MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the equation.
1) \( -1[7x + 6 - 7(x + 1)] = -4x - 6 \)
   A) \([-1] \)  
   B) \([-\frac{7}{4}] \)  
   C) \([-\frac{19}{7}] \)  
   D) \([-\frac{19}{4}] \)

Solve problems 2-4.
2) In triangle \( ABC \), the angle \( C \) is six times as large as angle \( A \). The measure of angle \( B \) is 60° greater than that of angle \( A \). Find the measure of the angles.
   A) 35°, 90° and 55°  
   B) 15°, 60° and 105°  
   C) 40°, 50° and 90°  
   D) 15°, 75° and 90°

3) A circular hole is filled with concrete to make a footing for a load-bearing pier. The hole measures 17 inches across and requires 1.6 bags of concrete in order to fill it to ground level. What is the depth of the hole? Round your answer to the nearest inch. (One bag of concrete, when mixed with the appropriate amount of water, makes 1800 in.\(^3\) of material.)
   A) 17 in.  
   B) 10 in.  
   C) 19 in.  
   D) 13 in.

4) A square plywood platform has a perimeter which is 9 times the length of a side, decreased by 35. Find the length of a side.
   A) 7  
   B) 1  
   C) 12  
   D) 5

Solve the equation.
5) \( \frac{x - 5}{7} = \frac{x + 3}{2} \)
   A) \([-\frac{31}{5}] \)  
   B) \([-\frac{11}{5}] \)  
   C) \([-\frac{31}{9}] \)  
   D) \([-\frac{26}{5}] \)

Solve the problem.
6) Your home state uses a linear model \( y = 22(x - 70) + 4338 \) to predict the number of vacationers (\( y \)) as compared to the average temperature for that week (\( x \)). Find the number of vacationers predicted for a week with an average temperature of 68 degrees.
   A) 7374 vacationers  
   B) 5764 vacationers  
   C) 95,392 vacationers  
   D) 4294 vacationers

Solve the equation by the zero-factor property.
7) \( 2x^2 = 18x - 36 \)
   A) \([-6, 3] \)  
   B) \([-6, -3] \)  
   C) \([3, 6] \)  
   D) \([-6, 12] \)

Solve the equation using the quadratic formula.
8) \( 3x^2 = -10x - 5 \)
   A) \([-\frac{5}{3}, \frac{\sqrt{10}}{3}] \)  
   B) \([-\frac{10 \pm \sqrt{10}}{3}] \)  
   C) \([-\frac{5}{3} \pm \frac{\sqrt{10}}{3}] \)  
   D) \([-\frac{5}{6}, \frac{\sqrt{10}}{6}] \)
Solve the equations in problem 9 and 10.

9) \( \sqrt{3x + 10} = 5 - 2x \)
   A) \( \left\{ \frac{3}{4}, 5 \right\} \)
   B) \{5\}
   C) \( \left\{ \frac{3}{4} \right\} \)
   D) \( \left\{ \frac{5}{4}, 9 \right\} \)  

Solve the equation.

10) \( x^4 + 1125 = 134x^2 \)
   A) \( \{-5\sqrt{5}, -3, 3, 5\sqrt{5}\} \)
   B) \{3, 5\sqrt{5}\}
   C) \{9, 125\}
   D) \{-125, -9, 9, 125\}  

Solve the equation using the quadratic formula.

11) \( 2 = \frac{10}{x} - \frac{5}{x^2} \)
   A) \( \left\{ \frac{-5 \pm \sqrt{15}}{2} \right\} \)
   B) \( \left\{ \frac{-5 \pm \sqrt{15}}{4} \right\} \)
   C) \( \left\{ \frac{-5 \pm \sqrt{35}}{2} \right\} \)
   D) \( \left\{ -10 \pm \sqrt{15} \right\} \)  

In problems 12 and 13, solve and graph the inequality. Give answer in interval notation.

