

1. Which expression is equivalent to $\sqrt{20x^{16}y^{25}}$ for positive x and y values?

- A $2x^4y^5\sqrt{5}$ C $2x^8y^{12}\sqrt{5y}$
 B $5x^4y^5\sqrt{2}$ D $5x^8y^{12}\sqrt{2y}$

2. Which expression is equivalent to $\sqrt[3]{6w^7} \cdot \sqrt[3]{4w^5}$?

- A $2w^4\sqrt[3]{3}$ C $2w^{11}\sqrt[3]{3w^2}$
 B $2w^4\sqrt[3]{6}$ D $2w^{11}\sqrt[3]{6w^2}$

3. No longer on SOL (properties)

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

$$\frac{\frac{11-w}{30w^2}}{\frac{w-11}{5w^6}} \quad \text{○ A } \frac{-w^4}{6} \quad \text{○ B } \frac{-6}{w^3} \quad \text{○ C } \frac{w^3}{6} \quad \text{○ D } \frac{6}{w^4}$$

5. What is the complete factorization of $(18x^4 + 12x^3 - 6x)$?

- A $6x^3(3x+2)$ C $6x(3x-1)(x+1)$
 B $6x(3x^3+2x^2)$ D $6x(3x^3+2x^2-1)$

6. Which of these is equivalent to i^{75} ?

- A i C 1
 B $-i$ D -1

7. For which value of b is $x^2 + bx - 60$ factorable over the set of integers?

- A 61 C -7
 B 23 D -16

8. If no denominator equals zero, which expression is equivalent to $\frac{25 - 4x^2}{6x^2 + 9x - 15} \cdot \frac{6x^2 - 2x - 4}{2x^2 - x - 10}$?

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

9. Assuming the denominators do NOT equal zero, which expression is equivalent to $\frac{12}{x+1} + \frac{1}{x-4}$?

- A $\frac{13x-47}{(x+1)(x-4)}$ C $\frac{13x-47}{2x-3}$
 B $\frac{13}{(x+1)(x-4)}$ D $\frac{13}{2x-3}$

10. Which expression is equivalent to $\sqrt{36x^9y^{25}}$, where $x > 0$ and $y > 0$?

- A $6x^3y^5$ C $18x^3y^5$
 B $6x^{\frac{9}{2}}y^{\frac{25}{2}}$ D $18x^{\frac{9}{2}}y^{\frac{25}{2}}$

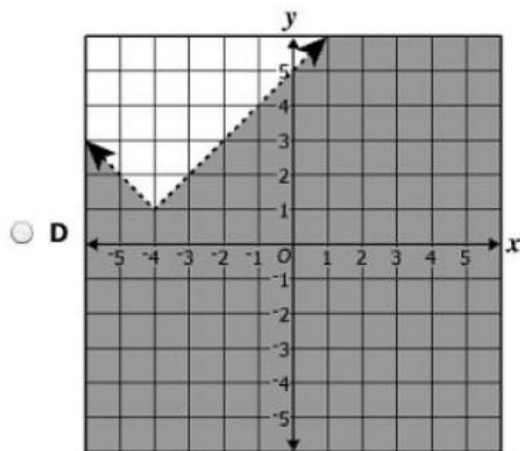
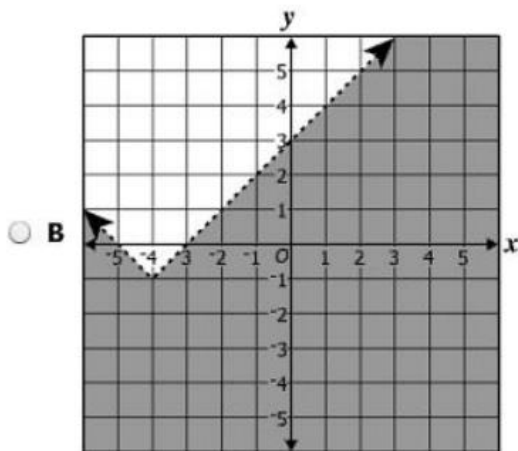
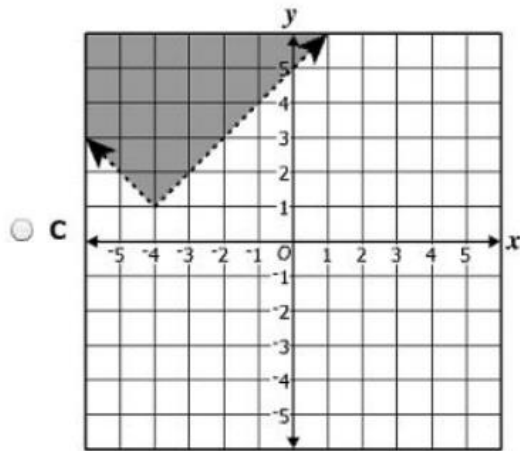
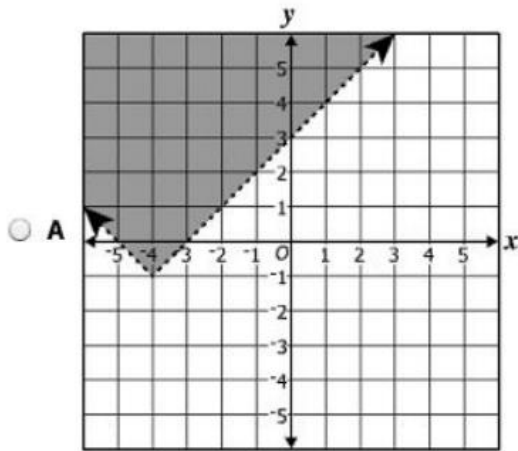
11. What nonzero value of x is a solution to the following equation?

