Algebra 2 **Sample SOL** **Name:**_____

1. Directions: Drag the expressions to the correct boxes.

Assuming the denominator does not equal zero, completely simplify the following expression.

$$\frac{^{-}2d^2 + d + 15}{9 - d^2} \div \frac{4d + 1}{2d^2 + 11d + 15}$$

Simplified Expression

$(^{-}1)$	$(3 + d)$	$(2d + 5)^2$	$(3 - d)$	$(9 - d^2)$	$(4d + 1)$	$(d^2 + 9)$	(2)	$(2d - 5)^2$

2. Which expression is equivalent to the one shown if the denominators do not equal zero?

$$\frac{2x}{x^2 - 49} - \frac{3}{(x - 4)(x - 7)}$$

A. $\dfrac{2x^2 - 11x - 21}{(x - 4)(x + 7)}$

B. $\dfrac{2x^2 - 11x + 21}{(x - 4)(x - 7)}$

C. $\dfrac{2x + 3}{(x - 4)(x + 7)}$

D. $\dfrac{2x + 3}{x - 4}$

3. Directions: Select the correct answers.

Identify two expressions that are equivalent to $\sqrt[6]{729q^{17}r^{11}}$.

$\frac{729}{6}q^{\frac{17}{6}}r^{\frac{11}{6}}$	$\frac{729}{6}q^{11}r^5$	$3q^{\frac{17}{6}}r^{\frac{11}{6}}$	$3q^{11}r^5$
$\frac{729}{6}q^{\frac{6}{17}}r^{\frac{11}{17}}$	$\frac{729}{6}q^2r\sqrt[6]{q^5r^5}$	$3q^{\frac{6}{17}}r^{\frac{6}{11}}$	$3q^2r\sqrt[6]{q^5r^5}$

4. Which expression is equivalent to the one shown if no denominators equal zero?

$$\frac{\frac{-13+d}{42d^3}}{\frac{13-d}{6d^9}}$$

A. $-\frac{7}{d^3}$

B. $-\frac{d^3}{7}$

C. $\frac{7}{d^6}$

D. $-\frac{d^6}{7}$

5. Which expression is equivalent to $\sqrt[3]{576n^8p^{27}}$?

A. $4n^2p^9\sqrt[3]{9n^2}$

B. $4n^2p^3\sqrt[3]{9}$

C. $24n^4p^{13}\sqrt[3]{p}$

D. $192n^2p^9\sqrt[3]{n^2}$

6. Which is the factored form of $125m^3 - 343$?

A. $(5m-7)^3$

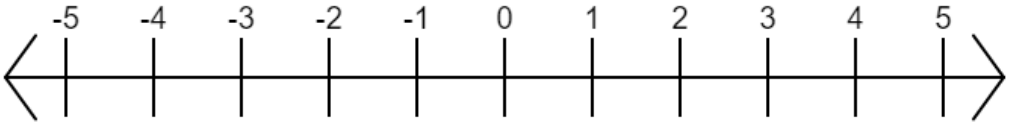
B. $(5m-7)(25m^2+35m+49)$

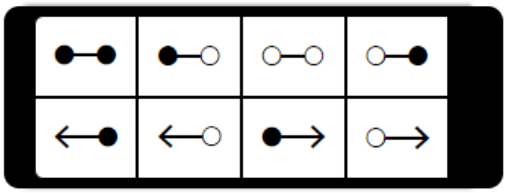
C. $(5m-7)(25m^2+70m+49)$

D. $(5m-7)(25m^2-35m-49)$

7. Directions: Select a segment or ray. Then drag the endpoint to the correct location on the number line.

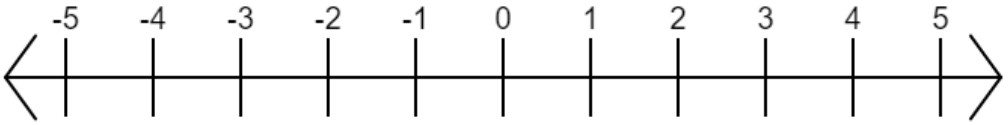
Plot the solution to the inequality $|x-2|>2$.