12) \(-6x + 12 > -7x + 17\)
   A) \((5, \infty)\)
   B) \((-\infty, 5)\)
   C) \((29, \infty)\)
   D) \((-\infty, 29)\)  

13) \(15 < 4x + 3 \leq 31\)
   A) \((3, 7)\)
   B) \([3, 7)\)
   C) \((3, 7]\)
   D) \([3, 7]\)  

Solve the quadratic inequality. Write the solution set in interval notation.

14) \(x^2 - 4x - 21 \leq 0\)
   A) \([7, \infty)\)
   B) \((-\infty, -3]\)
   C) \((-\infty, -3] \cup [7, \infty)\)
   D) \([-3, 7]\)
Graph the solution set in problems 15 and 16.

15) $|x| \geq 3$

16) $|x| = 1$

Solve the equations in 17 and 18.

17) $|2x - 8| = 5$

A) $\left\{ \frac{3}{2}, \frac{13}{2} \right\}$

B) $\left\{ -\frac{3}{2}, -\frac{13}{2} \right\}$

C) $\left\{ \frac{13}{2} \right\}$

D) $\left\{ \frac{13}{2}, \frac{3}{2} \right\}$

Solve the equation.

18) $|9x - 2| = |8x - 5|$

A) $\left\{ \frac{3}{17}, 7 \right\}$

B) $\left\{ -3, \frac{7}{17} \right\}$

C) $\{-7, 1\}$

D) $\{7, 1\}$
Solve the inequalities in 19 and 20. Write the solution set in interval notation.

19) \(|5 - 4x| > 8\)
   A) \(\left\{ -\infty, \frac{3}{4} \right\} \cup \left( \frac{3}{4}, \infty \right)\)
   B) \(\left\{ -\infty, \frac{13}{4} \right\} \cup \left( \frac{13}{4}, \infty \right)\)
   C) \(\left\{ -\infty, \frac{1}{4} \right\} \cup \left( -\frac{15}{4}, \infty \right)\)
   D) \(\left\{ -\infty, -\frac{13}{4} \right\} \cup \left( -\frac{13}{4}, \infty \right)\)

20) \(|-8x + 9| < 6\)
   A) \(\left\{ -\infty, \frac{17}{8} \right\} \cup \left( -\frac{5}{8}, \infty \right)\)
   B) \(\left\{ \frac{3}{8}, \frac{15}{8} \right\} \cup \left( \frac{5}{8}, \infty \right)\)
   C) \(\left\{ -\frac{3}{8}, \frac{15}{8} \right\} \cup \left( \frac{3}{8}, \infty \right)\)
   D) \(\left\{ -\infty, \frac{3}{8} \right\} \cup \left( \frac{15}{8}, \infty \right)\)

Find the products in problems 21-23.

21) \((3x - 5)(x + 5)\)
   A) \(x^2 - 25x + 10\)
   B) \(x^2 + 10x - 22\)
   C) \(3x^2 + 10x - 25\)
   D) \(3x^2 - 22x - 25\)

22) \(2(x - 4)(x + 9)\)
   A) \(24x^3 + 66x^2 - 18x\)
   B) \(20x^3 + 68x^2 - 16x\)
   C) \(22x^2 + 67x - 18\)
   D) \(12x^3 + 33x^2 - 9x\)

23) \((4r^2 - 5r + 3)(r^2 + 3r + 4)\)
   A) \(4r^4 + 12r^3 + 11r + 12\)
   B) \(4r^4 + 7r^3 + 11r + 12\)
   C) \(4r^4 + 7r^3 + 4r^2 - 11r + 12\)
   D) \(4r^4 + 12r^3 + 4r^2 - 11r + 12\)

Factor by grouping.

24) \((4x^2 - 16x + 15x - 20)\)
   A) \((4x - 5)(3x + 4)\)
   B) \((12x - 5)(x + 4)\)
   C) \((12x + 5)(x - 4)\)
   D) \((4x + 5)(3x - 4)\)

Find the center-radius form of the equation of the circle.

