

**MTEL General Curriculum Mathematics 03**  
**Multiple Choice Practice Test B**  
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**Note:** This test is the same length as the multiple choice part of the official test, and the number of questions addressing each objective is close to the distribution on the official test. I used the official objectives and sample test to construct these questions, but I make no promises that they accurately reflect what's actually on the real test. Feel free to copy, distribute, and modify for any educational, non-profit use. See [terms of use](#). For interactive practice questions with hints, see <http://debraborkovitz.com/2011/11/mtel-practice-questions/>.

1) Which of the following is equal to one million three hundred thousand?

- A)  $1.3 \times 10^6$
- B)  $1.3 \times 10^9$
- C)  $1.03 \times 10^6$
- D)  $1.03 \times 10^9$

2) A class is using base-ten block to represent numbers. A large cube represents 1000, a flat represents 100, a rod represents 10, and a little cube represents 1. Which of these is not a correct representation for 2,347?

- A) 23 flats, 4 rods, 7 little cubes
- B) 2 large cubes, 3 flats, 47 rods
- C) 2 large cubes, 34 rods, 7 little cubes
- D) 2 large cubes, 3 flats, 4 rods, 7 little cubes

3) Which of the following is an irrational number?

- A)  $\sqrt[3]{8}$
- B)  $\sqrt{8}$
- C)  $\frac{1}{8}$
- D)  $-8$

4) If  $x$  is an integer, which of the following must also be an integer?

A)  $\frac{x}{2}$

B)  $\frac{2}{x}$

C)  $-x$

D)  $\sqrt{x}$

5) Use the expression below to answer the question that follows.

$$\frac{(7,154) \times (896)}{216}$$

Which of the following is the best estimate of the expression above?

A) 2,000

B) 3,000

C) 20,000

D) 30,000

6) Which of the lists below is in order from least to greatest value?

A)  $-0.044$ ,  $-0.04$ ,  $0.04$ ,  $0.044$

B)  $-0.04$ ,  $-0.044$ ,  $0.044$ ,  $0.04$

C)  $-0.04$ ,  $-0.044$ ,  $0.04$ ,  $0.044$

D)  $-0.044$ ,  $-0.04$ ,  $0.044$ ,  $0.04$

7) Which of the numbers below is not equivalent to 4%?

A)  $\frac{1}{25}$

B)  $\frac{4}{100}$

C) 0.4

D) 0.04

8) Given that 10 cm is approximately equal to 4 inches, which of the following expressions models a way to find out how many inches are equivalent to 350 cm?

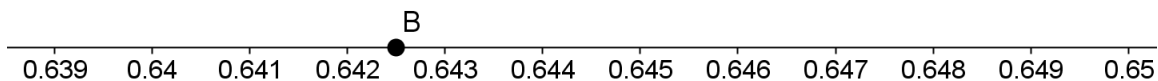
A)  $350 \times \left(\frac{10}{4}\right)$

B)  $350 \times \left(\frac{4}{10}\right)$

C)  $(10-4) \times 350$

D)  $(350-10) \times 4$

9) Below is a portion of a number line:



Point B is halfway between two tick marks. What number is represented by Point B?

A) 0.645

B) 0.6421

C) 0.6422

D) 0.6425

10) Kendra is trying to decide which fraction is greater,  $\frac{4}{7}$  or  $\frac{5}{8}$ . Which of the following answers shows the best reasoning?

A)  $\frac{4}{7}$  is  $\frac{3}{7}$  away from 1, and  $\frac{5}{8}$  is  $\frac{3}{8}$  away from 1. Since eighth's are smaller than seventh's,  $\frac{5}{8}$

is closer to 1, and is the greater of the two fractions.

B)  $7-4=3$  and  $8-5=3$ , so the fractions are equal.