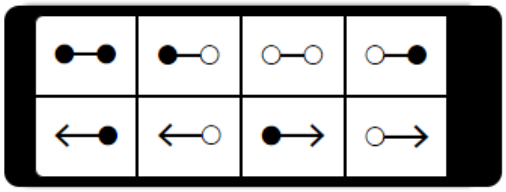




8. Directions: Select a segment or ray. Then drag the endpoint to the correct location on the number line.

Plot the solution to the inequality $^{-}3\,|x-2|+1<{}^{-}5$.

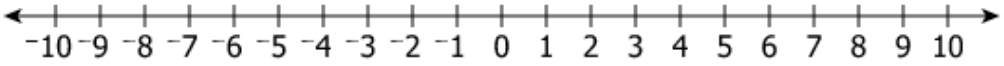




9. Directions: Select all the correct answers.

Graph the solutions to

$$\left|\frac{1}{8}x-\frac{1}{4}\right|=\frac{1}{2}.$$



10. Directions: Select all the correct answers.

Identify the x-coordinate of each point that is in the solution set of the system of equations.

$$\begin{cases} 5x-4y-11=0 \\ y=x^2-x-6 \end{cases}$$

−0.25	−1	−2	−3.25	−13
0.25	1	2	3.25	13

11. A solution to a quadratic equation is $^{-}16 - 8i\sqrt{35}$. Which of these must also be a solution to this equation?

- A. $16 - 8i\sqrt{35}$
- B. $^{-}16 + 8i\sqrt{35}$
- C. $16 + 8i\sqrt{35}$
- D. $^{-}16 - 8i\sqrt{35}$

12. What is the solution set for this equation?

$$3\sqrt{2x-4} + 6 = 3$$

- A. $\left\{\frac{5}{2}\right\}$
- B. $\left\{\frac{1}{2}\right\}$
- C. $\left\{-\frac{1}{2}\right\}$
- D. $\{\ \}$

13. What are the y-coordinates for the solutions to this system of equations?

$$\begin{cases} x^2 + 6x + 3y + 6 = 0 \\ x + y + 20 = 0 \end{cases}$$

- A. $y = {}^{-}9$ and $y = 6$
- B. $y = {}^{-}20$ and $y = {}^{-}2$
- C. $y = {}^{-}26$ and $y = {}^{-}11$
- D. $y = {}^{-}27$ and $y = {}^{-}18$

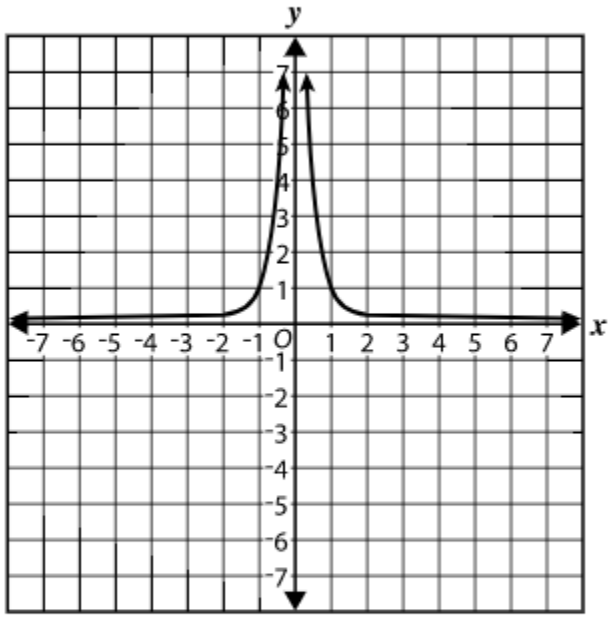
14. What is the value of this summation?

$$\sum_{n=1}^{\infty} \left(\frac{2}{3}\right)^n$$

- A. 0
- B. 1
- C. 2
- D. 3

15. Directions: Select all the correct answers.

The graph of a parent function is shown.

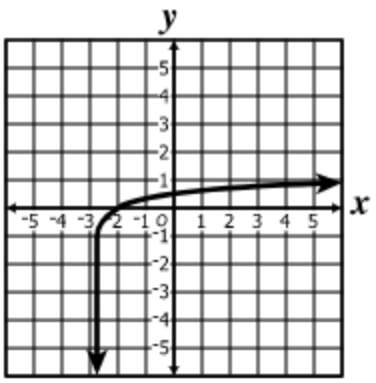


Identify each function which belongs to this same family.

