6. Which of the following equations would have no values of x in the solution set?Plug them in graphically.

\[ 10x + 7 = 10x + k \]
\[ 10x + 15 = 10x + k \]
\[ (a) k = -5 \]
\[ (b) k = 5 \]
\[ (c) k = 15 \]
\[ (d) k = 7 \]

5. For which of the following values of k will the equation be consistent?

\[ 3x + 3 = 3x + k \]
\[ 2x + 3 = 2x + k \]
\[ (a) 1 \]
\[ (b) 2 \]
\[ (c) 3 \]
\[ (d) 4 \]

4. The solution to \( \frac{x}{8} + \frac{3}{2} \) is \( x = \frac{7}{8} \). Is which of the following?

\[ \frac{7}{8} \]
\[ \frac{7}{2} \]
\[ \frac{3}{8} \]
\[ \frac{3}{2} \]

3. For \( x = -6 \), the rational expression \( \frac{x^2 + 2x - 3}{x - 3} \) has a value of

\[ \frac{2x + 6}{x - 3} \]
\[ \frac{3}{x - 3} \]
\[ \frac{4}{x - 3} \]
\[ \frac{5}{x - 3} \]

2. When the expression \( 5x(2x + 3) - 15x + 12 \) is simplified, it is equivalent to

\[ 7x^2 + 30x + 12 \]
\[ 7x^2 - 10x + 2 \]
\[ 7x^2 - 10x + 2 \]
\[ 7x^2 + 30x + 12 \]

1. Which of the following is algebraically equivalent to the sum of \( -x^2 - 8x + 7 \) and \( 3x^2 - 5x - 2 \)?

\[ 2x^2 - 5x + 5 \]
\[ 2x^2 - 5x - 5 \]
\[ 2x^2 - 13x + 5 \]
\[ 2x^2 - 13x - 5 \]
2. \( e^{-x} = x \quad b = 4 \quad h = 1 \quad i = 7 \quad k = 5 \sqrt{2} (x - 2) \)

\[
L = 7 - \frac{1}{17} x \quad \frac{1}{8} + x = \sqrt{x + 5} \\
\text{and} \quad 5x + 1 + \frac{1}{17} x = \frac{1}{8} + x
\]

Since they do not equal each other, these are both equations.
Choose one and solve for \( x \).

3. \( 1 + x^2 = x \quad (4) \quad \text{Choice} \quad i \)

Plug in \( x = 4 \) to get \( 1 + x^2 = x \).

10. Which of the following values of \( x \) is a zero of the expression

\[
x^3 + 1 = 0
\]

(1) \( x = 1 \) 
(2) \( x = 2 \) 
(3) \( x = 3 \) 
(4) \( x = 4 \)

9. The monomial \( 3x^7 \) can be written as the product of \( -3x^7 \) and \( 1 \).

The exponential expression \( 2x^5 \) can be written as \( 2x^5 \).

8. The exponential expression \( -2x^5 \) can be written as \( -2x^5 \).

7. If \( x = 10 - 2/x + 11 \), then what is the value of \( y \) when \( x = 25 \)?

6. The following expression is in the form \( ax^2 + bx + c \), where

\[
x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\]

Write the following expression in the form \( ax^2 + bx + c \), where

\[
x^2 - 3x + 2
\]

5. The exponential expression \( -2x^5 \) can be written as \( -2x^5 \).

4. \( 10x^3 - 2x^2 + 3x - 5 \) is formed, what is the coefficient of the \( x \) term?

3. If the product of the binomial \( (2x - 5) \) with the binomial

\[
(3x^2 + 5x - 2)
\]

is expanded, what is the constant term? The binomial \( (2x - 5) \) is formed, what is the coefficient of the \( x \) term?

2. If the product of the binomial \( (2x - 5) \) with the binomial

\[
(3x^2 + 5x - 2)
\]

is expanded, what is the constant term?
14. Consider the equation $7x - 3 = 2(x - 3) + 3(x + 1)$. 

