.08 \times 42 = 45$

GO ON TO THE NEXT PAGE.

2



2

28. A local college will construct a 2-floor building next year. Each of the 5 classrooms on the 1st floor will have 20 seats, and each of the 8 classrooms on the 2nd floor will have 35 seats. To comply with the 2010 ADA standard, what is the fewest total number of wheelchair spaces needed in the 13 classrooms?

DO YOUR FIGURING HERE.

- E. 4
- G. 6
- H. 11
- J. 13
- K. 21**

$$\begin{array}{r} 1 \times 5 = 5 \\ + 16 \\ \hline 21 \end{array}$$

29. A paint researcher collected the following data about the relationship between the paint level in a paint can and the surface area painted from this can.

distance from top of can (x inches)	surface area painted (y square feet)
3	96
7	224
11	352

Assume there is a linear relationship between  $x$  and  $y$ . Which of the following is an equation showing this relationship?

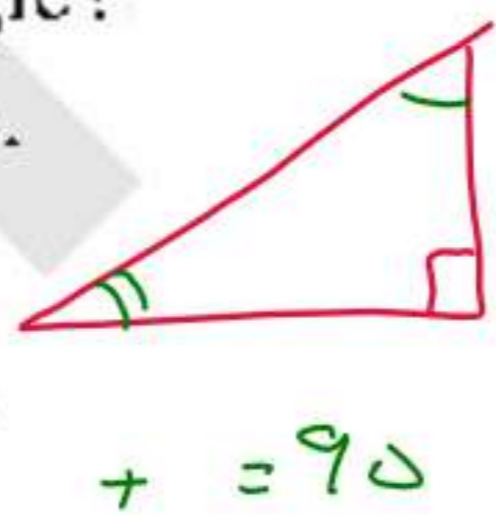
- A.  $y = 32x$**
- B.  $y = x + 96$
- C.  $y = x + 32$
- D.  $x = 32y$
- E.  $\frac{96}{3} = \frac{352}{11}$

$$\begin{array}{l} 32(3) = 96 \\ 32(7) = 224 \end{array}$$

$$\begin{array}{l} 5 = 5 \\ 7 = 7 \end{array}$$

30. Which of the following sentences is true about the 2 nonright angles of any right triangle?

- E. They are complementary angles.**
- G. They are congruent angles.
- H. They are obtuse angles.
- J. They are supplementary angles.
- K. They are vertical angles.



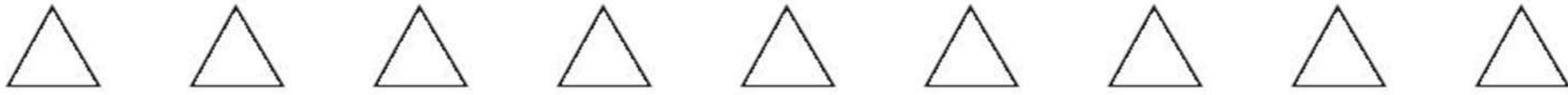
31. The temperature in Chicago was  $-4^{\circ}\text{F}$  at noon and rose  $24^{\circ}\text{F}$  by 3:00 p.m. The temperature in New Orleans was  $42^{\circ}\text{F}$  at noon and dropped  $24^{\circ}\text{F}$  by 3:00 p.m. How did the temperatures in Chicago and New Orleans compare at 3:00 p.m.?

- A. New Orleans was  $10^{\circ}\text{F}$  colder than Chicago.
- B. New Orleans was  $2^{\circ}\text{F}$  colder than Chicago.**
- C. The temperatures were the same.
- D. New Orleans was  $22^{\circ}\text{F}$  warmer than Chicago.
- E. New Orleans was  $46^{\circ}\text{F}$  warmer than Chicago.

$$\begin{array}{l} -4 + 24 = 20 \\ 42 - 24 = 18 \end{array}$$

GO ON TO THE NEXT PAGE.