C)  $4 \times 8 = 32$  and  $7 \times 5 = 35$ . Since  $32 < 35$ ,  $\frac{5}{8} < \frac{4}{7}$

D)  $4 < 5$  and  $7 < 8$ , so  $\frac{4}{7} < \frac{5}{8}$

11) The letters A, and B represent digits (possibly equal) in the ten digit number  $x = 1,438,152,A3B$ . For which values of A and B will  $x$  be divisible by 12, but not by 9?

- A)  $A = 0, B = 4$
- B)  $A = 7, B = 2$
- C)  $A = 0, B = 6$
- D)  $A = 4, B = 8$

12) How many factors does 80 have?

- A) 8
- B) 9
- C) 10
- D) 12

13) Elena is going to use a calculator to check whether or not 267 is prime. She will pick certain divisors, and then find 267 divided by each, and see if she gets a whole number. If she never gets a whole number, then she's found a prime. Which numbers does Elena NEED to check before she can stop checking and be sure she has a prime?

- A) All natural numbers from 2 to 266.
- B) All primes from 2 to 266.
- C) All primes from 2 to 133.
- D) All primes from 2 to  $\sqrt{267}$ .

14) The least common multiple of 60 and N is 1260. Which of the following could be the prime factorization of N?

- A)  $2 \cdot 5 \cdot 7$
- B)  $2^3 \cdot 3^2 \cdot 5 \cdot 7$
- C)  $3 \cdot 5 \cdot 7$
- D)  $3^2 \cdot 5 \cdot 7$

15) A biology class requires a lab fee, which is a whole number of dollars, and the same amount for all students. On Monday the instructor collected \$70 in fees, on Tuesday she collected \$126, and on Wednesday she collected \$266. What is the largest possible amount the fee could be?

- A) \$2
- B) \$7
- C) \$14
- D) \$70

16) Use the samples of a student's work below to answer the question that follows:

This student divides fractions by first finding a common denominator, then dividing the numerators.

$$\frac{2}{3} \div \frac{3}{4} \rightarrow \frac{8}{12} \div \frac{9}{12} \rightarrow 8 \div 9 = \frac{8}{9}$$

$$\frac{2}{5} \div \frac{7}{20} \rightarrow \frac{8}{20} \div \frac{7}{20} \rightarrow 8 \div 7 = \frac{8}{7}$$

$$\frac{7}{6} \div \frac{3}{4} \rightarrow \frac{14}{12} \div \frac{9}{12} \rightarrow 14 \div 9 = \frac{14}{9}$$

Which of the following best describes the mathematical validity of the algorithm the student is using?

- A) It is not valid. Common denominators are for adding and subtracting fractions, not for dividing them.
- B) It got the right answer in these three cases, but it isn't valid for all rational numbers.
- C) It is valid if the rational numbers in the division problem are in lowest terms.
- D) It is valid for all rational numbers.

17) Which of the following values of  $x$  satisfies the inequality  $|(x+2)^3| < 3$ ?

- A)  $x = -3$
- B)  $x = 0$
- C)  $x = -4$
- D)  $x = 1$

18) The expression  $8^3 \cdot 2^{-10}$  is equal to which of the following?

- A) 2
- B)  $\frac{1}{2}$
- C) 16
- D)  $\frac{1}{16}$

19) Here is a method that a student used for subtraction:

$$\begin{array}{r} 16 \\ 8 \cancel{-6} 4 \\ 3 \cancel{2} 8 3 \\ \hline 5 8 1 \end{array}$$

Which of the following is correct?

- A) The student used a method that worked for this problem and can be generalized to any subtraction problem.
- B) The student used a method that worked for this problem and that will work for any subtraction problem that only requires one regrouping; it will not work if more regrouping is required.
- C) The student used a method that worked for this problem and will work for all three-digit subtraction problems, but will not work for larger problems.
- D) The student used a method that does not work. The student made two mistakes that cancelled each other out and was lucky to get the right answer for this problem.

20) On a map the distance from Boston to Detroit is 6 cm, and these two cities are 702 miles away from each other. Assuming the scale of the map is the same throughout, which answer below is closest to the distance between Boston and San Francisco on the map, given that they are 2,708 miles away from each other?