15. The cubic expression $x^3 - 6x^2 - 31x + 120$ has three integer zeros on the interval $-10 \leq x \leq 10$. Use technology to help you determine the zeros. Explain how you found them.

17. If $y = 0$ and look to see outcome $y = c$.

\[ y' = x^3 - 6x^2 - 31x + 120 \]

When $x = 7$, the graph expression $y = 7x - 3$ and $x = -1$ are solutions to this equation.

When $x = 3$, the graph expression $y = 7x - 3$ and $x = -1$ are solutions to this equation.

\[ y' = x^3 - 6x^2 - 31x + 120 \]

When $x = 7$, the graph expression $y = 7x - 3$ and $x = -1$ are solutions to this equation.

When $x = 3$, the graph expression $y = 7x - 3$ and $x = -1$ are solutions to this equation.

16. Given the expression $(x - 5)(x + 7)(2x - 3)$ do the following:

(a) Show that $x = 5$ is a zero of the expression.

(b) What is the other zero of the expression? Show how you arrive at your answer.

(c) When you arrive at your answer, explain how you arrived at your answer.

13. If you have an infinite equation, how can this equation have at least two solutions as you showed in part (a)? Explain.

This is a literal equation. Typically, we expect literal equations to have at least one solution. In this case, we have an infinite number of solutions because the variables are not isolated.
23. Given the function $y = \frac{1}{x} + \frac{1}{x^2}$, for which values of $x$ is the function defined? (A) $x > 0$ (B) $x < 0$ (C) $x 
eq 0$ (D) All real numbers

24. For the function $y = x^2 - 4x + 4$, the equation $0\times0 = (x) f$ is solved by the formula $x = 2$. Which of the following is the value of the function $y$ at $x = 2$? (A) 0 (B) 4 (C) 16 (D) 32

25. Which of the following sets of ordered pairs would not be considered a function? (A) $\{(1, 2), (2, 3), (3, 4), (4, 5)\}$ (B) $\{(1, 2), (2, 3), (3, 3), (4, 5)\}$ (C) $\{(1, 2), (2, 3), (3, 4), (4, 4)\}$ (D) $\{(1, 2), (2, 3), (3, 4), (4, 5)\}$

18. Write the algebraic expression below in simplest terms. Then, simplify by selecting a value (let's use $x = 3$).

$$\frac{(x^2 - 3x + 2) + (x^2 + 4x + 5)}{(x^2 + x - 2) + (x^2 - x + 3)}$$
27. Which of the following is the y-intercept of the parabola?

28. Given the function shown graphed below, answer:

(a) When is

(b) How many values solve the equation \( f(x) = 4 \)? Explain how.

29. Determine the value of \( f(2) \) when \( y \) when \( x = 2 \) is

30. Determine the defined function \( g(x) = \frac{x^2 - 1}{x - 1} \).

31. Which of the following values of \( x \) would not be in the domain of the function?\( f(x) = \frac{2x + 3}{x - 7} \)

32. Given the function shown below, over which of the following intervals is the function always increasing?

(a) \( x > 0 \)
(b) \( x > 4 \)
(c) \( x > 5 \)
(d) \( x > 7 \)

33. If a second function is defined by \( g(x) = \frac{2x - 7}{x - 1} \), then

34. Solve for \( p \).

35. Your answer: \( \int f(x) \, dx = \frac{1}{2}x^2 + C \). Show the work that leads to this conclusion.

36. 

\[ \frac{d}{dx} (\frac{3}{x}) = \frac{-3}{x^2} \]

37. 

\[ \frac{d}{dx} (\frac{2x}{x - 7}) = \frac{2(x - 7) - 2x}{(x - 7)^2} = \frac{-2}{(x - 7)^2} \]
29. For the function \( f(x) = \sqrt{x-9} \), either \( x = 0 \) or \( x = 45 \) is a member of its domain. Determine which and explain how you arrived at your answer.

[Image: A graph showing the function \( f(x) = \sqrt{x-9} \)]

0 is not ble it gives a neg under the \( \sqrt{ } \) which are imaginary numbers.

