# Algebra 2 Fall Semester Final Review

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<th>Date Assigned</th>
<th>Assignment</th>
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<td><strong>Block Day</strong> Dec. 7th or 8th</td>
<td><strong>Final Review Day 1: Units 1 &amp; 2</strong>&lt;br&gt;HW: Fall Semester Final Review Unit 1 (pg.52) odd&lt;br&gt;Fall Semester Final Review Unit 2 (pg.53-54) odd</td>
<td>U1 U2</td>
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<td><strong>Friday</strong> December 9th</td>
<td><strong>Final Review Day 2: Units 3 &amp; 4</strong>&lt;br&gt;HW: Fall Semester Final Review Unit 3 (pg.55) even&lt;br&gt;Fall Semester Final Review Unit 4 (Pg. 56)&lt;br&gt;#’s 10, 11, 16-20, 22, 26, 30</td>
<td>U3 U4</td>
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<td><strong>Monday</strong> December 12th</td>
<td><strong>Final Review Day 3: Units 5 &amp; 6</strong>&lt;br&gt;HW: Fall Semester Final Review Unit 5 (pg.57)&lt;br&gt;#’s 11, 12, 14-21, 26&lt;br&gt;Fall Semester Final Review Unit 6 (pg. 58)&lt;br&gt;#’s 2, 9, 10, 13, 18, 19, 25, 26</td>
<td>U5 U6</td>
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<td><strong>Tuesday</strong> December 13th</td>
<td><strong>Final Review Day 4:</strong> Multiple Choice Review&lt;br&gt;HW: Study for FINAL!</td>
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<td><strong>Block Day</strong> Dec. 14th or 15th</td>
<td><strong>Fall Semester FINAL!</strong></td>
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<td><strong>Friday</strong> December 16th</td>
<td><strong>Make-up Day</strong>&lt;br&gt;HW: Make up any missing hw over break. Last day to turn in make-up work is Friday, January 3rd</td>
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*Assignments are subject to change*
Solve and graph.

Ex. 1
\[
\frac{24x + 15}{3} = \frac{8x + 5}{3}
\]

Ex. 2
\[
7(2x + 5) - 6(x + 8) > 7
\]
\[
14x + 35 - 6x - 48 > 7
\]
\[
8x - 13 > 7
\]
\[
x > \frac{20}{8}
\]
\[
x > 2.5
\]
\[
x > 2\frac{1}{2}
\]

Ex. 3

Ex. 4
\[
2|x + 4| + 1 > 11
\]
\[
2x + 4 > -10
\]
\[
x > -6
\]

Ex. 5

\[
|2x + 1| < 13
\]

\[
2x + 1 > -7
\]
\[
2x + 1 < 7
\]
\[
x < 6
\]

-7 < x < 6
Ex. 1 – Graph
\[ 2x + y < 6 \]
\[ 2x \quad -2y \]
\[ y < \frac{-2x + 6}{1} \]

Ex. 2 – Graph the solution to:
\[ x \geq -4 \]
\[ y \leq 3 \]

Ex. 3 – Graph the solution to:
\[ 2x + 3y \leq 12 \]
\[ y \geq x - 6 \]
\[ \frac{2y}{3} \leq -\frac{2x + 12}{3} \]
\[ y \leq -\frac{2}{3}x + 4 \]

Ex. 4 – solve for x and y:
\[ 2x + y = -4 \]
\[ 2y - 7 = -4x \]
\[ +4x + 7 \quad +9x + 7 \]
\[ 4x + 2y = 7 \]
\[ -4x - 3y = 8 \]
\[ 4x + 2y = 7 \]
\[ 0 = 15 \]
Ex. 5
5 binders and 3 pencils cost $13.10. 2 binders and 6 pencils cost $6.20. Find the cost of binders and pencils.

\[
\begin{align*}
\text{2.50 binders: } & x \\
\text{.20 pencils: } & y
\end{align*}
\]

\[
\begin{align*}
-2(5x + 3y & = 13.10) \\
2x + 6y & = 6.20
\end{align*}
\]

\[
\begin{align*}
-10x - 6y & = -26.20 \\
2x + 6y & = 6.20
\end{align*}
\]

\[
\begin{align*}
-8x & = -20 \\
\frac{-8x}{-8} & = \frac{-20}{-8} \\
x & = 2.5
\end{align*}
\]

\[
\begin{align*}
2(2.5) + 6y & = 6.20 \\
5 + 6y & = 6.20 \\
-5 & = -5
\end{align*}
\]

\[
\begin{align*}
y = \frac{1.20}{6} \\
\frac{0.20}{6}
\end{align*}
\]