- A) 21 cm
- B) 22 cm
- C) 23 cm
- D) 24 cm

21) Here is a number trick:

- 1) Pick a whole number
- 2) Double your number.
- 3) Add 20 to the above result.
- 4) Multiply the above by 5
- 5) Subtract 100
- 6) Divide by 10

The result is always the number that you started with! Suppose you start by picking  $N$ . Which of the equations below best demonstrates that the result after Step 6 is also  $N$ ?

A)  $N * 2 + 20 * 5 - 100 \div 10 = N$

B)  $((2 * N + 20) * 5 - 100) \div 10 = N$

C)  $(N + N + 20) * 5 - 100 \div 10 = N$

D)  $((((N \div 10) - 100) * 5 + 20) * 2 = N$

22) Taxicab fares in Boston (Spring 2012) are \$2.60 for the first  $\frac{1}{7}$  of a mile or less and \$0.40 for each  $\frac{1}{7}$  of a mile after that.

Let  $d$  represent the distance a passenger travels in miles (with  $d > \frac{1}{7}$  mile). Which of the following expressions represents the total fare?

A)  $\$2.60 + \$0.40d$

B)  $\$2.60 + \$0.40 \frac{d}{7}$

C)  $\$2.20 + \$2.80d$

D)  $\$2.60 + \$2.80d$

23) A sales companies pays its representatives \$2 for each item sold, plus 40% of the price of the item. The rest of the money that the representatives collect goes to the company. All transactions are in cash, and all items cost \$4 or more. If the price of an item in dollars is  $p$ , which expression represents the amount of money the company collects when the item is sold?

A)  $\frac{3}{5}p - 2$

B)  $\frac{3}{5}(p - 2)$

C)  $\frac{2}{5}p + 2$

D)  $\frac{2}{5}p - 2$

24) Use the solution procedure below to answer the question that follows:

$$(x+3)^2 = 10$$

$$(x+3)(x+3) = 10$$

$$x^2 + 9 = 10$$

$$x^2 + 9 - 9 = 10 - 9$$

$$x^2 = 1$$

$$x = 1 \text{ or } x = -1$$

Which of the following is incorrect in the procedure shown above?

A) The commutative property is used incorrectly

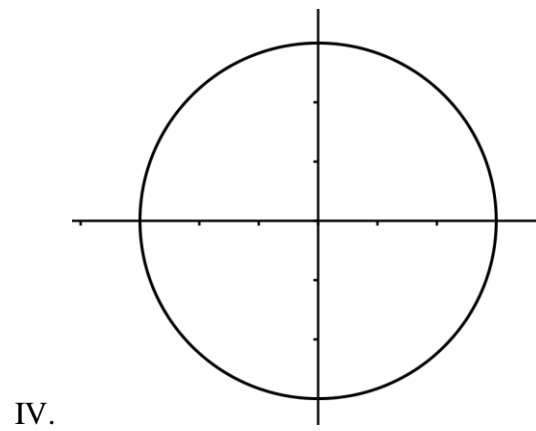
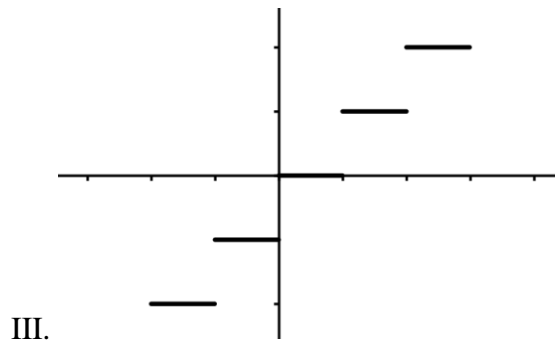
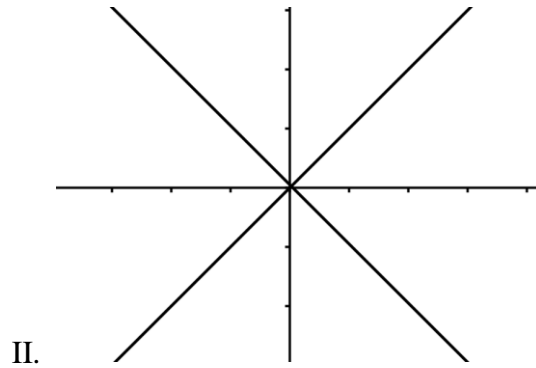
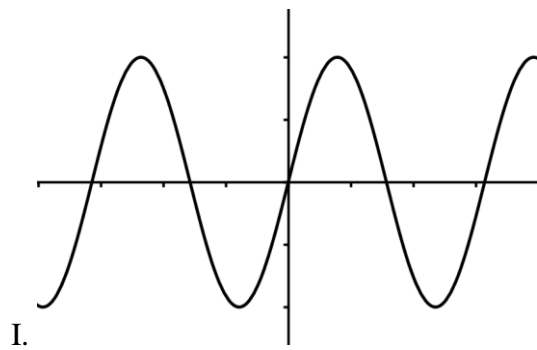
B) The associative property is used incorrectly.