- A $x = \frac{27}{14}$ $\frac{x+2}{x} + \frac{x-6}{3x} = \frac{2x+9}{5x}$
 B $x = \frac{17}{14}$
 C $x = \frac{13}{14}$
 D $x = \frac{5}{14}$

12. How many values of x will satisfy the equation $-2|3x - 5| = 0$?

- A 0
 B 1
 C 2
 D 3

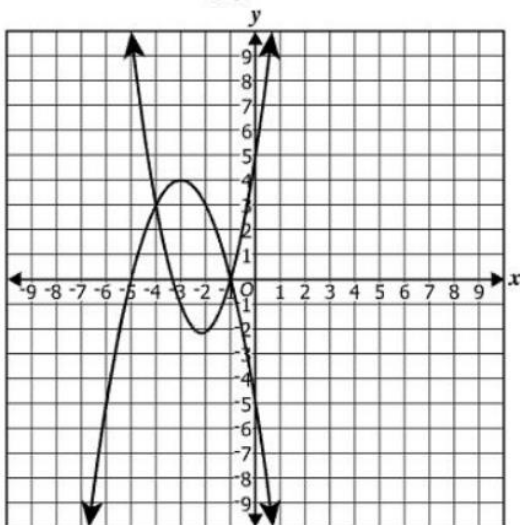
13. Which graph best represents the solutions for $y < |x + 4| - 1$?



14. What is a solution of $\sqrt{7 - 2x} + 5 = 8$?

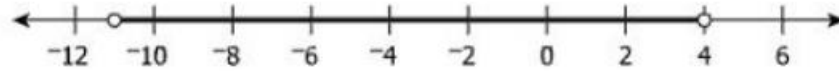
- A $x = -26$
 B $x = \frac{-19}{2}$
 C $x = \frac{-13}{2}$
 D $x = -1$

15. Which is the apparent solution set of the system of equations graphed on the following grid?



- A $\{(0, -5), (0, 5)\}$
 B $\{(-3, 4), (-2, -2)\}$
 C $\{(-4, 3), (-1, 0)\}$
 D $\{(-5, 0), (-3\frac{1}{3}, 0), (-1, 0)\}$

16. This graph best represents the solution to which inequality?



- A $|x - 11| > 4$ C $|2x + 7| > 15$
 B $|x - 11| < 4$ D $|2x + 7| < 15$

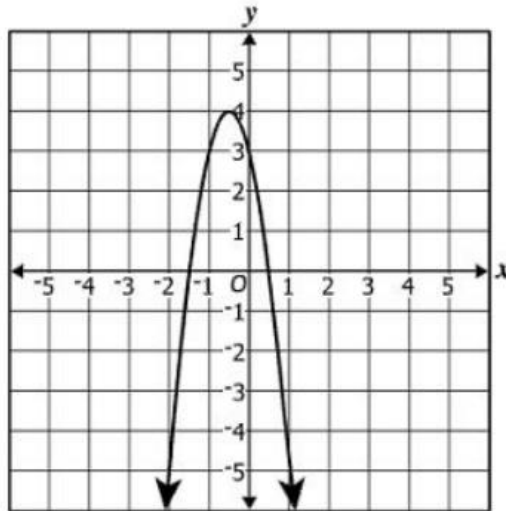
17. Directions: Type your answer in the box.

