

Equation Review

Solve each equation.

1) $p - 3 + p - 7 = -4(7p + 8) - 2(5 - 7p)$
 $2p - 10 = -28p - 32 - 10 + 14p$
 $2p - 10 = -14p - 42$
 $16p - 10 = -42$
 $16p = -32$
 $p = -2$

2) $3(b + 4) = 4 - (1 - 4b)$
 $3b + 12 = 4 - 1 + 4b$
 $3b + 12 = 3 + 4b$
 $12 = 3 + b$
 $b = 9$

3) $\left(\frac{1}{3}r + \frac{3}{2}\right) = \left(r + \frac{5}{3}\right)6$
 $2r + 9 = 6r + 10$
 $9 = 4r + 10$
 $-1 = 4r$
 $r = -\frac{1}{4}$

4) $\left(x + \frac{1}{2}\right) = \left(\frac{5}{3}x + \frac{11}{6}\right)6$
 $6x + 3 = 10x + 11$
 $3 = 4x + 11$
 $-8 = 4x$
 $x = -2$

Solve each absolute value equation.

5) $|-9r| + 5 = -67$
 $|-9r| = -72$
 No Solution

6) $2|4x + 10| - 7 = 5$
 $2|4x + 10| = 12$
 $|4x + 10| = 6$
 $4x + 10 = 6$ $4x + 10 = -6$
 $4x = -4$ $4x = -16$
 $x = -1$ $x = -4$

7) $-6y + 4 = |4y + 12|$
 $-6y + 4 = 4y + 12$ $6y - 4 = 4y + 12$
 $4 = 10y + 12$ $2y - 4 = 12$
 $-8 = 10y$ $2y = 16$
 $y = -\frac{4}{5}$ $y = 8$
 $-6(-8) + 4 = |4(8) + 12|$
 $48 + 4 = |32 + 12|$
 $52 = 44$

8) $-3y - 2 = |6y + 25|$
 $-3y - 2 = 6y + 25$ $3y + 2 = 6y + 25$
 $-2 = 9y + 25$ $2 = 3y + 25$
 $-27 = 9y$ $-23 = 3y$
 $y = -3$ $y = -\frac{23}{3}$

Solve each inequality, graph its solution, and write each answer in interval notation.

9) $31 - 7x \geq 7(1 - x) - 3x$
 $31 - 7x \geq 7 - 7x - 3x$
 $31 - 7x \geq 7 - 10x$
 $31 + 3x \geq 7$
 $3x \geq -24$
 $x \geq -8$
 $[-8, \infty)$

10) $-7(-4 + 3v) \geq -5v - 36$
 $28 - 21v \geq -5v - 36$
 $28 \geq 16v - 36$
 $64 \geq 16v$
 $4 \geq v$
 $v \leq 4$
 $(-\infty, 4]$

Solve each compound inequality and graph its solution.

11) $v - 8 < -12$ or $v - 6 \geq -3$

$+8 \quad +8 \quad +6 \quad +6$
 $v < -4$ OR $v \geq 3$

$(-\infty, -4) \cup [3, \infty)$

12) $-90 \leq 9n \leq 81$

$\frac{-90}{9} \quad \frac{81}{9}$
 $-10 \leq n \leq 9$

$[-10, 9]$

Solve each inequality and graph its solution.

13) $|2 + v| + 4 < 6$

$\frac{-4}{-4} \quad \frac{-4}{-4}$
 $|2 + v| < 2$

$(-4, 0)$

$2 + v < 2$ and $2 + v > -2$

$v < 0$ and $v > -4$

$-4 < v < 0$

$(-4, 0)$

15) $3 - |8 + m| \geq -4$

$-|8 + m| \geq -7$

$|8 + m| \leq 7$

$8 + m \leq 7$ and $8 + m \geq -7$

$m \leq -1$ and $m \geq -15$

$[-15, -1]$

14) $|v + 1| - 10 \geq -1$ $|v + 1| \geq 9$

$v + 1 \geq 9$ OR $v + 1 \leq -9$

$v \geq 8$ OR $v \leq -10$

$(-\infty, -10] \cup [8, \infty)$

$(-\infty, -10] \cup [8, \infty)$

16) $9|7 + n| + 2 \geq 65$

$|7 + n| \geq 7$

$7 + n \geq 7$ OR $7 + n \leq -7$

$n \geq 0$ OR $n \leq -14$

$(-\infty, -14] \cup [0, \infty)$

$(-\infty, -14] \cup [0, \infty)$

Describe the end behavior of each function and sketch the general shape of the graph.

17) $f(x) = -x^3 + 14x^2 - 64x + 93$ $\uparrow \downarrow$

$f(x) \rightarrow +\infty$ as $x \rightarrow -\infty$

$f(x) \rightarrow -\infty$ as $x \rightarrow +\infty$

18) $f(x) = x^2 - 4$ $\uparrow \uparrow$

$f(x) \rightarrow +\infty$ as $x \rightarrow -\infty$

$f(x) \rightarrow +\infty$ as $x \rightarrow +\infty$

Evaluate each function at the given value using synthetic substitution.

19) $f(x) = x^4 - 5x^3 + x^2 + 20x - 20$ at $x = 3$

3 | 1 -5 1 20 -20
 | ↓ 3 -6 -15 15
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 1 -2 -5 5 -5

$f(3) = -5$

20) $f(a) = a^3 - 3a^2 - 5a + 13$ at $a = 4$

4 | 1 -3 -5 13
 | ↓ 4 4 -4
 |-----
 1 1 -1 9

$f(4) = 9$