C) Order of operations is done incorrectly.

D) The distributive property is used incorrectly.

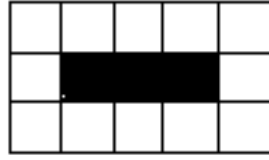
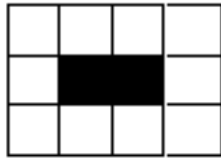
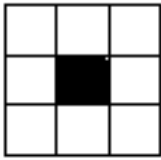


25) Which of the graphs below represent functions?



- A) I and IV only
- B) I and III only
- C) II and III only
- D) I, II, and IV only

26) The pattern below consists of a row of black squares surrounded by white squares.

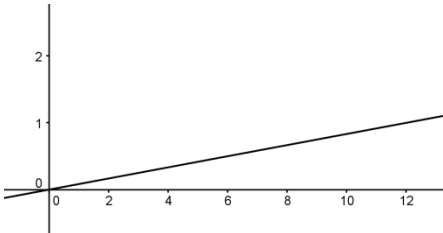


How many white squares would surround a row of 157 black squares?

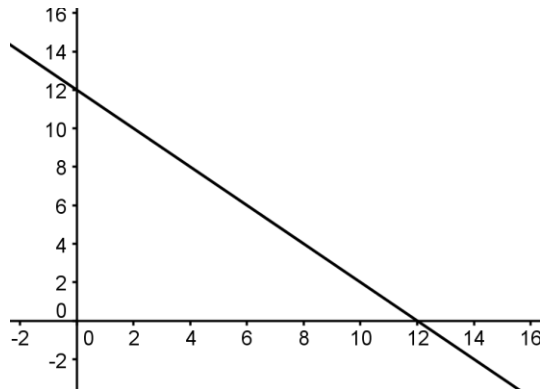
- A) 314
- B) 317
- C) 320
- D) 322

27) The function  $d(x)$  gives the result when 12 is divided by  $x$ . Which of the following is a graph of  $d(x)$ ?

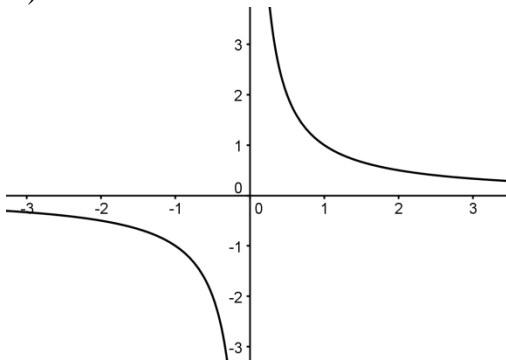
A)



