Name: _____   **Date:** _____
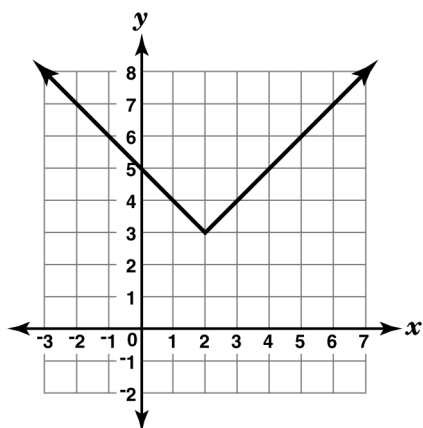
1. Which of these functions has the greatest y-intercept?

   A. $f(x) = 3(2)^x$ B. $f(x) = 5x + 2$

   C. $f(x) = 4\cos x + 2$ D. $f(x) = 5x^2 + 3x + 4$

2. Look at the function that is graphed below.

   Which of these statements about this function is true?

   A. The minimum value is 2.

   B. The minimum value is 3.

   C. The maximum value is 3.

   D. The maximum value is 5.

3. Which expression is equivalent to 3^8?

   A. $(3^4)^4$ B. $(3^2 \times 3^2)^4$

   C. $3^2 \times 3^2 \times 3^2$ D. $(3^2)^2 \times (3^2)^2$

4. $\dfrac{6 \times 10^3}{3 \times 10^5} =$

   A. 2×10^2 B. $2 \times 10^{0.6}$

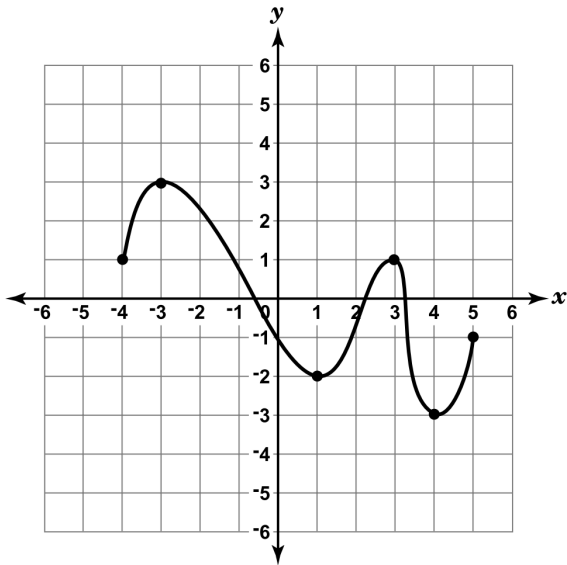   C. 0.5×10^{-2} D. 2×10^{-2}

5. What is $(2.49 \times 10^4) \div (3.0 \times 10^2)$ written in scientific notation?

   A. 8.3×10^1 B. 0.83×10^2

   C. 83×10^2 D. 830×1^1

6. When is $f(x) = x^2 - x - 12$ increasing?

   A. $x > \frac{1}{2}$ B. $x < \frac{1}{2}$
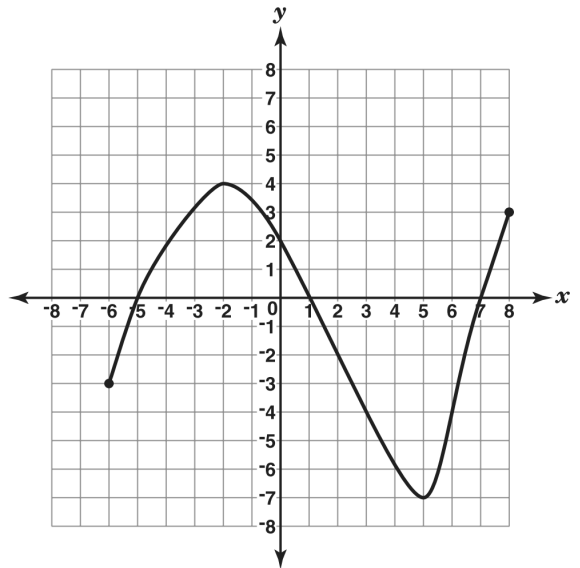
   C. $x > -3$ D. $x < 4$

7. Look at the function that is graphed below.

What is the range of this function?

