Basic Algebra Worksheet

Exponents

1. Simplify \( \left(\frac{2}{3}\right)^3 \)

2. Simplify \( (4x^2)^2 (2x^3)^3 \)

3. Simplify \( (4a^5b^3)^0 \)

4. Simplify with positive exponents only \( \frac{(x^{-3})^2 (x^{-2})^{-3}}{(x^{-3})^{-4}} \)

5. Simplify as much as possible \( \frac{(x^{-3} y^{1/2})^4}{x^{10} y^{3/2}} \)

Linear Equations

1. Determine whether -12 is a solution of \( \frac{1}{3} x + 2 = -\frac{1}{4} x + 1 \)

2. Find the solution set for \( 3a - 5 = -6a + 1 \)

3. Solve \(-15 + 3x = 3(x - 5)\)

Linear Inequalities

1. Solve and graph \( 3x + 3 < 2x - 1 \)

2. Solve \( 3(2x - 4) - 7x \leq -3x \)

3. Solve \( 2x - 3y < 6 \) for \( y \)

4. A company that manufactures ink cartridges finds that they can sell \( x \) cartridges each week at \( p \) dollars, according to \( x = 1300 - 100p \).
   What price should they charge if they want to sell at least 300 cartridges?
Absolute Value Equations

1. Solve \(|2a - 1| = 7\)
2. Solve \(|3a - 6| = -4\)
3. Solve \(\left|\frac{2}{3}x - 3\right| + 5 = 12\)
4. Solve \(|3a + 2| = |2a + 3|\)

Graphing Lines

1. Graph \(4x + 5y = 20\)
2. Graph \(y = 3x - 2\)
3. Graph \(y = -\frac{2}{3}x + 1\)
4. Graph each of the lines: a. \(y = \frac{1}{2}x\) b. \(x = 3\) c. \(y = -2\)

Slope

1. Find the slope of the line through the given points (3,1) and (5,4)
2. Find the slope of the line through the given points (-3,2) and (3, -2)
3. Find the slope of the line with an x-intercept of 4 and a y-intercept of 2.
4. Find \(a\) if the line through (5,a) and (4,2) has a slope of 3.
5. Find \(y\) if the line through \((2, y^2)\) and \((1, y)\) if perpendicular to a line with slope \(-\frac{1}{6}\)
Systems of Linear Equations

1. Solve \[
\begin{align*}
  x - 3y &= -1 \\
  2x - 3y &= 4
\end{align*}
\]

2. Solve \[
\begin{align*}
  4x + 2y &= 8 \\
  y &= -2x + 4
\end{align*}
\]

3. One number is 2 more than 3 times another. Their sum is 26. Find the two numbers.

4. Suppose 850 tickets were sold for a game for a total of $1100. If adult tickets cost $1.50 each and children’s tickets cost $1.00, how many tickets were sold?