25) Center \((4, 0)\), radius 7
   A) \((x - 4)^2 + y^2 = 49\)
   B) \(x^2 + (y + 4)^2 = 7\)
   C) \(x^2 + (y - 4)^2 = 7\)
   D) \((x + 4)^2 + y^2 = 49\)

Decide whether each relation defines a function in problems 26 and 27.

26) \((-2, 1), (-3, -6), (3, -4), (3, 6)\)
   A) Function
   B) Not a function

27) \(y = x^3\)
   A) Function
   B) Not a function

Give the domain and range of the relation.

28) \((2, 2), (-3, -3), (-6, -6), (6, 6)\)
   A) Domain: \([2, 6]\); range: \([-6, -3]\)
   B) Domain: \([-6, -3]\); range: \([2, 6]\)
   C) Domain: \([-6, -3, 2, 6]\); range: \([-6, -3, 2, 6]\)
   D) None of these
Graph the equation by determining the missing values needed to plot the ordered pairs.

29) \( y + x = 4; \ (1, \ _\ ), \ (4, \ _\ ), \ (3, \ _\ ) \)
Graph the circle.

30) \((x - 3)^2 + (y + 4)^2 = 4\)

![Graph of the circle](image)

A) 
B) 
C) 
D) 

Give the domain and range of the relation.

31) \(y = \frac{-6}{x - 2}\)

A) domain: \((-\infty, -2) \cup (2, \infty)\); range: \((-\infty, \infty)\)
B) domain: \((-\infty, 2) \cup (2, \infty)\); range: \((-\infty, \infty)\)
C) domain: \((-\infty, 2) \cup (2, \infty)\); range: \((-\infty, 0) \cup (0, \infty)\)
D) domain: \((-\infty, -2) \cup (-2, \infty)\); range: \((-\infty, 0) \cup (0, \infty)\)
32) Find the domain and the range.

A) domain: \((-\infty, \infty)\); range: \((-\infty, \infty)\)
B) domain: \((-\infty, -5)\) or \((-5, \infty)\); range: \((-\infty, 2)\) or \((2, \infty)\)
C) domain: \((-\infty, -5]\); range: \((-\infty, 2]\)
D) domain: \((-\infty, \infty)\); range: \((-\infty, 2]\)

33) An equation that defines \(y\) as a function of \(x\) is given. Solve for \(y\) in terms of \(x\), and replace \(y\) with the function notation \(f(x)\).

\[ x - 2y = 18 \]

A) \(f(x) = \frac{1}{2}x - 18\)   B) \(f(x) = \frac{1}{2}x - 9\)   C) \(f(x) = -x + 9\)   D) \(f(x) = -\frac{1}{2}x + 9\)

34) Determine the intervals over which the function is decreasing, increasing, and constant.

A) Increasing \([3, \infty)\); Decreasing \((-\infty, 3]\)
B) Increasing \((-\infty, 3]\); Decreasing \([3, \infty)\)
C) Increasing \((-\infty, 3]\); Decreasing \((-\infty, 3]\)
D) Increasing \([3, \infty)\); Decreasing \([3, \infty)\)
Solve the problem.

35) Along with incomes, people's charitable contributions have steadily increased over the past few years. The table below shows the average deduction for charitable contributions reported on individual income tax returns for the period 1993 to 1998. Find the average rate of change per year between 1995 and 1997.

<table>
<thead>
<tr>
<th>Year</th>
<th>Charitable Contributions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>$1850</td>
</tr>
<tr>
<td>1994</td>
<td>$2420</td>
</tr>
<tr>
<td>1995</td>
<td>$2480</td>
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<tr>
<td>1996</td>
<td>$2810</td>
</tr>
<tr>
<td>1997</td>
<td>$3100</td>
</tr>
<tr>
<td>1998</td>
<td>$3150</td>
</tr>
</tbody>
</table>

A) $340 per year  B) $310 per year  C) $335 per year  D) $620 per year

Solve the problem. Write all linear equations in slope-intercept form.

36) A biologist recorded 11 snakes on 24 acres in one area and 13 snakes on 49 acres in another area. Find a linear equation that models the number of snakes in x acres.