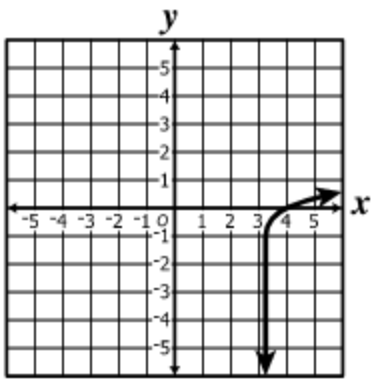
$f(x)=\frac{-3}{x^2}$	$f(x)=\frac{3}{x}$	$f(x)=\frac{3}{(x+1)^2}$	$f(x)=\frac{-3}{x+1}$

16. Which graph could represent a function $g(x) = \log(x) + c$ where $c < 0$?

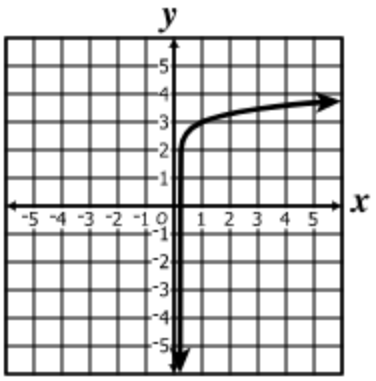
Graph A



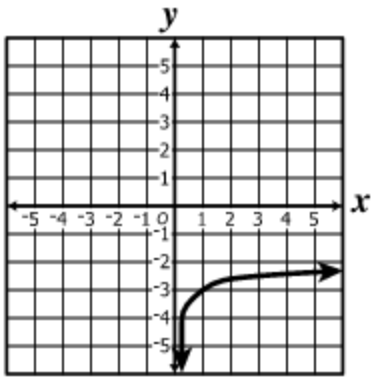
Graph B



Graph C



Graph D



Select the correct answer.