30. The temperature of a room is measured over the span of the day with selected values given in the table below.

<table>
<thead>
<tr>
<th>Time (hrs)</th>
<th>0.5</th>
<th>1.5</th>
<th>2.0</th>
<th>4.0</th>
<th>5.5</th>
<th>7.25</th>
<th>8.0</th>
<th>9.5</th>
<th>10.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature (°F)</td>
<td>64</td>
<td>66</td>
<td>71</td>
<td>78</td>
<td>81</td>
<td>79</td>
<td>71</td>
<td>68</td>
<td>66</td>
</tr>
</tbody>
</table>

Based on this table, explain why temperature can be considered a function of time but time cannot be considered a function of temperature. It cannot be a function because there are temperature values that repeat.

31. The distance that a person drives at a constant speed varies directly with the amount of time they have been driving. If, at a particular speed, a person drives 107 miles in two hours, then how far will they drive, at the same speed, in \( 1 \frac{1}{4} \) hours?

(1) 75 miles  (3) 91 miles
(2) 44 miles  (4) 67 miles

\[ \frac{107}{2} = \frac{x}{1 \frac{1}{4}} \]

32. Given the function \( f(x) = x^2 - 2x + 7 \), what is its average rate of change over the interval \( 3 \leq x \leq 11 \)?

\[ m = \frac{106 - 10}{11 - 3} = \frac{96}{8} = 12 \]

(1) 8  (3) -5  (4) -7  (2) 12  (3, 10)  (11, 106)

33. Which of the following an equation for the line that is parallel to the line \( y = 2x - 9 \) and passes through the point \((-1, 5)\)?

(1) \( y = -14x - 9 \)  (3) \( y = 2x + 7 \)
(2) \( y = 2x + 5 \)  (4) \( y = -14x + 4 \)

34. At what \( x \)-coordinate would a line whose equation is \( y = 2x - 3 \) intersect a perpendicular line whose \( y \)-intercept is 17?

(1) \( x = 12 \) negative reciprocal  (3) \( x = -5 \) \( y = \frac{1}{2}x + 17 \)
(2) \( x = -11 \) slopes  (4) \( x = 8 \) \( y = 2x - 3 \)

35. The speed of a car, in miles per hour, is a linear function of time, in minutes. Which of the following would be the units of the slope of this linear function?

(1) miles  (3) hours \( \frac{m}{hour} \)
(2) miles/hour \( \frac{min}{hour} \)  (4) miles \( \frac{min}{minute} \)
Let $n = 3 \frac{3}{4}$.
Then
$$u(\epsilon) = 3 \frac{3}{4} - 3 \frac{3}{4} = 0.$$
41. Solve the following system of equations algebraically:

\[
\begin{align*}
8x + 3y + 2z &= 10y \\
15x + 6y + 3z &= 10y \\
10x - 3x - 3z &= 40 \\
3x + 3y - 3z &= 33
\end{align*}
\]

42. The expression \( \frac{x}{1} \) is equivalent to

\[
\begin{align*}
\text{Exponential and Logarithmic Functions:} \\
3y &= 5y - 0 \\
15x &= 10y - 3z = 33 \\
8x + 3a &= 10y \\
\text{and } x = 32 \\
\text{and } z = 32
\end{align*}
\]

43. The exponential function \( y = 16(2)^x \) could be rewritten as

\[
\begin{align*}
\frac{x}{\phi} &= y \\
\phi &= 32 \\
\frac{x}{\phi} &= 2x \\
\frac{x}{\phi} &= 2x \\
\frac{x}{\phi} &= 2x \\
\frac{x}{\phi} &= 2x \\
\frac{x}{\phi} &= 2x
\end{align*}
\]

44. Which of the following is equivalent to \( \frac{x}{\phi} \)?

\[
\begin{align*}
\frac{2}{\phi} &= x \\
\phi &= 32 \\
\frac{2}{\phi} &= x \\
\phi &= 32 \\
\frac{2}{\phi} &= x \\
\phi &= 32 \\
\frac{2}{\phi} &= x \\
\phi &= 32 \\
\frac{2}{\phi} &= x
\end{align*}
\]