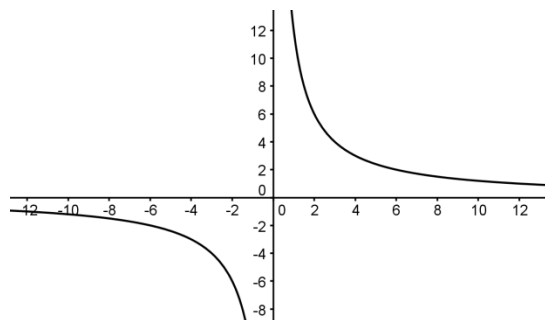
B)



C)



D)



28) A publisher prints a series of books with covers made of identical material and using the same thickness of paper for each page. The covers of the book together are 0.4 cm thick, and 125 pieces of the paper used together are 1 cm thick.

The publisher uses a linear function to determine the total thickness,  $T(n)$  of a book made with  $n$  sheets of paper. What are the slope and intercept of  $T(n)$ ?

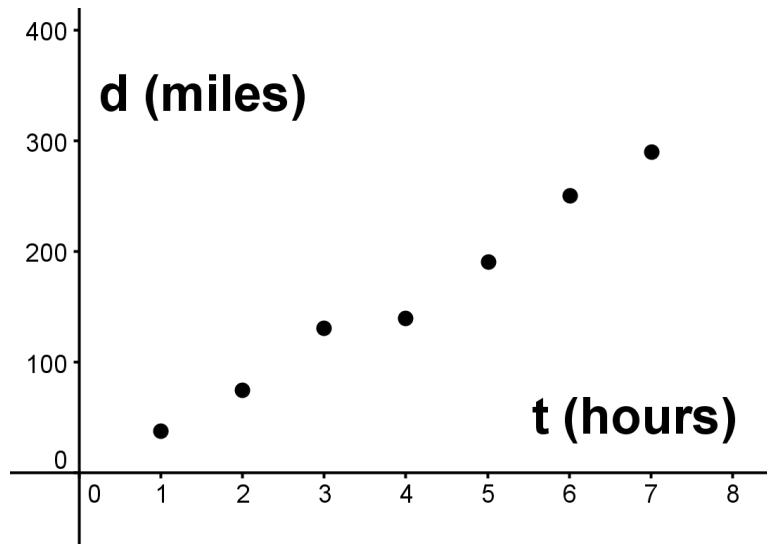
A) Intercept = 0.4 cm, Slope = 125 cm/page

B) Intercept = 0.4 cm, Slope =  $\frac{1}{125}$  cm/page

C) Intercept = 125 cm, Slope = 0.4 cm

D) Intercept =  $\frac{1}{125}$  cm, Slope = 0.4 pages/cm

29) A family went on a long car trip. Below is a graph of how far they had driven at each hour.



Which of the following is closest to their average speed driving on the trip?

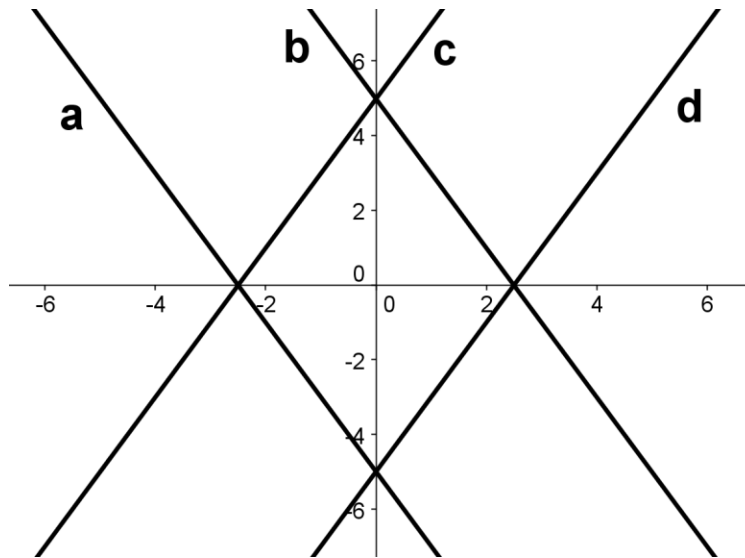
A)  $d = 20t$

B)  $d = 30t$

C)  $d = 40t$

D)  $d = 50t$

30) Which of the lines depicted below is a graph of  $y = 2x - 5$ ?