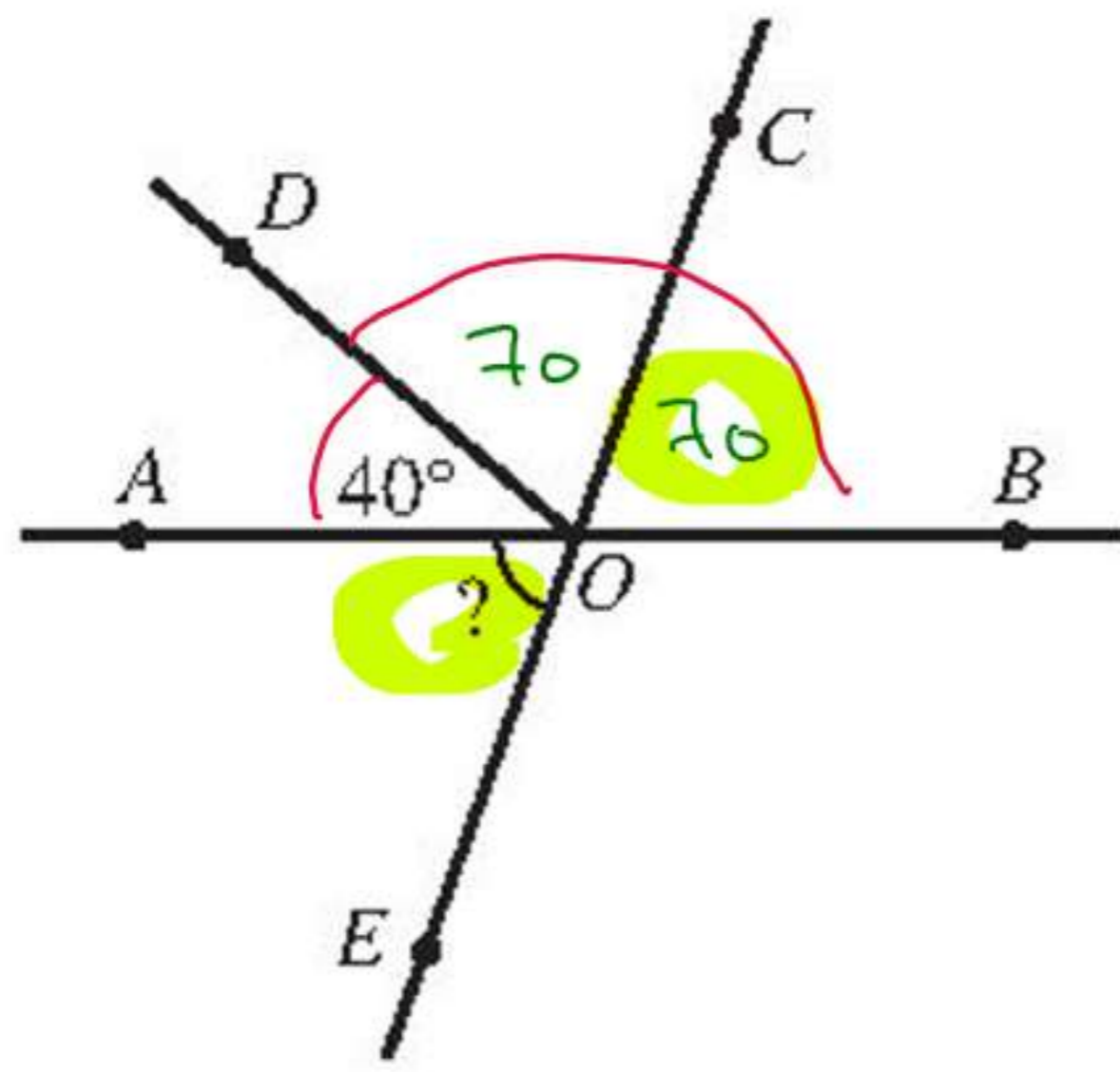
2



2

32. In the figure below,  $\overleftrightarrow{AB}$  and  $\overleftrightarrow{CE}$  intersect at  $O$ ,  $\overrightarrow{OC}$  bisects  $\angle BOD$ , and the measure of  $\angle AOD$  is  $40^\circ$ . What is the measure of  $\angle AOE$ ?