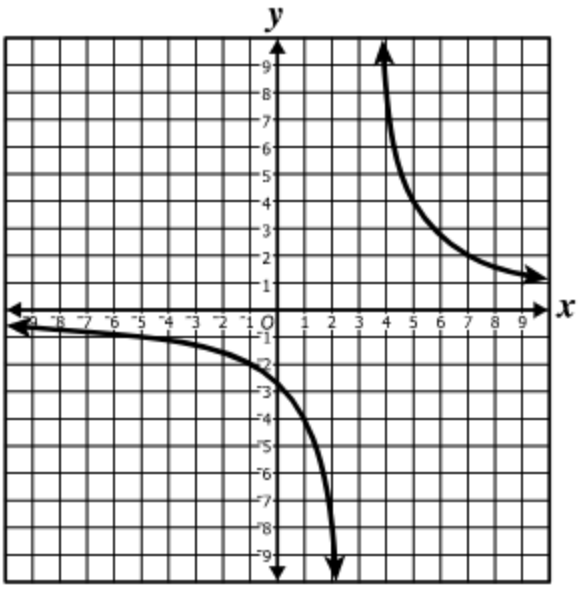
A. Graph A

B. Graph B

C. Graph C

D. Graph D

17. Which function is best represented by this graph?



A. $f(x) = \dfrac{8}{x+3}$

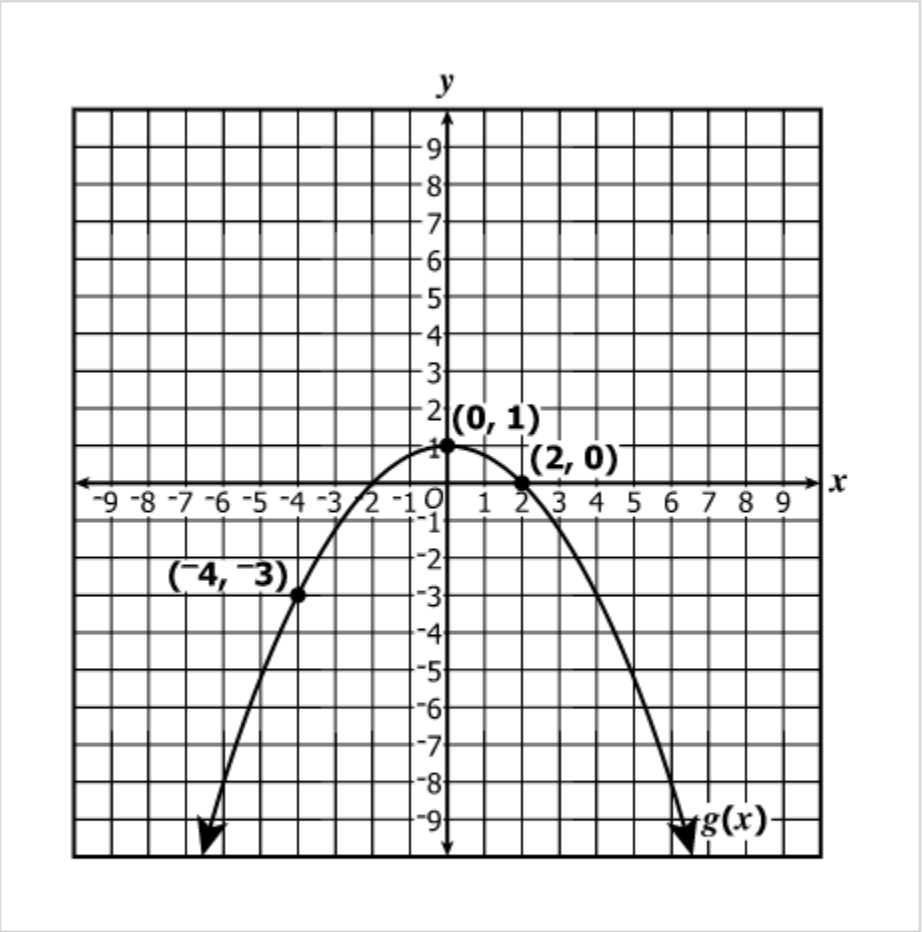
B. $f(x) = \dfrac{8}{x-3}$

C. $f(x) = \dfrac{x+1}{x+3}$

D. $f(x) = \dfrac{x+1}{x-3}$

18. **Directions: Select the correct answers.**

The function $f(x) = x^2$ is transformed to create $g(x)$ as shown in the graph.



Determine which transformations to $f(x)$ produced $g(x)$.

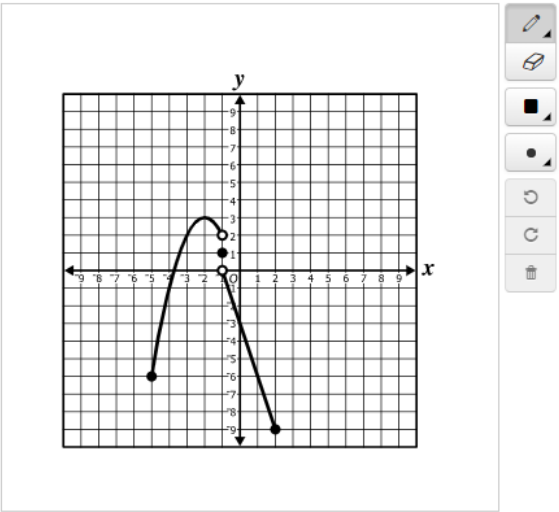
First, $f(x)$ was Choose... .

reflected over the x-axis
reflected over the y-axis

The result was then Choose... .

horizontally compressed by a factor of 0.25, translated up 1 unit
horizontally stretched by a factor of 2, translated up 1 unit
vertically compressed by a factor of 0.5, translated up 1 unit
vertically stretched by a factor of 4, translated up 1 unit

19. The graph of a function is shown on the grid.



What appears to be the domain of this function?

- A. $\{x|^{-}9 \leq x \leq 3\}$
- B. $\{x|^{-}5 \leq x \leq 2\}$
- C. $\{x|^{-}5 \leq x \leq {}^{-}1 \text{ and } {}^{-}1 < x < 2\}$
- D. $\{x|^{-}9 \leq x \leq 0 \text{ and } 2 < x \leq 3\}$

20. Directions: Type your answer in the box.

Given: $xy + y - x = 7$

Determine the value of x that is NOT in the domain of this function.

$x =$ ☐

21. Directions: Select the correct answers.

Identify two functions with the same range as $f(x) = |x| - 4$.