31) The equation  $F = \frac{9}{5}C + 32$  is used to convert a temperature measured in Celsius to the equivalent Fahrenheit temperature.

A patient's temperature increased by  $1.5^\circ$  Celsius. By how many degrees Fahrenheit did her temperature increase?

- A)  $1.5^\circ$
- B)  $1.8^\circ$
- C)  $2.7^\circ$
- D) Not enough information.

32) An above-ground swimming pool is in the shape of a regular hexagonal prism, is one meter high, and holds 65 cubic meters of water. A second pool has a base that is also a regular hexagon, but with sides twice as long as the sides in the first pool. This second pool is also one meter high. How much water will the second pool hold?

- A)  $65 \text{ m}^3$
- B)  $(65 \times 2) \text{ m}^3$
- C)  $(65 \times 4) \text{ m}^3$
- D)  $(65 \times 8) \text{ m}^3$

33) The speed of sound in dry air at 68 degrees F is 343.2 meters per second. Which of the expressions below could be used to compute the number of kilometers that a sound wave travels in 10 minutes (in dry air at 68 degrees F)?

A)  $343.2 \times 60 \times 10$

B)  $343.2 \times 60 \times 10 \times \frac{1}{1000}$

C)  $343.2 \times \frac{1}{60} \times 10$

D)  $343.2 \times \frac{1}{60} \times 10 \times \frac{1}{1000}$

34) A homeowner is planning to tile the kitchen floor with tiles that measure 6 inches by 8 inches. The kitchen floor is a rectangle that measures 10 ft by 12 ft, and there are no gaps between the tiles. How many tiles does the homeowner need?

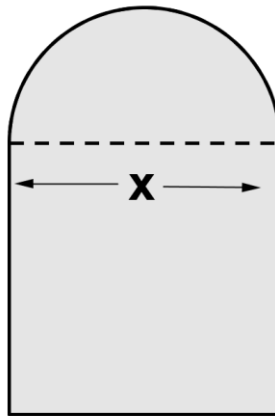
A) 30

B) 120

C) 300

D) 360

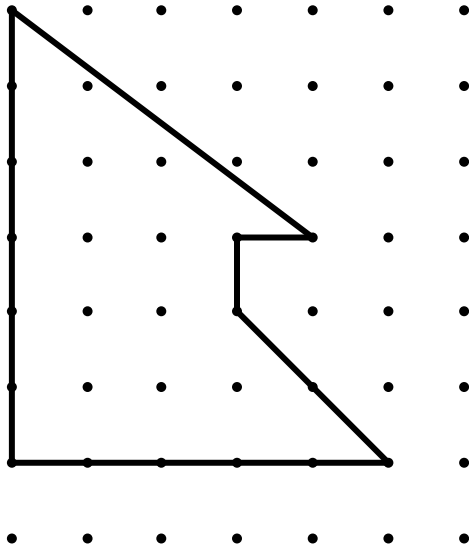
35) The window glass below has the shape of a semi-circle on top of a square, where the side of the square has length  $x$ . It was cut from one piece of glass.



What is the perimeter of the window glass?

- A)  $3x + \frac{\pi x}{2}$
- B)  $3x + 2\pi x$
- C)  $3x + \pi x$
- D)  $4x + 2\pi x$

36) The polygon depicted below is drawn on dot paper, with the dots spaced 1 unit apart. What is the perimeter of the polygon?



A)  $18 + \sqrt{2}$  units

B)  $18 + 2\sqrt{2}$  units

C) 18 units

D) 20 units

37) Which of the following sets of polygons can be assembled to form a pentagonal pyramid?