45. Which of the following would give the same result as \( \sqrt{x^2} \)?

\[
\begin{align*}
\sqrt{x^2} &= \frac{x}{\phi} \\
\sqrt{x^2} &= \frac{x}{\phi} \\
\sqrt{x^2} &= \frac{x}{\phi} \\
\sqrt{x^2} &= \frac{x}{\phi} \\
\sqrt{x^2} &= \frac{x}{\phi}
\end{align*}
\]

43. The exponential function \( y = 16(2)^x \) could be rewritten as
46. For the function \( f(x) = 5x + 2 \), which of the following represents its \( y \)-intercept?

(1) 2
(2) 3
(3) 12
(4) 17

47. Which of the following could be the equation of the graph shown below?

(1) \( y = 0 \)
(2) \( y = 1 \)
(3) \( y = -1 \)
(4) \( y = -2 \)

48. Selected values of an exponential function of the form \( P(t) = P_0 \cdot 2^{t/h} \) are shown below. To the nearest hundredth, which of the following represents the value of \( h \)?

(1) 1.13
(2) 1.78
(3) 2.03
(4) 2.13

49. Which of the following values of \( x \) solves the equation \( 2^{x+2} - 8 = 2^{x-2} \)?

(1) 2
(2) 3
(3) 8
(4) 13

50. In terms of the unknown constant \( a \), which of the following is the correct form of the equation of the line shown below?

(1) \( y = \frac{6}{5}x + 3 \)
(2) \( y = \frac{5}{3}x - 2 \)
(3) \( y = \frac{3}{5}x + 2 \)
(4) \( y = \frac{2}{5}x - 3 \)
58. Given the function \( f(x) = \log_2(2x - 8) \), which of the following:

\[ y = 100 (1 + 0.028)^x \]

55. The importance of a cooking humidifier is a room held at a constant

54. If a population grows at a constant rate of 3% per year, then

53. The half-life of a radioactive material is the amount of time it takes for 50% of its radioactive material to decrease. If a particular

radiometric dating was a sample of 35 years, then what percent remains

52. The water level in a drainage reservoir is changing such that the

51. If the percent will grow over the next 10 years?

50. If 6 < 0, then \( \log_b \left( \frac{3}{9} \right) \) is equal to

49. What is the amount of time it has been cooking in minutes, and is the amount of time it has been cooking in minutes, \( p(t) \) where \( p(t) = 132 \times 0.97 \) + 75, where \( p \) is the Fahrenheit temperature

48. A student is using a calculator to find the value of \( \log_2 \left( \frac{3}{9} \right) \). Which of the following is closest to the value of \( \log_2 (40) \)?

47. If a population will grow over the next 10 years?

46. The logarithm of a number is a logarithm of the

45. After 10

\[ y = 132 \times 0.97 + 75 \]

44. \( y = 13.11 \times 0.85 \times 1.028 \)

43. The water level in a drainage reservoir is changing such that the

42. The water level in a drainage reservoir is changing such that the

41. If the percent will grow over the next 10 years?

40. If 6 < 0, then \( \log_b \left( \frac{3}{9} \right) \) is equal to

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38. Given the function \( f(x) = \log_2(2x - 8) \), which of the following:

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27. If 6 < 0, then \( \log_b \left( \frac{3}{9} \right) \) is equal to

26. Which of the following is closest to the value of \( \log_2 (40) \)?

25. The importance of a cooking humidifier is a room held at a constant

24. If a population grows at a constant rate of 3% per year, then

23. The water level in a drainage reservoir is changing such that the

22. The water level in a drainage reservoir is changing such that the

21. If the percent will grow over the next 10 years?

20. If 6 < 0, then \( \log_b \left( \frac{3}{9} \right) \) is equal to

19. The logarithm of a number is a logarithm of the

18. Given the function \( f(x) = \log_2(2x - 8) \), which of the following:

17. If 6 < 0, then \( \log_b \left( \frac{3}{9} \right) \) is equal to

16. Which of the following is closest to the value of \( \log_2 (40) \)?

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14. If a population grows at a constant rate of 3% per year, then