A) \( y = x + 13 \)  B) \( y = \frac{2}{25}x - \frac{227}{25} \)  C) \( y = \frac{25}{2}x + \frac{25}{227} \)  D) \( y = \frac{2}{25}x + \frac{227}{25} \)

Find the product. Write the answer in standard form.

37) \((6 - 2i)(7 - 5i)\)

A) 52 +16i  B) 10i^3 +44i^2 +42i  C) -44 - 32i  D) 44 +32i

Find the sum or difference in problems 38 and 39. Write the answer in standard form.

38) \((2 - 4i) + (3 + 7i)\)

A) -1 +11i  B) -5 -3i  C) 5 +3i  D) 5 -3i

39) \((-2 - 3i) - (-9 +9i) - (2 +5i)\)

A) 9 -7i  B) 5 +11i  C) 5 -17i  D) -9 +11i

Factor the trinomial completely.

40) \(3x^3 +9x^2 - 30x\)

A) \(3x(x - 2)(x +5)\)  B) \((3x^2 +6x)(x - 5)\)  C) \(3x(x +2)(x - 5)\)  D) \((x - 2)(3x^2 +15)\)

Factor out the greatest common factor. Simplify the factors, if possible.

41) \(96x^8y^9 - 60x^3y^7 +84x^6y^4\)

A) \(x^3y^2(96x^5y^5 - 60y^3 +84x^3)\)  B) \(12x^3y^4(8x^5y^5 - 5y^3 +7x^3)\)

C) \(12(8x^8y^9 - 5x^3y^7 +7x^6y^4)\)  D) \(12x^3(8x^5y^9 - 5y^7 +7x^3y^4)\)

Determine if the function is even, odd, or neither.

42) \(f(x) = -4x^5 +7x^3\)

A) Even  B) Odd  C) Neither
Find the product.

43) \( \frac{k^2 + 13k + 42}{k^2 + 15k + 56} \cdot \frac{k^2 + 8k}{k^2 + 11k + 30} \)

A) \( \frac{k^2 + 8k}{k + 5} \)  
B) \( \frac{k}{k + 5} \)  
C) \( \frac{k}{k^2 + 15k + 56} \)  
D) \( \frac{1}{k + 5} \)

Perform the indicated operations in problems 44 and 45.

44) \( \frac{x}{x^2 - 16} - \frac{8}{x^2 + 5x + 4} \)

A) \( \frac{x^2 + 7x + 32}{(x - 4)(x + 4)(x + 1)} \)  
B) \( \frac{x^2 - 7}{(x - 4)(x + 4)(x + 1)} \)  
C) \( \frac{x^2 - 7x + 32}{(x - 4)(x + 4)} \)  
D) \( \frac{x^2 - 7x + 32}{(x - 4)(x + 4)(x + 1)} \)

45) \( \frac{7}{8x} + \frac{1}{2x} \)

A) \( \frac{11}{8x} \)  
B) \( \frac{8}{11x} \)  
C) \( \frac{11}{16x} \)  
D) 1

Simplify the expression involving rational exponents.

46) \( \left( \frac{25}{64} \right)^{\frac{1}{2}} \)

A) \( \frac{25}{8} \)  
B) not a real number  
C) \( \frac{5}{8} \)  
D) \( \frac{5}{64} \)

Factor.

47) \( 25a^3 - 36a \)

A) \( a(5a + 6)(5a - 6) \)  
B) \( a(25a + 1)(a - 36) \)  
C) \( (5a^2 + 6)(5a - 6) \)  
D) \( a(5a - 6)^2 \)

Evaluate.

48) Find \( (f + g)(1) \) when \( f(x) = x + 6 \) and \( g(x) = x - 3. \)

A) 5  
B) -1  
C) 11  
D) -7

For the pair of functions, find the indicated sum, difference, product, or quotient.