A. $-4 \leq y \leq 5$

B. $-3 \leq y \leq 3$

C. $-2 \leq y \leq 3$

D. $-4 \leq y \leq -1$

8. Look at the function that is graphed below.

What is the range of this function?

A. $-7 \leq y \leq 4$

B. $-6 \leq y \leq 8$

C. $-5 \leq y \leq 7$

D. $-2 \leq y \leq 5$

9. Which expression demonstrates the rule used to simplify $\dfrac{x^4}{x^{-2}}$?

A. $x^{(4-2)}$

B. $x^{(4-{}^-2)}$

C. $x^{(-2-4)}$

D. $x^{(2-4)}$

10. Bacteria in a culture are growing exponentially with time, as shown in the table below.

Bacteria Growth

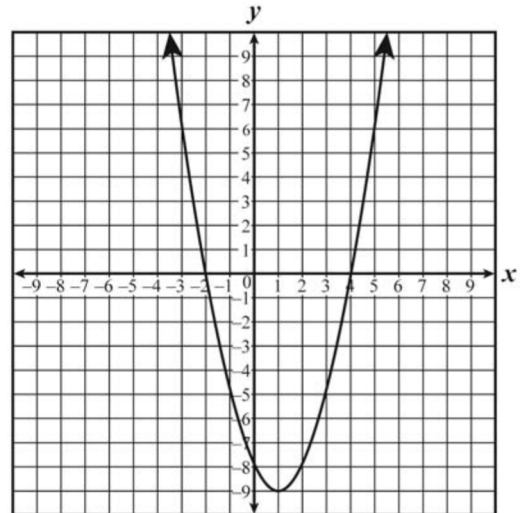| Day	Bacteria
0	100
1	200
2	400

Which of the following equations expresses the number of bacteria, y, present at any time, t?

A. $y = 100 + 2^t$

B. $y = (100) \cdot (2)^t$

C. $y = 2^t$

D. $y = (200) \cdot (2)^t$

11. Which of the following functions will represent $500 placed into a mutual fund yielding 10% per year for 4 years.

A. $A = 500(.10)^4$

B. $A = 500(1.1)^4$

C. $A = 500(4)(.10)$

D. $A = 500(1.04)^{10}$

12. The graph of a quadratic function is shown below.

Which set includes the zeros of this function?

A. $\{2, 4\}$

B. $\{-2, 4\}$

C. $\{-4, 2\}$

D. $\{-4, -2\}$

13. A human heart beats approximately 72 times each minute. Which of these is closest to the number of times the human heart beats in one day?

A. 1×10^5 beats per day

B. 1×10^6 beats per day
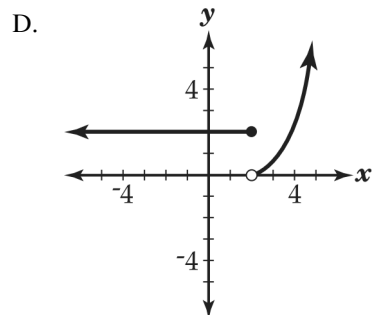
C. 2×10^5 beats per day
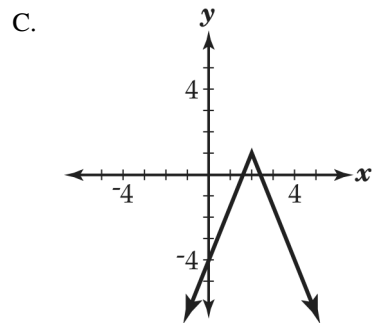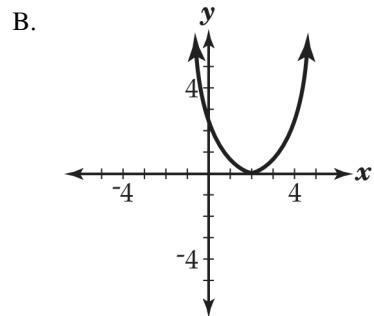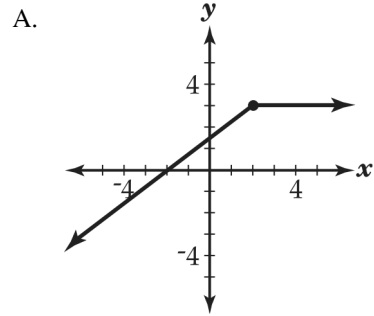
D. 2×10^6 beats per day

14. In the expression shown below, a and b represent different whole numbers.

$$10^a \times 10^b$$

How many zeros must be in the product of the expression?