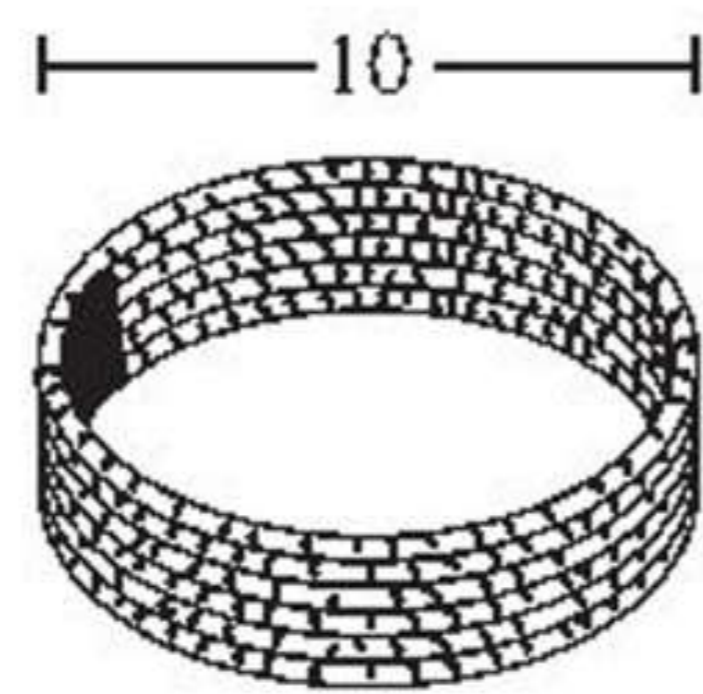
DO YOUR FIGURING HERE.



$180 - 40 = 140$

- E.  $40^\circ$
- G.  $50^\circ$
- H.  $60^\circ$
- J.  $70^\circ$
- K.  $80^\circ$

33. The entire length of a rope is coiled into 6 circular loops, each with a diameter of 10 inches, as shown below. Which of the following is closest to the length, in inches, of the rope?



$r = 5$   
 $C = 2\pi r \times 6$   
 $= 2\pi(5) \times 6$   
 $= 190$

- A. 30
- B. 80
- C. 95
- D. 190
- E. 315

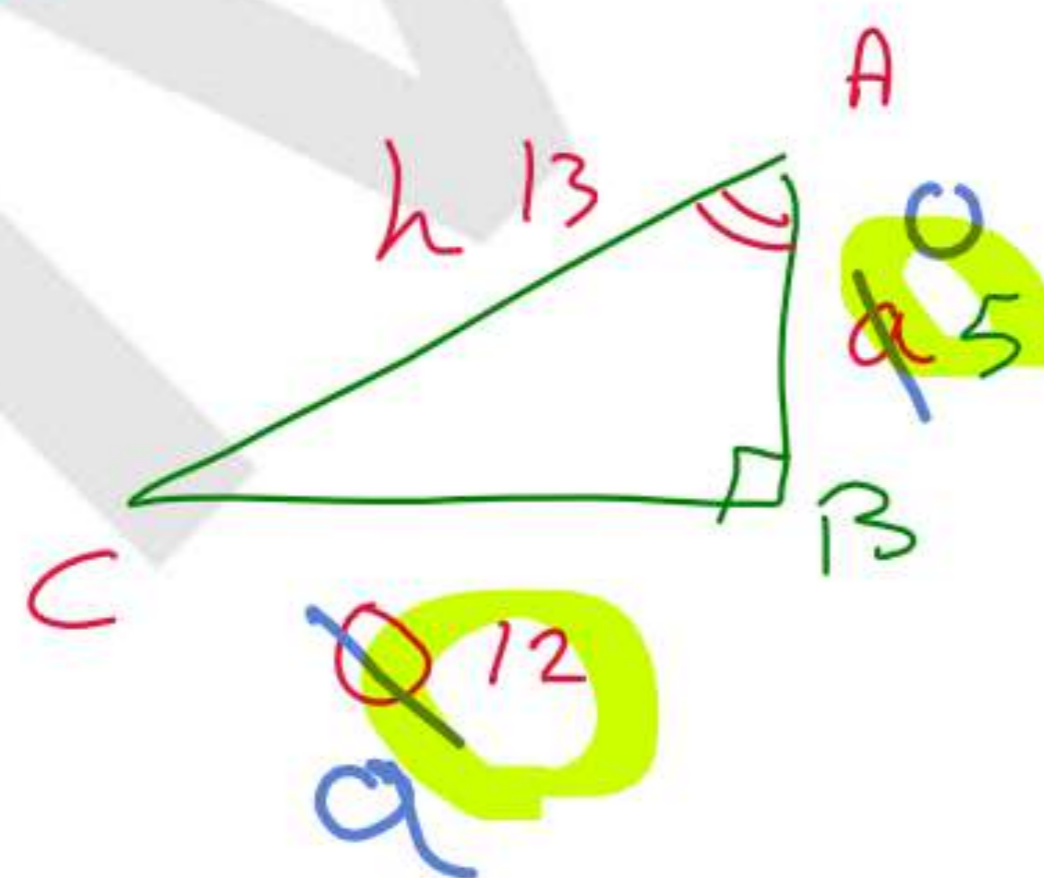
34. Given the matrix equation below, what is the value of  $ab$ ?