49) \( f(x) = 9x - 4, g(x) = 7x - 9 \)

Find \( (f - g)(x). \)

A) \( 16x - 13 \)  
B) \( 2x + 5 \)  
C) \( 2x - 13 \)  
D) \( -2x - 5 \)
Perform the indicated operation when given that \( f(x) = 5x^2 - 8x \), \( g(x) = x^2 - 5x - 24 \) 50)

Find \( f(g)(x) \).

A) \( \frac{5x}{x + 1} \)  
B) \( \frac{5x^2 - 8x}{x^2 - 5x - 24} \)  
C) \( \frac{5x - 8}{-5} \)  
D) \( \frac{5 - x}{24} \)

Evaluate.

51) Find \( (fg)(2) \) when \( f(x) = x - 1 \) and \( g(x) = -5x^2 + 14x + 7 \).

A) 45  
B) -39  
C) 39  
D) 15

Solve the equation by the square root property.

52) \( x^2 = 8 \)

A) \( \{\sqrt{8}\} \)  
B) \( \{64\} \)  
C) \( \{\pm 2\sqrt{2}\} \)  
D) \( \{4\} \)

Find the requested function value.

53) Find \( (f \circ g)(3) \) when \( f(x) = 7x - 6 \) and \( g(x) = 5x^2 - 7x - 6 \).

A) -36  
B) 1014  
C) -90  
D) 120

Find the requested value.

54) \( f(-8) \) for \( f(x) = \begin{cases} 5x + 1, & \text{if } x < 8 \\ 8x, & \text{if } 8 \leq x \leq 10 \\ 8 - 8x, & \text{if } x > 10 \end{cases} \)

A) 41  
B) -39  
C) -64  
D) 72

Write an equation for the line described. Give your answer in slope-intercept form.

55) \( m = -5 \), through \( (-7, 9) \)

A) \( y = -5x + 33 \)  
B) \( 5x + y = 26 \)  
C) \( y = 5x - 24 \)  
D) \( y = -5x - 26 \)

Write an equation for the line described. Give your answer in standard form.

56) \( x\)-intercept -5, \( y\)-intercept 2

A) \( 2x - 5y = -10 \)  
B) \( 2x + 5y = -10 \)  
C) \( 2x - 5y = 10 \)  
D) \( -2x - 5y = -10 \)
Simplify the expression. Assume all variables represent positive real numbers.

57) $-\sqrt{96}$
   A) 9
   B) $-16\sqrt{6}$
   C) $-4\sqrt{6}$
   D) Not a real number

Graph the function.

58) $f(x) = \begin{cases} 
2x + 9, & \text{if } x < 0 \\
2x^2 - 1, & \text{if } x \geq 0 
\end{cases}$

A) 

B) 

C) 

D) 

Not a real number
Perform the indicated operations. Write the answer using only positive exponents. Assume all variables represent positive real numbers.

\[
59) \left( \frac{b^{5/6}}{n^{7/4}} \right)^2 \left( \frac{n^{1/3}}{b^{1/7}} \right)^{-3}
\]

A) \( \frac{b^{44/21}}{n^{9/2}} \)  
B) \( \frac{n^{5/2}}{b^{26/21}} \)  
C) \( \frac{n^{9/2}}{b^{44/21}} \)  
D) \( \frac{b^{26/21}}{n^{5/2}} \)  

The figure below shows the graph of a function \( y = f(x) \). Use this graph to solve the problem.

60) Sketch the graph of \( y = -f(x) \).

A)  

B)  

C)  

D)
Solve the rational inequality. Write the solution set in interval notation.

\[
61) \quad \frac{1}{x + 10} > 0
\]

A) \((-\infty, 10)\) \hspace{1cm} B) \((10, \infty)\) \hspace{1cm} C) \((-10, \infty)\) \hspace{1cm} D) \([10, \infty)\)
62) A marketing firm wishes to find a function that relates the unit price, \( p \), to demand, \( D \) for a product.

<table>
<thead>
<tr>
<th>Unit Price, ( P ) in $</th>
<th>Demand, ( D ) (Quantity sold)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>60</td>
</tr>
<tr>
<td>22</td>
<td>57</td>
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