A. $a + b$ B. $a \times b$ C.   2   D.   100

15. Which of these graphs shows a function that is *not* continuous at $x = 2$?

A.

B.

C.

D.

16. What is the vertex of the quadratic function
    $y = -(x - 3)^2 + 4$?

    A. $(5, 0)$ B. $(0, -5)$

    C. $(3, 4)$ D. $(-3, 4)$

19. A girl drops a ball from a height of 10 feet. Each time the ball hits the ground, it bounces to $\frac{2}{3}$ its previous height. Which equation gives y, the height of the ball after x bounces?

    A. $y = 10^{\frac{2}{3}x}$ B. $y = 10\left(\frac{2}{3}\right)^x$

    C. $y = \frac{2}{3}(10)^x$

17. The value, V, of a car can be modeled by the function $V(t) = 13,000(0.82)^t$, where t is the number of years since the car was purchased. To the nearest tenth of a percent, what is the monthly rate of depreciation?

    A. 1.5%   B. 1.6%   C. 9.2%   D. 18.0%

20. Dennis compared the y-intercept of the graph of the function $f(x) = 3x + 5$ to the y-intercept of the graph of the linear function that includes the points in the table below.

x	$g(x)$
-7	2
-5	3
-3	4
-1	5

    What is the difference when the y-intercept of $f(x)$ is subtracted from the y-intercept of $g(x)$?

    A. -11.0 B. -9.3 C. 0.5   D. 5.5

18. According to the 1998 Census Bureau data, New York City was ranked number 1 in population with a population of approximately 7.3×10^6. Los Angeles, California, ranked number 2 with a population of slightly less than half that of New York City. Which of the following could be the *approximate* population for Los Angeles?

    A. 7,300   B. 3,500,000

    C. 3,900,000   D. 14,700,000

21. Which expression is equivalent to $\dfrac{8^{12}}{8^3}$?

    A. 1^9 B. 8^4 C. 8^9 D. 5^{12}

22. If a city's population growth rate is 7% per year (compounded annually), how long will it take the city's population to double?

    A. 3.86 years   B. 9.90 years

    C. 10.24 years   D. 26 years

23. Nationwide 3,457,000 copies of a novel were sold during the first week it was available.

What is that number written in scientific notation?

    A. 3.457×10^7 B. 3.457×10^6

    C. 3.457×10^{-6} D. 3.457×10^{-7}

24. An ant colony has approximately 3×10^6 ants. Which could be the actual number of ants in the colony?

    A. 3,106   B. 29,069

    C. 296,423   D. 3,059,101

25. Which statement is true about the asymptotes of $g(x) = \dfrac{2x^2 + 4x + 2}{x^2 - 1}$ and the function f graphed below?
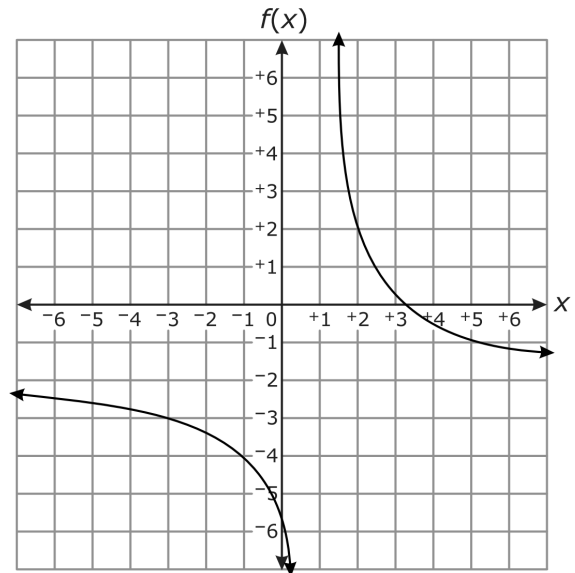