- $g(x) = x^2 + 2x - 3$
- $h(x) = x^3 - 4$
- $j(x) = 2^x - 5$
- $k(x) = \sqrt{x} - 4$
- $m(x) = (x - 4)^2$

22. Directions: Drag the correct answer to the box.

Complete the equation to create a continuous function.

$$g(x) = \frac{x^2}{\square}$$

$(x + 13)(x - 15)$	$(x + 2)^2 + 13$	x	$x^2 - 2x - 4$

23. Directions: Select all the correct answers.

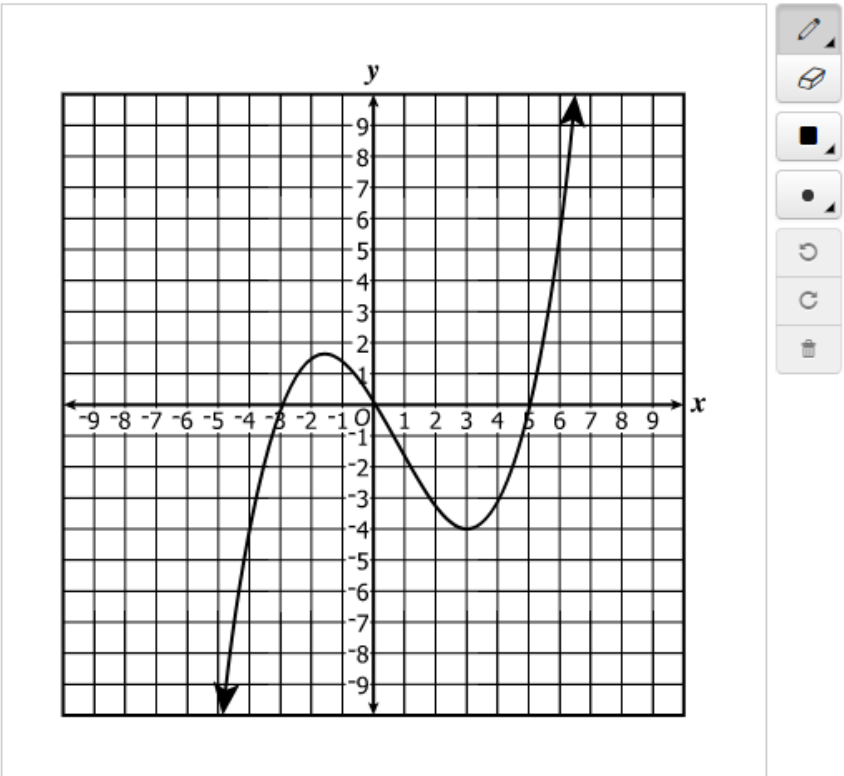
Indicate the intervals where the graph of $f(x) = 2x^3 - 3x^2 - 12x + 20$ is only increasing throughout the interval.

- $-\infty < x < \infty$
- $-\infty < x < -1$
- $-2.5 < x < \infty$
- $-1 < x < 2$
- $0 < x < \infty$
- $2 < x < \infty$

24. Directions: Type your answer in the box.

The graph of f is shown.

$$f(x) = \frac{x(x+3)(x-5)}{9}$$



What is the value of the apparent relative minimum in the interval $(-3, 6)$?

25. **Throughout which interval is $f(x) = {}^{-}x^3 + 2x^2 + 4x - 2$ increasing?**

- A. $({}^{-}\infty, {}^{-}3]$
- B. $[{}^{-}3, 0]$
- C. $[0, 2)$
- D. $(2, \infty)$

26. **Directions: Type your answer in the box.**

What is the zero of $g(x) = 9^x - 243$?

27. **The graph of**

$$g(x) = \frac{x+1}{x}$$

has —

- A. two x-intercepts and no y-intercept
- B. two x-intercepts and one y-intercept
- C. one x-intercept and no y-intercept
- D. one x-intercept and one y-intercept

28. Which of the following describes the end behavior of

$$h(x) = \frac{x - 6}{x^2}$$

as x approaches negative infinity?

- A. y approaches negative infinity
- B. y approaches $^-6$
- C. y approaches $^-1$
- D. y approaches 0

29. Which of the following describes the end behavior of

$$f(x) = 9\log\left(\frac{2}{5}x\right) + 5$$

as x approaches 0 ?