$\begin{bmatrix} 5 & -6 \\ 3 & 12 \end{bmatrix} + \begin{bmatrix} a & 2 \\ 0 & b \end{bmatrix} = \begin{bmatrix} 10 & -4 \\ 3 & 4 \end{bmatrix}$

$5 + a = 10$        $12 + b = 4$   
 $a = 5$        $b = -8$   
 $ab = (5)(-8)$   
 $= -40$

- F. -40
- G. -3
- H. -2
- J.  $-\frac{1}{3}$
- K.  $\frac{2}{3}$

35. In right triangle  $\triangle ABC$ , the right angle is at  $B$ , and  $\sin A = \frac{12}{13}$ . What is the value of  $\tan C$ ?



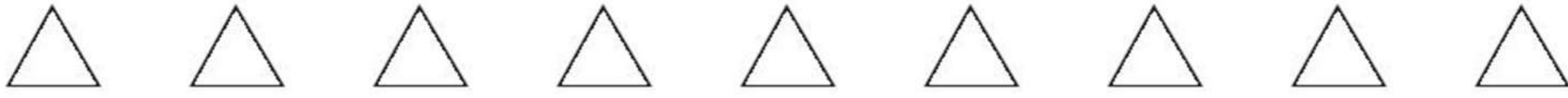
Soh  
Cah  
Toa

3, 4, 5  
5, 12, 13

- A.  $\frac{5}{12}$
- B.  $\frac{5}{13}$
- C.  $\frac{12}{5}$
- D.  $\frac{12}{13}$
- E.  $\frac{13}{5}$

GO ON TO THE NEXT PAGE.

2



2

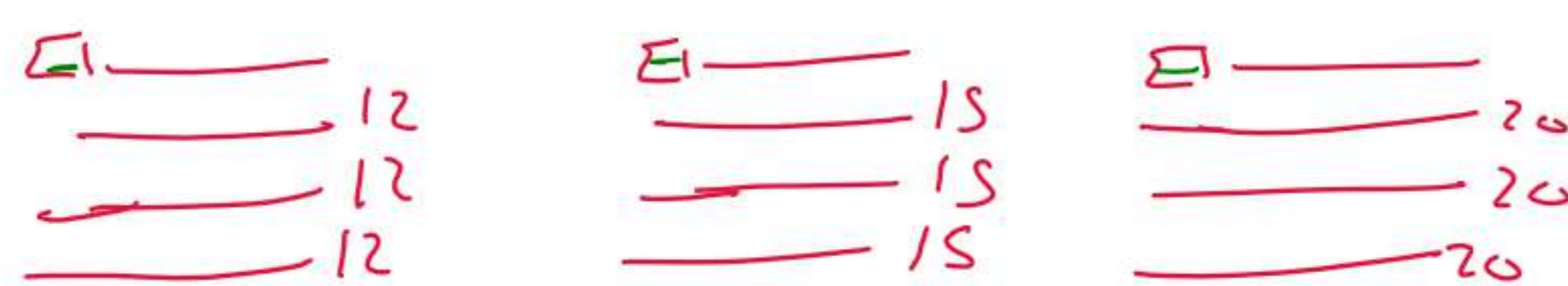
36. During rehearsal for the Founders' Day choir program, the director, Mrs. Mazurek, tried 3 different configurations, each using all the choir members at the rehearsal. One configuration was to have only rows of 12, one was to have only rows of 15, and one was to have only rows of 20. None of these configurations worked because for each, the last row had 1 person less than the other rows. What was the least of the possible numbers of choir members at the rehearsal?

