1. \{ 1, 2, 3, ... \} is called the set of ________________
A natural number greater than 1 is a prime number if it is divisible only by 1 and itself. T or F. __________
Complete by using the associative law of addition. \((3 + 7) + 6 = \) ________
Which property (law) is being used below?
\[3(4 + 5) = 3(4) + 3(5) \rightarrow \] ____________________________

2. Find the prime factorization of \(80 = \) ____________________

3. Find the LCM of 36 and 30. ____________

4. Simplify.
\[-|-2| - |-3| + |-2|^2 = \] _________
\[-4^0 = \] _________
\[-4^2 = \] ________

5. Find
\begin{align*}
a) \quad & x + y \cdot x + y \quad \text{if } x = -4 \text{ and } y = -2 \rightarrow \quad \text{___________} \\
b) & -5 - 2 (3 - 4) - (-2) = \quad \text{__________}
\end{align*}

6. Use the rules of exponents to simplify.
\begin{align*}
a) \quad & (-2/3)^{-4} = \quad \text{___________} \\
b) \quad & (2x^3)^{-2} = \quad \text{___________} \\
c) \quad & (-4x^2y)(3x^2y) = \quad \text{___________}
\end{align*}
\begin{align*}
g) \quad & \left(\frac{2x^4y^{-2}}{4xy}\right)^2 = \quad \text{___________} \\
h) \quad & (2x^3)^2 = \quad \text{___________} \\
i) \quad & x^{3/4} \cdot x^{1/2} = \quad \text{___________}
\end{align*}

7. Simplify by using the properties of radicals and fractional exponents.
\begin{align*}
a) \quad & \sqrt[4]{64x^6y^9} = \quad \text{___________} \\
b) \quad & \sqrt{40} = \quad \text{___________} \\
c) \quad & \sqrt[3]{8x^3} = \quad \text{___________}
\end{align*}
\begin{align*}
d) \quad & (9x^2y^8)^{-1/2} = \quad \text{___________} \\
e) \quad & \frac{6}{\sqrt[3]{3}} = \quad \text{___________}
\end{align*}
1. Simplify by reducing

\[
\frac{2x^2 + 6x}{x^3 + 27} = \underline{\quad \quad} 
\]

2. Perform the given operation and simplify.

a) \[
\frac{2x}{9} \div \frac{4}{3y} \div \frac{6x^2}{5} = \underline{\quad \quad} 
\]

b) \[
\frac{5}{x-2} - \frac{2x+1}{x-2} = \underline{\quad \quad} 
\]

c) \[
\frac{x}{2x-1} - \frac{2}{2x} = \underline{\quad \quad} 
\]

d) \[
\frac{1}{x-2} + \frac{1}{x+6} = \underline{\quad \quad} 
\]

3. Find the solution of each equation.

a) \[
\frac{2x + 1}{x^2 - 4} = 0 
\]

b) \[
\frac{2}{x^3 + 2} = 0 
\]
4. Find the solution of

\[ \frac{3x + 1}{2x - 1} = \frac{3x}{2x + 1} \quad \text{b) } x - \frac{3x}{x - 2} = 1 \]

4. Find the solution of

\[ 5x^2 - 20 = 0 \quad \text{b) } 2x = 18x^2 \]

\[ x^2 - 2x = 24 \]
1. Find the solution of the following system of equations.

   a) by graphing - clearly and selectively mark (circle) your unique solution of the system of equations.

   a) \[ \begin{align*}
   x + 2y &= 4 \\
   2x - y &= 6
   \end{align*} \]

   b) \[ \begin{align*}
   y &= x^2 \\
   y &= 3
   \end{align*} \]

2. Solve by the substitution method. Solutions may include fractions.

   \[ \begin{align*}
   x + 2y &= 5 \\
   2x - 3y &= 2
   \end{align*} \]

3. Solve by the elimination method.

   \[ \begin{align*}
   4x + 3y &= 12 \\
   5x - 4y &= 20
   \end{align*} \]

4. Solve by any method.

   \[ \begin{align*}
   4x - 8y &= 1 \\
   5x - 10y &= 4
   \end{align*} \]
5. A company employs 400 employees. 2 ½ % of the employees exceeded their sick-leave allowance. How many exceeded their allowed sick time?