- A. $f(x)$ approaches $^-\infty$
- B. $f(x)$ approaches 0
- C. $f(x)$ approaches 5
- D. $f(x)$ approaches ∞

30. Directions: Drag the correct answers to the boxes.

Identify the equation of the horizontal asymptote and the equation of the vertical asymptote of

$$g(x) = \frac{4x+1}{x-3}\ .$$

Horizontal Asymptote	Vertical Asymptote

$x = 0$	$x = \frac{1}{4}$	$x = 3$	$y = \frac{-1}{3}$	$y = 0$	$y = 4$

31. Which of the following is the inverse of $g(x) = x^3 - 8$?

- A. $g^{-1}(x) = x + 2$
- B. $g^{-1}(x) = x - 2$
- C. $g^{-1}(x) = \sqrt[3]{x+8}$
- D. $g^{-1}(x) = \sqrt[3]{x-8}$

32. Directions: Type your answer in the box.

Let $g(x) = 2x^2 - 5$ and

$$h(x) = \frac{x}{3} - 7\ .$$

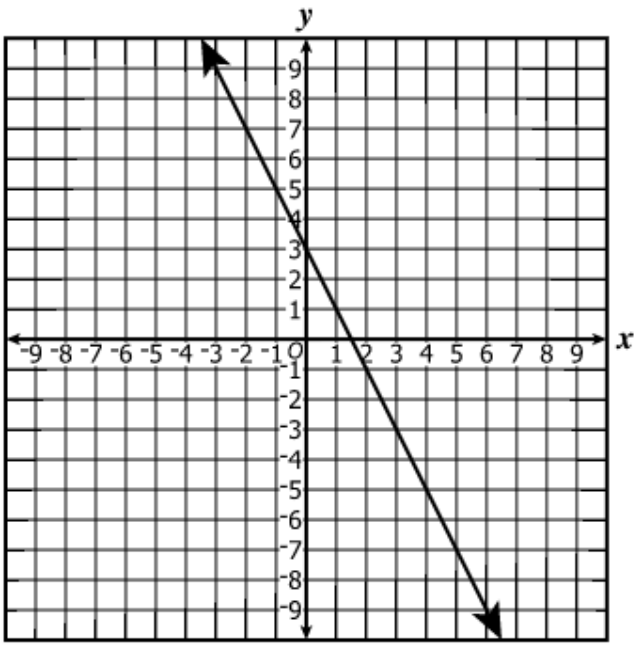
What is $g(h(12))$?