DO YOUR FIGURING HERE.

$$\begin{aligned} &\div 12 \\ &\div 15 \\ &\div 20 \end{aligned}$$

$$\begin{aligned} 45 \div 12 &= 3 \times \\ 48 \div 12 &= 4 \\ 48 \div 15 &= 3 \times \\ 60 \div 12 &= 5 \\ 60 \div 15 &= 4 \\ 60 \div 20 &= 3 \end{aligned}$$

- F. 44 + 1 = 45
- G. 47 + 1 = 48
- H. 59 + 1 = 60
- J. 79
- K. 119



37. The equation  $x^2 + P = 0$ , where  $P$  is an integer, has 2 integer solutions for  $x$ . Which of the following is a possible value of  $P$ ?

- A. -48
- B. -36
- C. -10
- D. 36
- E. 48

$$\begin{aligned} x^2 - 48 &= 0 \\ x^2 &= 48 \\ x &= \pm\sqrt{48} \\ &= \pm 6.9 \end{aligned}$$

$$\begin{aligned} x^2 - 36 &= 0 \\ x^2 &= 36 \\ x &= \pm\sqrt{36} \\ x &= \pm 6 \end{aligned}$$

38. Of the 17 members of Xavier High School's honor society, 1 member will be chosen at random to attend a conference. The table below shows the number of honor society members according to class and whether they are in their first or second year in the honor society. What is the probability that the member chosen will NOT be a senior who is in his or her second year in the honor society?

	First year	Second year
Junior	2	0
Senior	8	<del>7</del>

- F.  $\frac{2}{17}$
- G.  $\frac{7}{17}$
- H.  $\frac{8}{17}$
- J.  $\frac{10}{17}$
- K.  $\frac{17}{17}$

$$\text{Prob.} = \frac{\text{Part}}{\text{Total}} = \frac{2 + 8 + 0}{2 + 8 + 0 + 7} = \frac{10}{17}$$

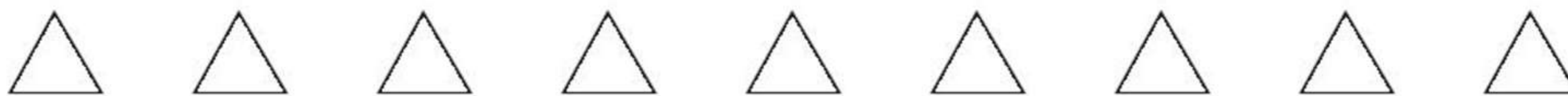
39. Given  $x = 4y$  and  $y = 2z$ , which of the following expressions is equivalent to  $x + 4y - 8z$  in terms of  $z$ ?

- A.  $-3z$
- B.  $-2z$
- C.  $2z$
- D.  $4z$
- E.  $8z$

$$\begin{aligned} 4y + 4y - 8z \\ 8y - 8z \\ 8(2z) - 8z \\ 16z - 8z = 8z \end{aligned}$$

GO ON TO THE NEXT PAGE.