What value of x makes $\sqrt[3]{2x - 5} = 3$ true?

$x =$

18. What are the apparent roots of the equation graphed on the coordinate grid?

- A $\{0, 3\}$
 B $\{-\frac{1}{2}, 4\}$
 C $\{-\frac{3}{2}, \frac{1}{2}\}$
 D $\{-2, 1\}$



19. If no denominator is equal to zero, what is the solution set for the following equation?

$$\frac{3x - 4}{x^2} = \frac{3}{2x}$$

- A $\{\frac{8}{3}\}$ C $\{-\frac{2}{3}, 2\}$
 B $\{\frac{8}{9}\}$ D $\{-\frac{2}{3}, \frac{2}{3}\}$

20. What is the solution set for the following system of equations?

$$\begin{cases} y = 4x + 2 \\ y = x^2 + x - 8 \end{cases}$$

- A $\{(-5, -18), (2, 10)\}$ C $\{(-6, -22), (1, 6)\}$
 B $\{(-1, -2), (6, 26)\}$ D $\{(-2, -6), (5, 22)\}$

21. Directions: Click on all correct answers.

Identify all the points where the graph of $h(x) = (x + 1)(x^2 + 8x + 16)$ intersects the x -axis.

$(-4, 0)$	$(1, 0)$
$(-2, 0)$	$(4, 0)$
$(-1, 0)$	$(16, 0)$

22. The function $f(x) = (1 - x)^2 - 4$ is decreasing throughout the interval —

- A $-4 < x < \infty$
 B $-\infty < x < 1$
 C $-1 < x < 3$
 D $-\infty < x < \infty$

23. Given: $f(x) = 4x^4 - 15$ and $g(x) = 2x + 11$

What is the value of $g(f(x))$?

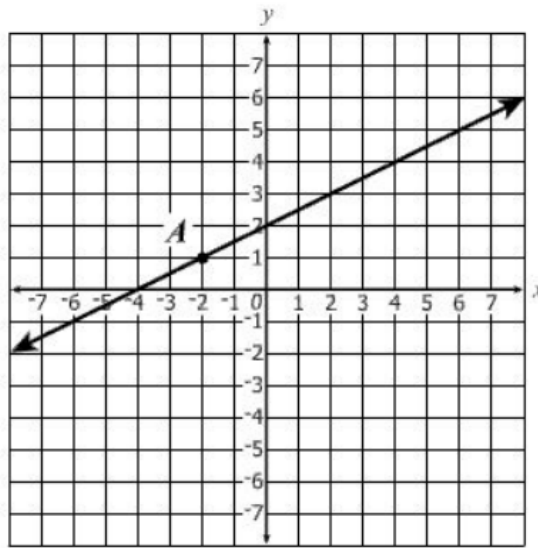
- A $8x^5 + 44x^4 - 30x - 165$ C $8x^4 - 4$
 B $8x^5 - 165$ D $8x^4 - 19$

24. A normally distributed data set has a mean of 0 and a standard deviation of 0.5. Which is closest to the percent of values between -1 and 1?

- A 34% C 68%
 B 50% D 95%

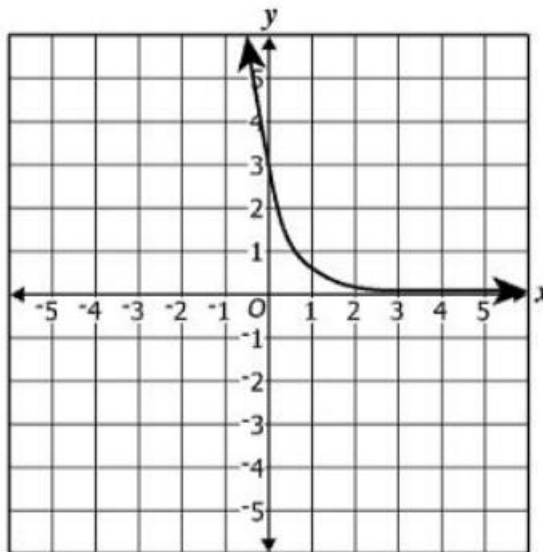
25. Directions: Click on the grid to plot the correct point.

