Simplify:

1. \[
\frac{5x + 20}{5x - 20}
\]
   - [A] -1
   - [B] none of these
   - [C] \(\frac{x + 4}{x - 4}\)
   - [D] \(\frac{x + 20}{x - 20}\)

2. \[
\frac{3x + 15}{3x - 15}
\]
   - [A] \(\frac{x + 5}{x - 5}\)
   - [B] none of these
   - [C] -1
   - [D] \(\frac{x + 15}{x - 15}\)

3. \[
\frac{2x^2 - 2x - 4}{6x^2 - 6}
\]
   - [A] \(\frac{x + 2}{3(x + 1)}\)
   - [B] \(\frac{x + 1}{3(x - 1)}\)
   - [C] \(\frac{x - 2}{3(x - 1)}\)
   - [D] \(\frac{x - 2}{3(x + 1)}\)

4. \[
\frac{3x^2 - 14x + 8}{3x^2 - 48}
\]
   - [A] \(\frac{3x - 4}{3(x + 4)}\)
   - [B] \(\frac{3x - 2}{3(x - 4)}\)
   - [C] \(\frac{3x - 2}{3(x + 4)}\)
   - [D] \(\frac{3x + 2}{3(x - 4)}\)

5. \[
\frac{-x^2 + x + 42}{7 - x}
\]
   - [A] \(-(x - 6)\)
   - [B] \((x + 6)\)
   - [C] \((x - 6)\)
   - [D] \(-(x + 6)\)

6. \[
\frac{x^2 - x - 12}{4 - x}
\]
   - [A] \(-(x - 3)\)
   - [B] \((x + 3)\)
   - [C] \(-(x + 3)\)
   - [D] \((x - 3)\)

7. \[
\frac{x^2 + 2x - 3}{1 - x}
\]
Algebra II Practice A.APR.D.6: Rational Expressions 1

Simplify:

8. \( \frac{x^2 - 2x - 8}{4 - x} \)

9. \( \frac{-7x}{x - x^2} \)

10. \( \frac{-9x}{x - x^2} \)

11. Compare the quantity in Column A with the quantity in Column B.

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \frac{x^2 + 4x - 5}{x^2 - x - 30} ), if ( x \neq -5 )</td>
<td>( \frac{x - 1}{x - 6} ), if ( x \neq 6 )</td>
</tr>
</tbody>
</table>

[A] The quantity in Column A is greater.
[B] The quantity in Column B is greater.
[C] The two quantities are equal.
[D] The relationship cannot be determined on the basis of the information supplied.

12. Compare the quantities in Column A and Column B.

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \frac{4x + 8}{x} )</td>
<td>( \frac{3x^2 + 6x}{x} )</td>
</tr>
</tbody>
</table>

[A] The quantity in Column A is greater.
[B] The quantity in Column B is greater.
[C] The quantities are equal.
[D] The relationship cannot be determined from the information given.

13. True or False? The expression \( \frac{x^2 - 3x - 10}{x - 5} \) is exactly the same as the expression \( x + 2 \). Justify your answer.

14. The design for a rectangular box has width \( x \), length \( 2x \), and height 3 in. Compare the surface area of the box to its volume. Write your answer as a rational expression.

15. The sum of a set of data can be modeled by the expression \( x^3 + x^2 - 2x \). Write an expression in simplest form for the mean of this data if the are \( (x - 1) \) data items.
Algebra II Practice A.APR.D.6: Rational Expressions 1

[7] \(- (x + 3)\)  [8] \(- (x + 2)\)  
[9] \(\frac{7}{x-1}\)  [10] \(\frac{9}{x-1}\)  

False; the two expressions give the same result for any given value of \(x\), but the first expression does not exist when \(x = 5\).  
[13] \(\frac{2x + 9}{3x}\)  [14] \(\frac{x(x + 2)}{}\)