2

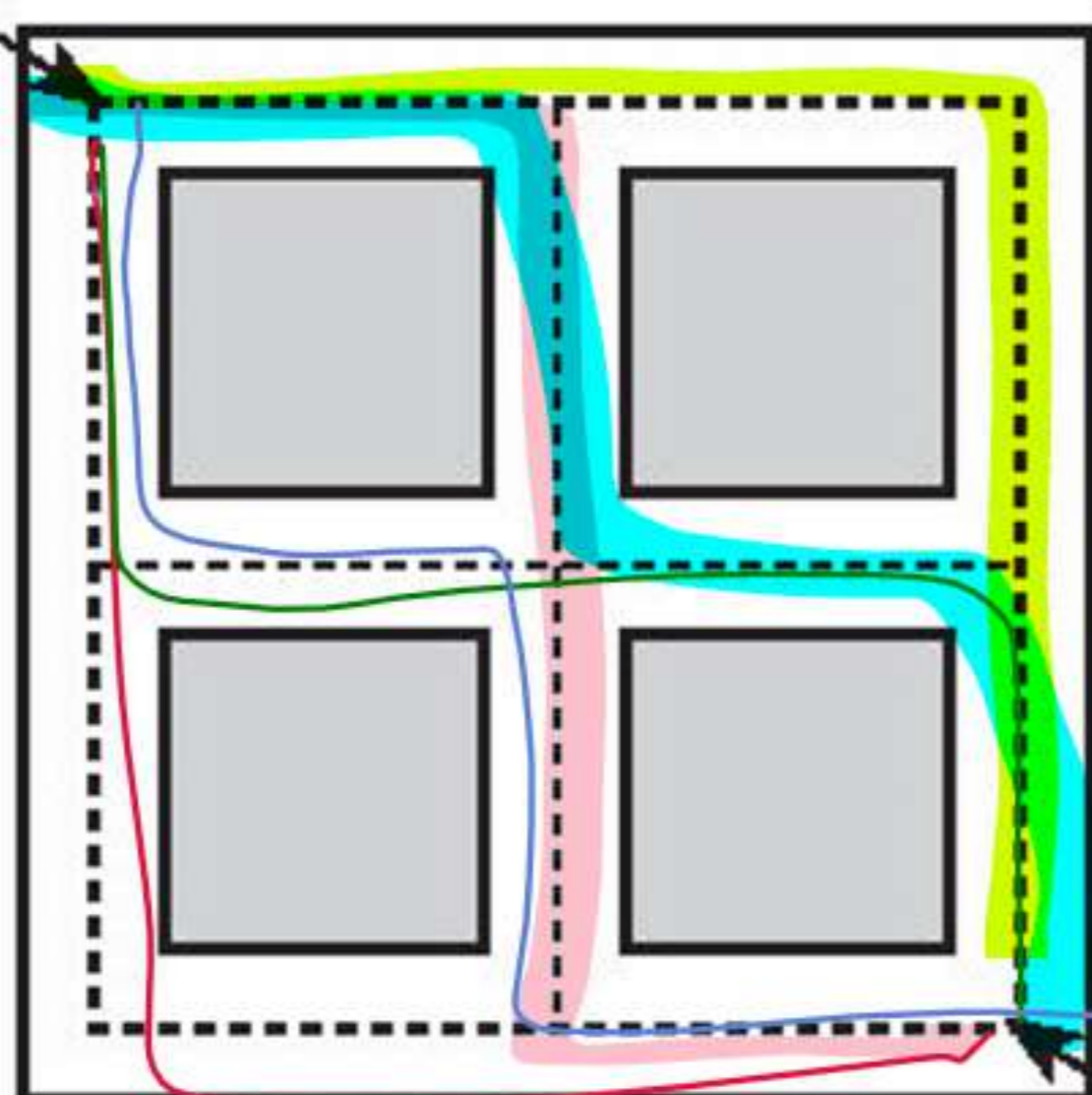


2

40. Using the street map shown below, you are directed to take a 4-block-long route to walk from First and Main Streets to Third and Market Streets. If each of the different 4-block-long routes consists of a unique sequence of streets, how many such routes could you take?