A. The horizontal asymptote of $f(x)$ lies below the horizontal asymptote of $g(x)$.

B. The horizontal asymptote of $f(x)$ lies above the horizontal asymptote of $g(x)$.

C. The number of vertical asymptotes of $f(x)$ is less than the number of vertical asymptotes of $g(x)$.

D. The number of vertical asymptotes of $f(x)$ is greater than the number of vertical asymptotes of $g(x)$.

26. Which function is an even function?

    A. $f(x) = x^4 - (x + 4)^2$ B. $f(x) = 4x^2 - 2x$

    C. $f(x) = x^4 - 2x^2 + 6$ D. $f(x) = 4x$

27. Which piecewise function is graphed below?
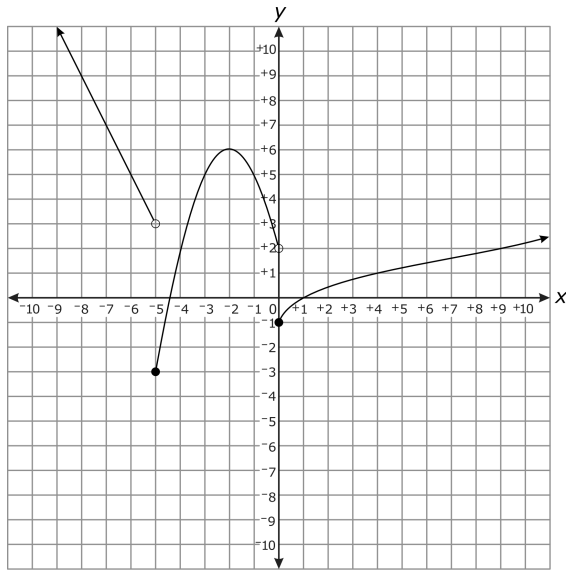
A. $f(x) = \begin{cases} -2x - 7 & \text{for x < -5} \\ -(x+2)^2 + 6 & \text{for -5 <= x < 0} \\ \sqrt{x} - 1 & \text{for x >= 0} \end{cases}$

B. $f(x) = \begin{cases} -2x - 7 & \text{for x < -5} \\ -(x-2)^2 + 6 & \text{for -5 <= x < 0} \\ \sqrt{x-1} & \text{for x >= 0} \end{cases}$

C. $f(x) = \begin{cases} -2x - 7 & \text{for x <= -5} \\ -(x-2)^2 + 6 & \text{for -5 < x <= 0} \\ \sqrt{x} - 1 & \text{for x > 0} \end{cases}$

D. $f(x) = \begin{cases} -2x - 7 & \text{for x <= -5} \\ -(x+2)^2 + 6 & \text{for -5 < x <= 0} \\ \sqrt{x} - 1 & \text{for x > 0} \end{cases}$

28. Which expression is equivalent to $\dfrac{2^3 \cdot 5^2}{2^5 \cdot 3 \cdot 5^4}$?

A. $\dfrac{1}{2^5}$

B. $\dfrac{2^3}{3 \cdot 5^4}$

C. $\dfrac{2^2 \cdot 5^2}{3}$

D. $\dfrac{1}{2^2 \cdot 3 \cdot 5^2}$

29. The human body contains about 1×10^{12} bacteria. The human body contains about 4×10^4 genes. The number of bacteria contained in the human body is how many times as great as the number of genes contained in the human body?

A. 250

B. 4,000

C. 25,000,000

D. 400,000,000

30. Mr. Murphy's company used a total of 5000 gallons of gasoline in the year 2007. Mr. Murphy planned to reduce the amount of gasoline used by his company each year by 10% from the previous year.

Based on Mr. Murphy's plan, what is the total amount of gasoline that his company will use in the year 2010?

A. 3281 gallons

B. 3500 gallons

C. 3645 gallons

D. 4050 gallons

31. The population of a small town in North Carolina is 4,000, and it has a growth rate of 3% per year. Which expression can be used to calculate the town's population x years from now?

A. $3(4,000)^x$

B. $4,000(1.03)^x$

C. $4,000x^{1.03}$

D. $4,000x^3$

32. What are the domain and range of the function $(x) = -|x - 3| + 2$?

   A. Domain: all numbers less than or equal to 2. Range: all real numbers.

   B. Domain: all numbers greater than or equal to 2. Range: all real numbers.

   C. Domain: all real numbers. Range: all numbers greater than or equal to 2.

   D. Domain: all real numbers. Range: all numbers less than or equal to 2.

33. In 1984, the population of Greensboro, N.C. was 197,910. According to the U.S. Census Bureau, Greensboro has been growing at the rate of 6.9% annually since 1984. What equation models the population of Greensboro t years after 1984?