A) 2 pentagons and 5 rectangles

B) 1 square and 5 equilateral triangles

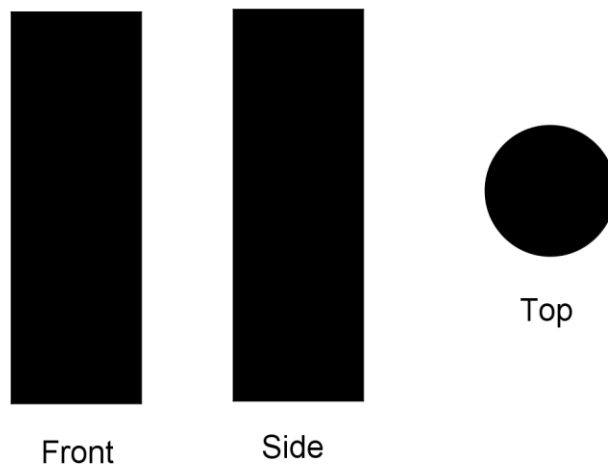
C) 1 pentagon and 5 isosceles triangles

D) 1 pentagon and 10 isosceles triangles

38) Which property is not shared by all rhombi?

- A) 4 congruent sides
- B) A center of rotational symmetry
- C) 4 congruent angles
- D) 2 sets of parallel sides

39) Below are front, side, and top views of a three-dimensional solid.

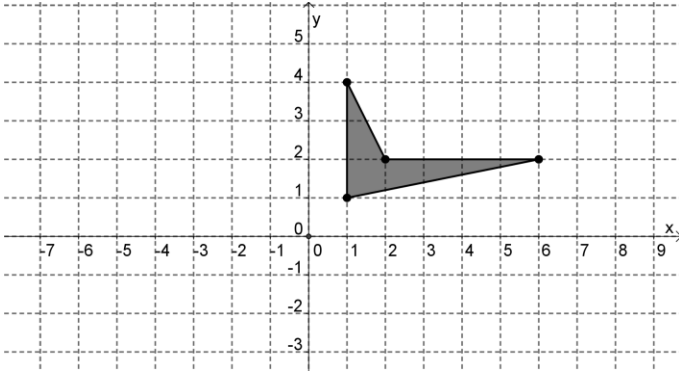


Which of the following could be the solid shown above?

- A) A sphere
- B) A cylinder
- C) A cone
- D) A pyramid

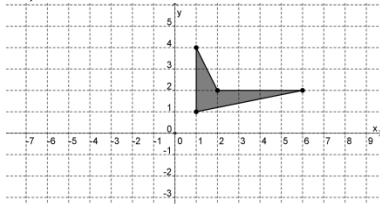


40) Use the graph below to answer the question that follows.

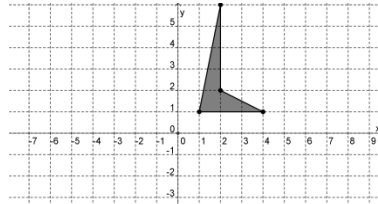


If the polygon shown above is reflected about the y axis and then rotated 90 degrees clockwise about the origin, which of the following graphs is the result?

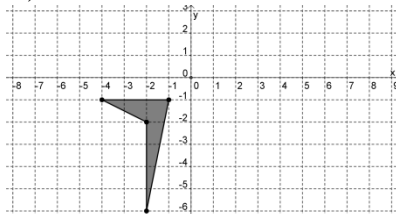
A)



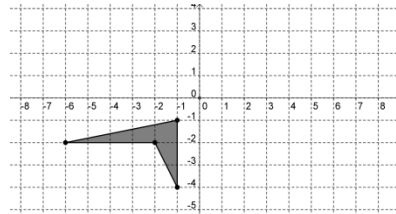
B)



C)



D)



41) A teacher has a list of all the countries in the world and their populations in March 2012. She is going to have her students use technology to compute the mean and median of the numbers on the list. Which of the following statements is true?