33. Given: $f(x) = x - 1$

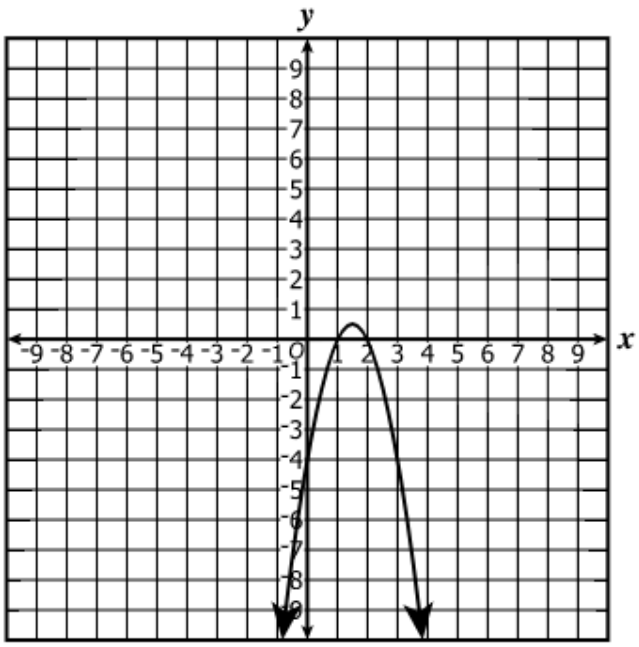
$g(x) = {}^{-}2x + 4$

Which graph best represents $f(g(x))$ **?**

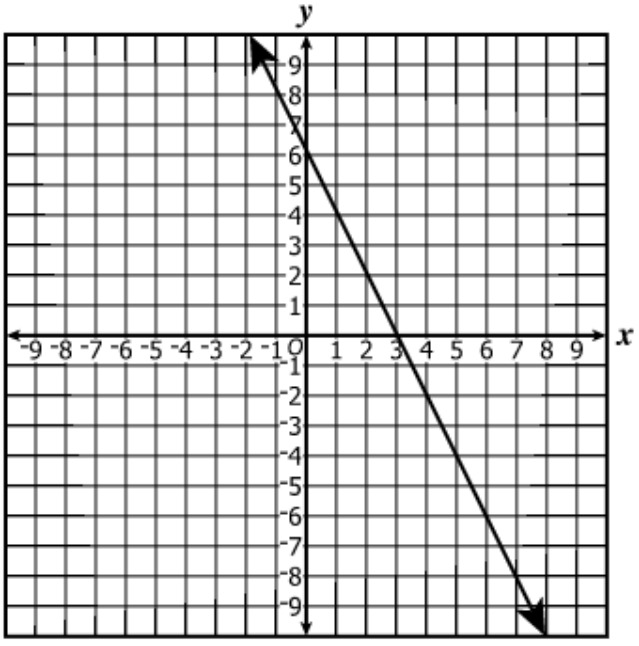
Graph A



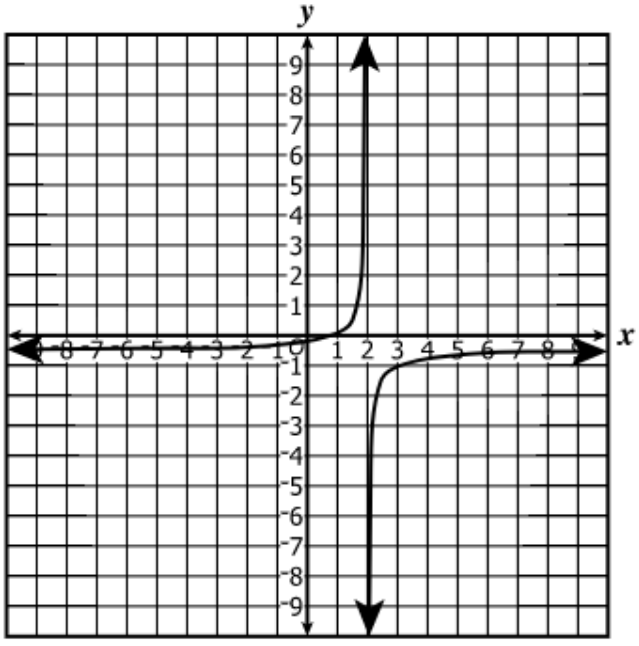
Graph B



Graph C



Graph D



Select the correct answer.

A. Graph A

B. Graph B

C. Graph C

D. Graph D

34. Directions: Select all the correct answers.

The zeros of a cubic function $f(x)$ are -1, $-\frac{2}{3}$, and 5. Select all of the factors of $f(x)$.

$(x-1)$	$(3x+2)$	$(x+5)$
$(x+1)$	$(3x-2)$	$(x-5)$

35. The amount of lost revenue from tickets not sold for a concert is shown in the table. The ticket prices include tax.

Lost Revenue From Tickets Not Sold

Price per Ticket (x)	$25	$35	$55	$125
Number of Tickets Not Sold	84	80	92	323
Amount of Lost Revenue (y)	$2,100	$2,800	$5,060	$40,325

Which equation best models the relationship between y, the amount of lost revenue, and x, the price per ticket?

- A. $y = 1{,}218(1.01)^x$
- B. $y = 997(1.03)^x$
- C. $y = 400x - 11{,}570$
- D. $y = 156x - 10{,}000$

36. Directions: Type your answer in the box.

The volume of a container varies jointly with the square of its radius, r, and its height, h. The container has a height of 10 centimeters, a radius of 6 centimeters, and a volume of 377 cubic centimeters. What is the volume of a container with a radius of 4 centimeters and a height of 4 centimeters? Your answer must be rounded to the nearest whole number.

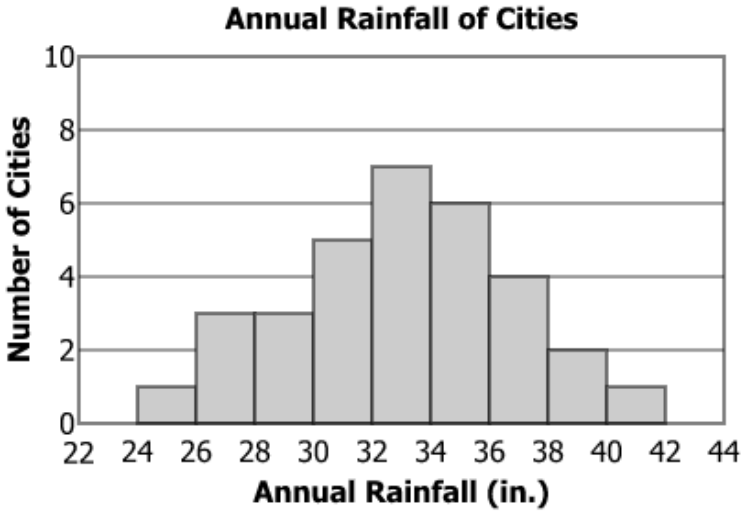
[ ] cm^3

37. Directions: Select all the correct bars on the histogram.

The normally distributed data on the annual rainfall for 32 cities are summarized in this histogram.