6. If the there were 6000 students enrolled in 1990 at ASU and in 2000 there were 6250 students, then what was the percent increase in the number of students based on the initial data from 1990?

7. An employee receives a 2 % pay raise based on his old salary. If his new salary is $2840, then find his old salary.

8. You want to have a downpayment of $2400 for a car. You invest the $2000 that you got from selling your old car (you will ride a bike for a while) into an account that pays 4 1/3 % simple interest (per year). How long (to the nearest month) will you have enough ($2400 – maybe a little bit more – but not less) to put down a downpayment of $2400.

9. You start saving up your money for college during the end of your sophomore year. On August 1, you deposit $2400. The next year you deposit $3000. At the end of your senior year you earn a total of $4000 by August 1.

   If you invest the original amounts into an account that pays 3 ¼ % per year by August 1 on each of the corresponding years. Then what amount will be in your account on August 1 when you make the third and last deposit?
1. Simplify by reducing

\[
\frac{2x^2 + 6x}{x^3 + 27} = \frac{2x(x + 3)}{(x + 3)(x^2 - 3x + 9)} = \frac{2x}{x^2 - 3x + 9}
\]

Answer:

2. Perform the given operation and simplify.

a) \[\frac{2x}{9} \div \frac{4}{3y} \div \frac{6x^2}{5} = \frac{5y}{36x}\]

Answer: \[\frac{5y}{36x}\]

b) \[\frac{5}{x - 2} - \frac{2x + 1}{x - 2} = \frac{-2x + 4}{x - 2} = \frac{-2(x - 2)}{x - 2} = -2\]

Answer: \[-2\]

c) \[\frac{x}{2x - 1} - \frac{2}{2x} = \frac{4x - 2x}{4x - 2x} = \frac{2x}{2x} = 1\]

Answer: \[1\]

d) \[\frac{1}{x - 2} + \frac{1}{x + 6} = \frac{x + 6 + x - 2}{(x - 2)(x + 6)} = \frac{2x + 4}{(x - 2)(x + 6)}\]

Answer: \[\frac{2x + 4}{(x - 2)(x + 6)}\]

3. Find the solution of each equation.

a) \[\frac{2x + 1}{x^2 - 4} = 0\]

Answer: \[2x + 1 = 0 \rightarrow x = -1/2\]

b) \[\frac{2}{x^3 + 2} = 0\]

Answer: \[2 = 0 \rightarrow \text{not possible} \rightarrow \text{no solution}\]
4. Find the solution of

a) \[ \frac{3x + 1}{2x - 1} = \frac{3x}{2x + 1} \]

answer:

\[ (3x + 1)(2x + 1) = 3x(2x - 1) \]
\[ 6x^2 + 5x + 1 = 6x^2 - 3x \]
\[ 8x = -1 \]
\[ x = -\frac{1}{8} \]

b) \[ x - \frac{3x}{x - 2} = 1 \]

answer:

\[ x(x - 2) - 3x = x - 2, \quad x \neq 2 \]
\[ x^2 - 2x - 3x = x - 2 \]
\[ x^2 - 3x - 3x + 2 = 0 \]
\[ x^2 - 6x + 2 = 0 \]
which does not factor, need quadratic formula!

5. Find the solution of

a) \[ 5x^2 - 20 = 0 \]

answer:

\[ 5x^2 = 20 \]
\[ x^2 = 4 \]
\[ x = \pm 2 \]

b) \[ 2x = 18x^2 \]

answer:

\[ 0 = 18x^2 - 2x \]
\[ 0 = 2x(9x - 1) \]
\[ 2x = 0 \quad \text{or} \quad 9x - 1 = 0 \]
\[ x = 0 \quad \text{or} \quad x = \frac{1}{9} \]

c) \[ x^2 - 2x = 24 \]

answer:

\[ x^2 - 2x - 24 = 0 \]

can use the quadratic formula but it factors!

\[ (x - 6)(x + 4) = 0 \]
\[ x = 6 \quad \text{or} \quad x = -4 \]