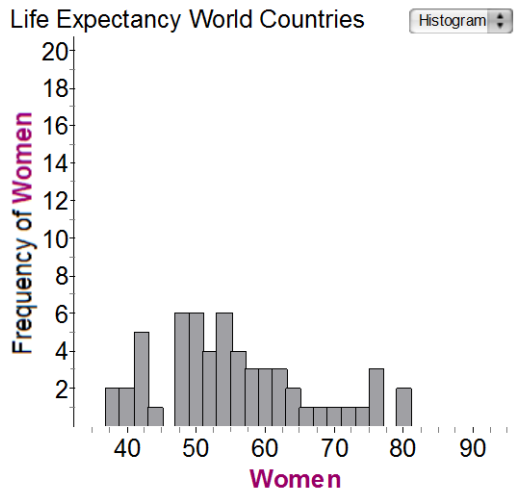
A) The teacher can be sure that the mean and median will be the same without doing any computation.

B) The teacher can be sure that the mean is bigger than the median without doing any computation.

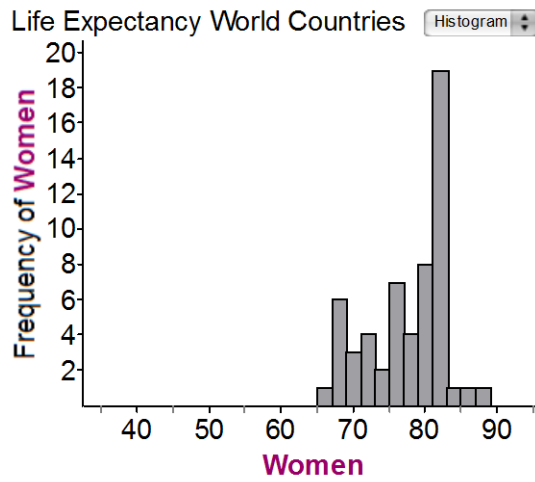
C) The teacher can be sure that the median is bigger than the mean without doing any computation.

D) There is no way for the teacher to know the relative size of the mean and median without computing them.

42) The histogram on the left shows the average life expectancies for women in different countries in Africa in 1998; the histogram on the right gives similar data for Europe:



Region = "Africa"



Region = "Europe"

How much bigger is the range of the data for Africa than the range of the data for Europe?

- A) 10 years
- B) 12 years
- C) 20 years
- D) 35 years

43) The table below gives the result of a survey at a college, asking students whether they were residents or commuters:

—  
Student living situations

		Home			Row Summary
		No Response	Resident	Commuter	
Year	No Response	0	0	0	0
	First Year	0	32	4	36
	Sophomore	0	35	5	40
	Junior	0	24	16	40
	Senior	0	13	18	31
Column Summary		0	104	43	147

S1 = `count ( )`

Based on the above data, what is the probability that a randomly chosen commuter student is a junior or a senior?

- A)  $\frac{34}{43}$
- B)  $\frac{34}{71}$
- C)  $\frac{34}{147}$
- D)  $\frac{71}{147}$

44) At a school fundraising event, people can buy a ticket to spin a spinner like the one below. The region that the spinner lands in tells which, if any, prize the person wins.



If 240 people buy tickets to spin the spinner, what is the best estimate of the number of keychains that will be given away?

- A) 40
- B) 80
- C) 100
- D) 120

45) A family has four children. What is the probability that two children are girls and two are boys? Assume the the probability of having a boy (or a girl) is 50%.

- A)  $\frac{1}{2}$
- B)  $\frac{1}{4}$
- C)  $\frac{1}{5}$
- D)  $\frac{3}{8}$

## Answer Key

1	A
2	B
3	B
4	C
5	D
6	A
7	C
8	B
9	D
10	A
11	C
12	C
13	D
14	D
15	C
16	D
17	A
18	B
19	A
20	C
21	B
22	C
23	A

24	D
25	B
26	C
27	D
28	B
29	C
30	D
31	C
32	C
33	B
34	D
35	A
36	B
37	C
38	C
39	B
40	B
41	B
42	C
43	A
44	B
45	D