- The mean amount of rainfall for these cities is 32.5 inches.
- The standard deviation of the data is 4 inches.

On the histogram, identify each interval that may have data points within 1.5 standard deviations of the mean.



38. Directions: Type your answer in the box.

The heights of 200 kindergarten students at T. E. Wright Elementary are normally distributed with a mean of 40 inches and a standard deviation of 1.8 inches. Approximately how many students have a height between 37.3 inches and 44.5 inches? Your answer must be in the form of a whole number.

[ ] Students

39. A normally distributed set of 968 values has a mean of 108 and a standard deviation of 11. Which is closest to the number of values expected to be above 125 ?

- A. 910
- B. 789
- C. 210
- D. 59

40. This table shows data on the amount of money raised during a fundraiser for four different classes and for one student in each class. The data is normally distributed.

Amount of Money Raised

	Mean for Class	Standard Deviation for Class	Student's z-Score
Jill	60	11	1.8
Kelli	58	12	2.1
Monroe	55	13	1.4
Tim	57	10	2.5

Which of the four students raised the greatest amount of money?

- A. Jill
- B. Kelli
- C. Monroe
- D. Tim

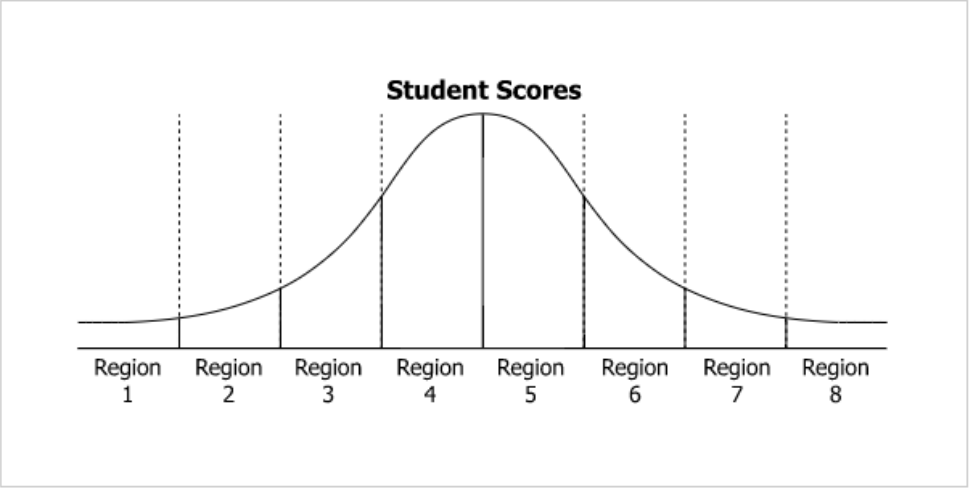
41. Directions: Type your answer in the box.

A data set is normally distributed with a mean of 68.42 and a standard deviation of 7.91. An element in this set is 57.

What is the z-score for 57 ? Round the answer to the nearest hundredth. Your answer must be in decimal form.

z-score = [ ]

42. Directions: Select the correct answers.



This graph summarizes the test scores of 50,000 students. The data is normally distributed with a mean of 81 and a standard deviation of 2.5. Identify the regions under the curve where only the data for approximately 23,750 students are located.

Region 1	Region 2	Region 3	Region 4
Region 5	Region 6	Region 7	Region 8

43. Directions: Type your answer in the box.

A store owner employs a total of 3 cashiers and 7 clerks. The owner plans to select a committee of 1 cashier and 2 clerks. What is the number of different committees the owner could choose? Your answer must be a whole number.

44. Directions: Type your answer in the box.

A family reunion planning committee with 8 members plans to elect 3 officers– a president, treasurer, and historian. If each office is to be held by one person and no person can hold more than one office, in how many ways can those offices be filled?