1) Which statement(s) below is(are) true?

<table>
<thead>
<tr>
<th></th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>The number 4.8 is a rational number.</td>
</tr>
<tr>
<td>II</td>
<td>Every rational number is an integer.</td>
</tr>
<tr>
<td>III</td>
<td>$\sqrt{12}$ is a rational number.</td>
</tr>
</tbody>
</table>

A II and III only  
B I and III only  
C I and II only  
D I only  
E III only

2) Simplify and collect (combine) like terms.

$$-4(x + 2) + 3y + \frac{1}{2}(4x - 8y + 10) - 10x$$

A $-12x - y + 13$  
B $-12x - y - 3$  
C $-12x - 5y + 12$  
D $-12x - 5y + 2$  
E None of the above.

3) Which statement is false?

A $4^{-2} = \frac{1}{16}$  
B $(x^3)(x^3) = 1$  
C $3^4 \cdot 3^{-8} \cdot 3 = -27$  
D $(-6)^4 = 1296$  
E $\frac{8^{24}}{8^7} = 8^{31}$
4) Simplify. \[
\left( \frac{3p^3}{q^5} \right)^3 \left( \frac{3p^4}{q^2} \right)^{-1}
\]

\[
\begin{align*}
A & \quad \frac{81}{pq^7} \\
B & \quad \frac{9}{pq^{11}} \\
C & \quad \frac{-81p^7}{q^3} \\
D & \quad \frac{-81}{pq^{11}} \\
E & \quad \frac{9}{pq^{12}q^{18}}
\end{align*}
\]

5) In 2009, there was $2,800,000,000 collected for taxes in Metropolis. If there were 160,000 residents in the city and the taxes were divided evenly among all residents, how much did each resident pay? (Use scientific notation.)

\[
\begin{align*}
A & \quad \$1.75 \times 10^3 \\
B & \quad \$1.75 \times 10^5 \\
C & \quad \$1.2 \times 10^4 \\
D & \quad \$1.75 \times 10^4 \\
E & \quad \$1.2 \times 10^5
\end{align*}
\]

6) Simplify by combining, if possible.
\[
3\sqrt{27} - 4\sqrt{48} + \sqrt{243}
\]

\[
\begin{align*}
A & \quad 7\sqrt{3} \\
B & \quad \sqrt{243} - 7\sqrt{3} \\
C & \quad -12\sqrt{3} \\
D & \quad 2\sqrt{3} \\
E & \quad None \ of \ the \ above.
\end{align*}
\]
7) Find this product. \[
\left( \frac{1}{9^2} \right) \left( \frac{3}{4^2} \right)
\]

\[A \quad 24\]
\[B \quad 1296\]
\[C \quad 6\]
\[D \quad 18\]
\[E \quad 11\]

8) Simplify: \[ (7x^2 - 5x + 1) - (4 - 5x)(4 + 5x) \]

\[A \quad 32x^2 + 20x - 15\]
\[B \quad 32x^2 - 5x - 15\]
\[C \quad -18x^2 - 5x - 15\]
\[D \quad -32x^2 + 5x + 15\]
\[E \quad 17x^2 - 5x - 7\]

9) Multiply. \[ (x - 2)(5x^2 - x + 2) \]

\[A \quad 5x^3 - 11x^2 - 4\]
\[B \quad 5x^3 - 11x^2 - 4x + 4\]
\[C \quad 5x^3 - 11x^2 + 4x - 4\]
\[D \quad 5x^3 + 11x^2 - 4x - 4\]
\[E \quad 5x^3 + 11x^2 + 4x - 4\]

10) One factor of \[6n^2 + 23n - 4\] is which of the following?

\[A \quad 6n + 1\]
\[B \quad n - 4\]
\[C \quad 3n - 2\]
\[D \quad 3n + 2\]
\[E \quad n + 4\]
11) Factor $9x^3 - 4x + 18x^2 - 8$ completely.

$A$ $(3x + 2)(3x - 2)(x + 2)$
$B$ $(3x - 2)^2(x + 2)$
$C$ $(3x + 2)(3x - 2)(x - 2)$
$D$ $(9x^2 + 4)(x - 2)$
$E$ $(3x + 2)^2(x + 2)$

12) Divide. Assume all denominators are nonzero.

$$\frac{x^2 - x - 2}{3x^3 - 6x^2} \div \frac{x^2 - 1}{x^3 + x^2 - 2x}$$

$A$ $\frac{(x-1)(x+2)^2}{3x(x-2)(x+1)}$
$B$ $\frac{(x+1)(x-1)}{3x^3(x-2)}$
$C$ $\frac{x+2}{3x}$
$D$ $\frac{(x-1)(x-2)}{3x(x+1)}$
$E$ $\frac{x-2}{3}$

13) Add. Assume all denominators are nonzero.

$$\frac{5}{x-2} + \frac{6}{x} + \frac{12}{x^2-2x}$$

$A$ $\frac{11}{x-2}$
$B$ $\frac{11x+24}{x(x-2)}$
$C$ $\frac{23}{x(x-2)}$
$D$ $\frac{11x+10}{x(x-2)}$
$E$ $\frac{5x+16}{x(x-2)}$
14) Solve the equation below. Describe the solution.

\[
3 + \frac{1}{2(x+3)} = \frac{x}{x+3} + \frac{7}{2(x+3)}
\]

\[
A \ x = 0 \\
B \ x = 3 \\
C \ x = -\frac{1}{2} \\
D \ x = -3 \\
E \ No \ solution
\]

15) When Liam got his car repaired after an accident, he was charged $569 for parts and the remaining part of the bill was labor. If the total bill was $1025 and labor was $48 per hour, how many hours did they work on his car?

\[
A \ 8.5 \ hr. \\
B \ 9.75 \ hr. \\
C \ 8.75 \ hr. \\
D \ 10.25 \ hr. \\
E \ None \ of \ the \ above.
\]