   A. $y = 197,910(1 + 0.69)^t$

   B. $y = 197,910(1 + 69)^t$

   C. $y = 197,910(1 + 6.9)^t$

   D. $y = 197,910(1 + 0.069)^t$

34. What are the x-intercepts for the function $f(x) = x^2 + 2x - 15$?

   A. $(0, -5), (0, 3)$ B. $(0, 5), (0, -3)$

   C. $(5, 0), (-3, 0)$ D. $(-5, 0), (3, 0)$

35. What is the range of the function

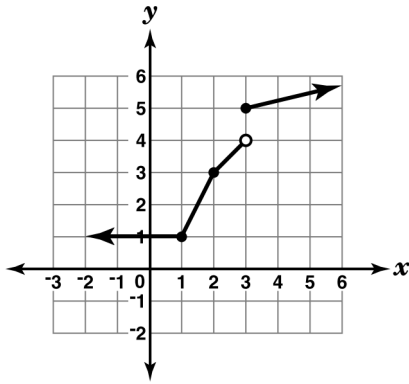 $$f(x) = \tfrac{1}{2}x^2 + 4$$

   when the domain is $\{-2, 0, 4\}$?

   A. $\{2, 4, 10\}$ B. $\{3, 4, 6\}$

   C. $\{4, 6, 12\}$ D. $\{4, 6, 8\}$

36. The vestibule is a small round chamber in the central part of the inner ear. If the vestibule is 0.005 meter long, how is this expressed in scientific notation?

   A. 0.5×10^3 m   B. 5×10^3 m

   C. 0.5×10^{-3} m   D. 5×10^{-3} m

37. Look at the function that is graphed below.

Which of these statements about the function is true?

A. It is continuous.

B. It is not continuous at $x = 1$.

C. It is not continuous at $x = 2$.

D. It is not continuous at $x = 3$.

38. Which expression is equivalent to $3x^{-2}$?

A. $-9x^2$ B. $-3x^2$ C. $\dfrac{1}{9x^2}$ D. $\dfrac{3}{x^2}$

39. A function, $f(x)$, is shown below.

$$f(x) = \begin{cases} x - 4 & \text{for } 0 <= x < 2 \\ x^2 - 3x + 4 & \text{for } 2 <= x < 4 \\ 5 & \text{for } 4 <= x < 7 \end{cases}$$

What is the range of $f(x)$?

A. $[-4, 5)$ B. $[-4, 8)$

C. $[-4, -2) \cup [2, 5)$ D. $[-4, -2) \cup [2, 8)$
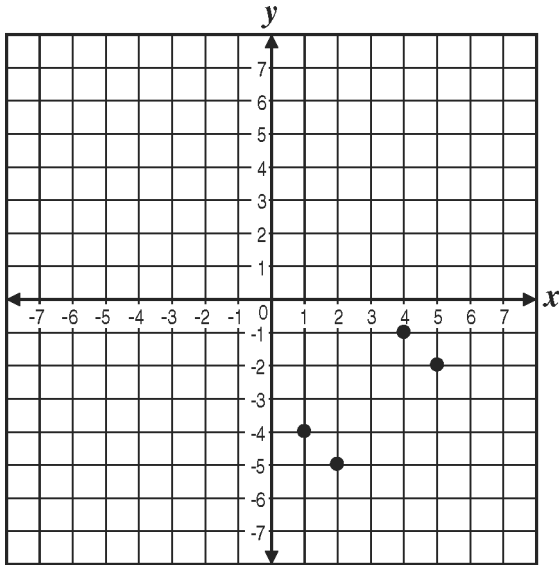
40. The function $f(x) = x^3 - 5x^2 - 2x + 24$ is positive for what parts of its domain?

A. $-2 \le x \le 3$ or $x \ge 4$

B. $-2 < x < 3$ or $x > 4$

C. $x \le -2$ or $3 \le x \le 4$

D. $x < -2$ or $3 < x < 4$

41. James purchased a truck for $25,900. The value of the truck decreases by 12% per year. What will be the *approximate* value 8 years after the purchase?

