1 (1 point) Rewrite the following number using scientific notation: 7840000

\[ 7.84 \times 10^6 \]

2 (1 point) Rewrite the following number using scientific notation: 0.000345

\[ 3.45 \times 10^{-4} \]

3 (1 point) Rewrite the following number without scientific notation: 6.38 \times 10^{-2}

\[ 0.0638 \]

4 (3 points) Solve the following inequality for x, and express your answer using interval notation:

\[ 5x + 7 \geq 3x - 9 \]

Subtract 2x:

\[ 2x + 7 \geq -9 \]

Subtract 7:

\[ 2x \geq -16 \]

Divide by 2:

\[ x \geq -8 \]

\[ (-8, \infty) \]

5 (3 points) Solve the following inequality for x, and express your answer by graphing on a number line:

\[ -2x + 5 \geq 7 \]

Subtract 5:

\[ -2x \geq 2 \]

Divide by -2:

\[ x \leq -1 \]

\[ \boxed{-1} \]
6 (4 points) Next to each number line graph below, write down the corresponding interval notation.

\[ [-1, \infty) \]
\[ (-\infty, 2) \]
\[ [-3, 2] \]
\[ (-1, 2] \]

7 (2 points) Solve the following inequality for \( x \). Give your answer as an inequality with \( x \) isolated on one side.

\[
2(4 - 3x) < 9 + 3(x + 2) \\
8 - 6x < 9 + 3x + 6 \\
8 - 6x < 3x + 15 \\
-6x < 3x + 7 \\
-9x < 7 \\
x > -\frac{7}{9}
\]

8 (5 points) Completely simplify each of the following expressions by using properties of exponents.

(a) \((2x)^3 = 8x^2\)

(b) \((2x^{28})(3x^{11}) = 6x^{39}\)

(c) \((\frac{3}{2})^{-2} = \left(\frac{2}{3}\right)^2 = \frac{4}{9}\)

(d) \((2x^2 + 89x^4 + 1008x^6 + 55)^0 = 1\)

(e) \(\frac{x^{103}}{x^{104}} = \frac{1}{x}\)
9 (3 points) Use substitution to solve the following system of equations for \( x \) and \( y \).

\[
\begin{align*}
3x + 4y &= 6 \\
2x - 6y &= 8
\end{align*}
\]

\[
\begin{align*}
2x &= 6y + 8 \\
x &= 3y + 4
\end{align*}
\]

\[
3(3y + 4) + 4y = 6
\]

\[
9y + 12 + 4y = 6
\]

\[
13y + 12 = 6
\]

\[
13y = -6
\]

\[
y = \frac{-6}{13}
\]

\[
x = 3 \left( \frac{-6}{13} \right) + 4
\]

\[
x = \frac{-18}{13} + 4
\]

\[
x = \frac{-18}{13} + \frac{52}{13}
\]

\[
x = \frac{34}{13}
\]

10 (3 points) Use substitution to solve the following system of equations for \( x \) and \( y \).

\[
\begin{align*}
6x - 10y &= 8 \\
5y - 3x &= 0
\end{align*}
\]

\[
5y = 3x
\]

\[
y = \frac{3}{5} x
\]

\[
6x - 10 \left( \frac{3}{5} x \right) = 8
\]

\[
6x - \frac{30}{5} x = 8
\]

\[
6x - 6x = 8
\]

\[
0 = 8 \quad \text{CONTRADICTION}
\]

\[
\text{NO SOLUTION.}
\]
Let \( x \) represent the number of adult tickets sold.
Let \( y \) represent the number of student tickets sold.

Then
\[
x + y = 788 \quad \text{(the total number sold)}
\]
\[
2.50x + 1.25y = 1400 \quad \text{(the total money raised)}
\]

So
\[
y = 788 - x
\]

Hence
\[
2.50x + 1.25(788 - x) = 1400
\]
\[
2.50x + 985 - 1.25x = 1400
\]
\[
1.25x + 985 = 1400
\]
\[
1.25x = 415
\]
\[
x = 332
\]

So
\[
y = 788 - 332 = 456
\]

So there were 332 adult tickets sold and 456 student tickets sold.