13. The water level in a drainage reservoir is changing such that the

12. The water level in a drainage reservoir is changing such that the

11. If the percent will grow over the next 10 years?

10. If 6 < 0, then \( \log_b \left( \frac{3}{9} \right) \) is equal to

9. The logarithm of a number is a logarithm of the

8. Given the function \( f(x) = \log_2(2x - 8) \), which of the following:

7. If 6 < 0, then \( \log_b \left( \frac{3}{9} \right) \) is equal to

6. Which of the following is closest to the value of \( \log_2 (40) \)?

5. The importance of a cooking humidifier is a room held at a constant

4. If a population grows at a constant rate of 3% per year, then

3. The water level in a drainage reservoir is changing such that the

2. The water level in a drainage reservoir is changing such that the

1. If the percent will grow over the next 10 years?
59. If $y = 2 - x$, then $y = \log_b (x+2)$.

60. Which of the following is equivalent to $\log_2 (\frac{x}{y})$?
   - (1) $\log_2 x - \log_2 y$
   - (2) $2 \log_2 x - \log_2 y$
   - (3) $\log_2 x + \log_2 y$
   - (4) $\frac{\log_2 x}{\log_2 y}$

61. If $\log_3 (5) = 1.2$, then $\log_3 (125) = ?$
   - (1) 0.4
   - (2) 1.728
   - (3) 3
   - (4) 5

62. If $\log_e (c) = \ln (\frac{1}{2})$, then which of the following is the natural base $e$?
   - (1) $\frac{1}{\ln c}$
   - (2) $\frac{1}{k}$
   - (3) $\ln c$
   - (4) $\frac{k}{c}$

63. If $f(x) = 50(0.92)^x + 75$, then which of the following values of $x$ solves the equation $f(x) = 90$?

64. If $c^x = c$ and $c$ and the natural base $e$.
   - (1) $\ln (\frac{1}{2})$
   - (2) $1$
   - (3) $-2$
   - (4) $2$

65. Which of the following is the value of $k$?
   - (1) $k = -1$
   - (2) $k = 1$
   - (3) $k = 2$
   - (4) $k = 3$

66. If $\log_3 (b) = \frac{3}{2}$, then $b = ?$
   - (1) $0.5$
   - (2) $1.4$
   - (3) $3.0$
   - (4) $3.6$

67. If $\log_2 (x) = 3$, then $x = ?$
   - (1) $2$
   - (2) $4$
   - (3) $8$
   - (4) $16$
70. An object is slowing down such that its speed is decreasing down the easy incline.

Where the answer matches the nearest hundredth, both $a$ and $p$ to the nearest hundredth.

Both $a$ and $p$ to the nearest hundredth.

68. The expression \( \sqrt{\frac{q}{r}} \) can be written as \( b \) in simplest form. Determine the value of \( q \). Show how you arrived at your answer.

5. $3 \div 2 = \frac{3}{2}$

69. The temperature of a cooling liquid is given by the function $T(t) = 38(0.82)^t + 21$, where $T$ represents the temperature in degrees Celsius, $t$ represents the number of minutes, and $m$ represents the initial temperature.

69. The temperature of a cooling liquid is given by the function $T(t) = 38(0.82)^t + 21$, where $T$ represents the temperature in degrees Celsius, $t$ represents the number of minutes, and $m$ represents the initial temperature.

$T(0) = 38$, and after 3 seconds it is decreasing at only 11 feet per second and after 3 seconds it is increasing at 9.5 feet per second exponentially. If after 2 seconds it is traveling at 58 feet per second, find an equation in the form $y = a(t)n$ that have the position $y$ as a function of the number of seconds $x$.