A. $3,100   B. $7,200

C. $9,300   D. $22,800

42. What is the domain of the function shown on the graph below?

A. $\{-1, -2, -3, -4\}$ B. $\{-1, -2, -4, -5\}$

C. $\{1, 2, 3, 4\}$ D. $\{1, 2, 4, 5\}$

43. Which equation *best* fits the data in the given table?

Number of Half-Lives	Remaining Amount of Substance (in grams)
0	4,000
1	2,000
2	1,000
3	500
4	250
5	125
6	62.5

A. $y = 4,000(\frac{1}{2})^x$ B. $y = 2,000(\frac{1}{2})^x$

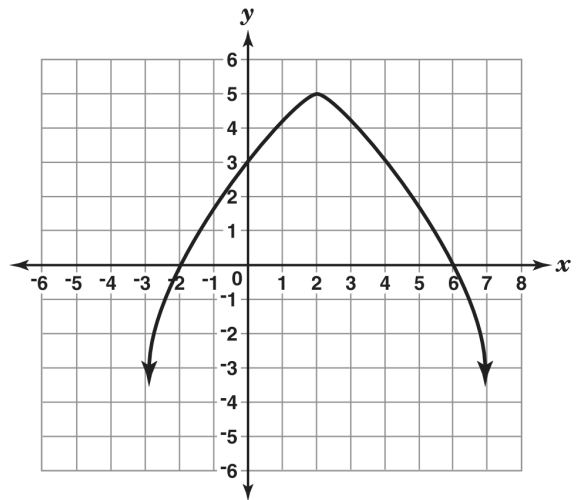C. $y = \frac{1}{2}(4,000)^x$ D. $y = \frac{1}{2}(2,000)^x$

44. Which is an *x*-intercept of $y = 2x^2 - 7x + 3$?

A. $\frac{-1}{2}$ B. $\frac{1}{2}$ C. -3 D. $\frac{7}{4}$

45. A company's profit of $\$1.71 \times 10^6$ will be shared equally by its 3,800 employees. How much money will each employee receive?

A. $\$4.5 \times 10^1$ B. $\$4.5 \times 10^2$

C. $\$4.5 \times 10^3$ D. $\$4.5 \times 10^5$

46. Look at the function below.

What is the maximum value of this function?

A. 2 B. 5 C. 6

47. Evaluate: $2.58 \times 10^5 + 3.8 \times 10^4$

    A. 2.96×10^5 B. 9.804×10^5

    C. 6.38×10^9 D. 2.580038×10^{13}

48. A \$2,000 bicycle depreciates at a rate of 10% per year.

    After how many years will it be worth less than \$1,000?

    A. 5 years   B. 7 years

    C. 10 years   D. 100 years

49. A light year is defined as approximately 5,880,000,000,000 miles.

    Which distance is the same as a light year?

    A. 5.88×10^{13} miles   B. 5.88×10^{12} miles

    C. 5.88×10^{11} miles   D. 5.88×10^{10} miles

50. The area of Alaska is about 6×10^5 square miles. The area of Rhode Island is about 1.5×10^3 square miles.

    What is the difference between the area of Alaska and the area of Rhode Island?

    A. 4.5×10^2 square miles

    B. 4.5×10^5 square miles

    C. 5.985×10^5 square miles

    D. 5985×10^5 square miles

Exam 1 Practice   10/2/2018

1.
Answer: C

2.
Answer: B

3.
Answer: D

4.
Answer: D

5.
Answer: B

6.
Answer: A

7.
Answer: B

8.
Answer: A

9.
Answer: B

10.
Answer: B

11.
Answer:

12.
Answer: B

13.
Answer: A

14.
Answer: A

15.
Answer: D

16.
Answer: C

17.
Answer: B

18.
Answer: B

19.
Answer: B

20.
Answer: C

21.
Answer: C

22.
Answer:

23.
Answer: B

24.
Answer: D

25.
Answer: A

26.
Answer: C

27.
Answer: A

28.
Answer: D

29.
Answer: C

30.
Answer: C

31.
Answer: B

32.
Answer: D

33.
Answer:

34.
Answer:

35.
Answer: C

36.
Answer: D

37.
Answer: D

38.
Answer: D

39.
Answer: D

40.
Answer: B

41.
Answer: C

42.
Answer: D

43.
Answer:

44.
Answer: B

45.
Answer: B

46.
Answer: B

47.
Answer: A

48.
Answer: B

49.
Answer: B

50.
Answer: C