Point A lies on the graph of $f(x) = \frac{1}{2}x + 2$. Locate the image of Point A that lies on the graph of $f^{-1}(x)$.



26. Which equation best represents this graph?

- A $f(x) = 3\left(\frac{1}{5}\right)^x$
- B $f(x) = 3\sqrt{5x}$
- C $f(x) = \frac{1}{3}\log(5x)$
- D $f(x) = \frac{1}{3}(5)^x$



27. If $f(x) = x^2 + 3x$ and $g(x) = 2x^2$, what is $g(f(-1))$?

- A -4
- B 0
- C 8
- D 10

28. The volume of a cone (V) varies jointly with its height (h) and the square of its radius (r). If k is the constant of proportionality, which of the following equations represents the correct relationship between volume, radius, and height?

- A $V = k(rh)^2$ C $V = \frac{k}{r^2h}$
 B $V = \frac{kr^2}{h}$ D $V = kr^2h$

29. What is the equation of the horizontal asymptote of the graph of the following equation?

$$f(x) = 4^{(x+1)} - 10$$

- A $y = 4$ C $y = -1$
 B $y = 0$ D $y = -10$

30. As x approaches negative infinity, which of the following describes the end behavior of $f(x) = -x^7 + bx^3 + c$?

- A $f(x)$ approaches c C $f(x)$ approaches positive infinity
 B $f(x)$ approaches 0 D $f(x)$ approaches negative infinity

31. Jessica paid \$23,000 for her car and kept a record of its value.

Assuming the relationship is exponential, which equation best models the curve of best fit for the data?

- A $y = 21,000(1.20)^x$
 B $y = 22,300(2.60)^x$
 C $y = 23,100(0.85)^x$
 D $y = 23,500(0.70)^x$

Number of Years (x)	Value (in dollars) (y)
0	23,000
1	20,000
2	16,000
3	14,000
4	12,000
5	10,000

32. What is the sum of the infinite geometric series $9 - 6 + 4 - \frac{8}{3} + \dots$?

- A $\frac{29}{3}$ B $\frac{25}{3}$ C $\frac{27}{5}$ D $\frac{18}{5}$

33. Which number is a zero of $f(x) = 7x^2 + 16x - 48$?

- A 12
- B 4
- C $\frac{12}{7}$
- D $\frac{4}{7}$

34. Which function is the inverse of $g(x) = x^3 + 11$?

- A $g^{-1}(x) = \sqrt[3]{x-11}$
- B $g^{-1}(x) = \sqrt[3]{x+11}$
- C $g^{-1}(x) = x - \sqrt[3]{11}$
- D $g^{-1}(x) = x + \sqrt[3]{11}$

35. What is the domain of $g(x) = \log(x-1)$?

- A $\{x|x > 10\}$
- B $\{x|x > 9\}$
- C $\{x|x > 1\}$
- D $\{x|x > 0\}$

36. A scientist obtained a sample that contained 80 grams of radioactive Barium-122 that decays exponentially over time. The amount of Barium-122 that remained in the sample at observed times is shown in the table.

Radioactive Decay of Barium-122

Time (minutes)	Mass of Remaining Barium-122 (grams)
0	80.0
1	56.6
2	40.0
3	28.3
4	20.0

If the radioactive decay continues at the same rate, which is closest to the amount of the sample of Barium-122 remaining at 5 minutes?

- A 8.3 grams
- B 10.0 grams
- C 11.7 grams
- D 14.1 grams
37. What is the sum of the first 20 terms of the arithmetic sequence shown?

$$\frac{1}{3}, \frac{2}{3}, 1, \frac{4}{3}, \frac{5}{3}, \dots$$

- A 5
- B 20
- C 70
- D 140