DO YOUR FIGURING HERE.

First and Main Streets



Third and Market Streets

- E. 4
- G. 6**
- H. 8
- J. 12
- K. 16

41. For  $i = \sqrt{-1}$ ,  $(3 + i)^2 = ?$

Mode 2

- A. -9
- B. 8
- C.  $8 + 6i$**
- D.  $6 + i$
- E.  $6 + 2i$

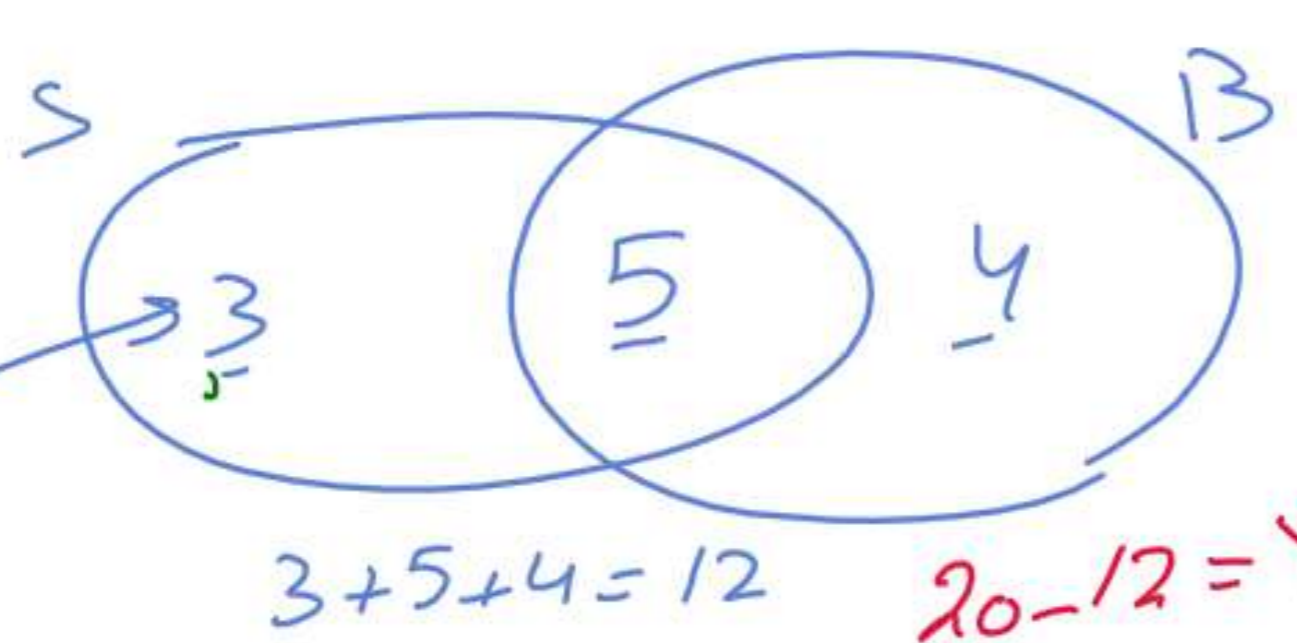
42. Define the functions  $f(x)$  and  $g(x)$  such that  $f(x) = 2x$  and  $g(x) = \sqrt{x+3}$ . For all  $x$  such that  $x \geq 3$ , which of the following expressions is equal to  $f(g(x))$ ?

- E.  $2\sqrt{x+3}$**
- G.  $2x\sqrt{x+3}$
- H.  $\sqrt{2x+3}$
- J.  $\sqrt{2x^2+3}$
- K.  $\sqrt{2x^2+6x}$

$2\sqrt{x+3}$

43. In a small high school with 20 seniors, 8 of the seniors are in soccer, 9 of the seniors are in band, and 5 of the seniors are in both. How many seniors are in neither soccer nor band?

- A. 15
- B. 12
- C. 11
- D. 8**
- E. 3



or  $8 + 9 - 5 = 12$

$20 - 12 = 8$

GO ON TO THE NEXT PAGE.