72. An object is slowing down such that its speed is decreasing down the easy incline.

67. Following is the value of $y$ to the nearest hundredth:

\[
\frac{9}{13} - 2.17 = 0.089 \text{ yrs}
\]

Following is the value of $y$ to the nearest hundredth:

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\frac{9}{13} - 2.17 = 0.089 \text{ yrs}
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\]
71. A bank account's worth can be modeled using the formula

\[ A = P \left(1 + \frac{r}{n}\right)^{nt} \]

where:
- \(A\) is the amount of money accumulated after n years, including interest.
- \(P\) is the principal amount (the initial amount of money).
- \(r\) is the annual interest rate (decimal).
- \(n\) is the number of times that interest is compounded per year.
- \(t\) is the number of years the money is invested for.

72. If the population of Arizona is decreasing by 5.8% per year, by what factor will it be decreased in 5 years?

Assuming the population decreases exponentially, the formula for exponential decay is:

\[ P = P_0 \times (1 - r)^t \]

where:
- \(P\) is the final amount.
- \(P_0\) is the initial amount.
- \(r\) is the rate of decrease.
- \(t\) is the time in years.

Given that the population decreases by 5.8% per year, the rate of decrease \(r = 0.058\). Plugging the values into the formula:

\[ P = P_0 \times (1 - 0.058)^5 \]

For the sake of this problem, let's assume the initial population is 100,000. Then:

\[ P = 100,000 \times (0.942)^5 \]

Calculating this gives the final population after 5 years.

73. A liquid's temperature is held at 70°F. The temperature is rising at a rate of 3°F per minute. Write a function that models the temperature of the liquid as a function of time, \(T\).

The formula for temperature change is:

\[ T(t) = T_0 + rt \]

where:
- \(T(t)\) is the temperature at time \(t\).
- \(T_0\) is the initial temperature.
- \(r\) is the rate of temperature change.
- \(t\) is time in minutes.

Given \(T_0 = 70\) and \(r = 3\), the function becomes:

\[ T(t) = 70 + 3t \]

74. A bank account is worth $380. If \((1 + \frac{1}{2}) \frac{1}{2}\) is deposited into the account, it takes 7 years for the account to be worth $500. How much is deposited into the account?

The formula for compound interest is:

\[ A = P \left(1 + \frac{r}{n}\right)^{nt} \]

where:
- \(A\) is the amount of money accumulated after n years, including interest.
- \(P\) is the principal amount (the initial amount of money).
- \(r\) is the annual interest rate (decimal).
- \(n\) is the number of times that interest is compounded per year.
- \(t\) is the number of years the money is invested for.

Given \(A = 500\), \(P = 380\), \(t = 7\), and \(r = \frac{1}{2}\), we can solve for \(n\) to find the number of times interest is compounded per year.

75. How many minutes does the model predict it will take for the liquid to reach a temperature of 70°F? Round to the nearest minute.

To find the time \(t\) when the temperature reaches 70°F, we set the function \(T(t) = 70\) and solve for \(t\).

\[ 70 = 70 + 3t \]

Solving for \(t\) gives the time it takes for the liquid to reach 70°F.

76. If \(T(15) = 105\), find the value of \(x\) accurate to the nearest hundredth. 105 = 70 + 3x

Solving for \(x\) gives the value of \(x\) when \(T(15) = 105\).

77. Why does it make sense to round your answer to the nearest quarter of a year?

Rounding to the nearest quarter of a year ensures that the final amount is calculated using whole years, which is more practical and easier to understand than using fractions of a year.

78. What does \(y = \frac{1}{10^2}\) represent in the context of the problem?

The expression \(\frac{1}{10^2}\) represents the fraction of the original amount of money after 100 years, given a certain growth rate.

79. If \(y = 1.49\), what does this represent in the context of the problem?

The value \(y = 1.49\) represents the growth factor of the account after 100 years.

80. Why does \(1 + \frac{1}{10^2}\) make sense in this context?

The expression \(1 + \frac{1}{10^2}\) represents the growth rate of the account when \(y = 1.49\), indicating the account has increased by 49% over 100 years.