Ex. 6 – Solve for x, y, and z
\[
\begin{align*}
(2x - 2y + 4z & = 6) \\
(4x + 2y + 8z & = 12) \\
(4x - 2y + 8z & = 12)
\end{align*}
\]

\[
\begin{align*}
-4(6x + 12z & = 18) \\
3(8x + 16z & = 24)
\end{align*}
\]

\[
\begin{align*}
-24x - 48z & = -72 \\
24x + 48z & = 72
\end{align*}
\]

\[
0 = 0
\]

all R's
Ex. 1 - Simplify
\[
\frac{(3xy^3)^3}{(-x^2y^3)^2}
\]
\[
= \frac{27y^3}{x}
\]

Ex. 2
\[(3x - 4)(2x^2 + x - 1)\]

Ex. 3
\[
\frac{2x^2 + 4x + 1}{2x - 1}
\]

Factor Completely
Ex. 4
\[8x^3 + 125\]
\[= (2x+5)(4x^2 - 10x + 25)\]

Ex. 5
\[27x^3 - y^3\]
\[= (3x-y)(9x^2 + 3xy + y^2)\]
Ex. 6
\[4y^2 - 16x^2 \frac{y^2}{4x^2} = 4 \left(y^2 - \frac{y^2}{x^2}\right) = 4 \left(y - \frac{y}{x}\right) \left(y + \frac{y}{x}\right)\]

Ex. 7
\[(x + 7)^2 - 36\]
\[\text{let } z = x + 7\]
\[z^2 - 36 = (z + 6)(z - 6) = \frac{(x + 7 + 6)(x + 7 - 6)}{(x + 13)(x + 1)}\]

Ex. 8
\[8x^2 + 10x - 3\]
\[x^2 + 10x - 24\]
\[\frac{(x + 12)(x - \frac{21}{8})}{8}\]
\[(2x + 3)(4x - 1)\]
Ex. 1 Find the volume
\[
\begin{array}{c|c|c}
& x + 1 & (2x^2 + 7x + 5)(x - 5) \\
\hline
2x & 2x^2 & 2x \\
5x & 5 & 5x \\
\end{array}
\]
\[
\begin{array}{c|c|c|c|c}
& x^2 & 7x & 5 \\
\hline
-3 & -6x^2 & -21x & -15 \\
\end{array}
\]

Ex. 2
The area of a rectangle is \(2x^2 - 7x - 15\). If the width is \(x - 2\), find the length.
\[
\frac{2x^2 - 7x - 15}{x - 2}
\]

Ex. 3
State the x-intercepts of:
\[
6x^2 - x - 2 = 0
\]
\[
\begin{align*}
6x^2 & - x - 2 = 0 \\
(x - \frac{1}{3}) & (x + 2) = 0 \\
\end{align*}
\]
\[
3x - 2 = 0 \\
3x = 2 \\
x = \frac{2}{3}
\]

Ex. 4
Give the vertex and state whether it is a minimum or a maximum.
\[
y = x^2 + 8x + 1
\]
\[
\begin{align*}
x &= -\frac{b}{2a} \\
8 &= -\frac{8}{2} \\
&-4
\end{align*}
\]

Ex. 5
How does the 3 change the graph of \(y = (x + 3)^2 + 1\) from the original graph of \(y = x^2\)?

Vertex: \((-3, 1)\) shifted 3 left and 1 up
Ex. 1 Two numbers are consecutive positive odd integers. The square of the larger is 3 less than 12 times the smaller. Find the sum of the two positive odd integers.

\[
(x+2)^2 = 12x - 3 \\
x^2 + 4x + 4 = 12x - 3 \\
-12x + 3 = -4x + 9
\]

\[
(x-7)(x-1) = 0 \\
x = 7, 1
\]

Ex. 2

\[
7i(2i + 5) = 14i^2 + 35i \\
-14 + 35i
\]

Ex. 3

\[
\frac{12 - 3i}{17}
\]

Ex. 4

\[
-5i
\]

Ex. 5

\[
3x^2 + 40 = 4 \\
3x^2 = -36 \\
x = \pm 2i \sqrt{3}
\]

Ex. 6

Find the sum of \((7 + 2i) + (3 - 4i) - (4 - 7i)\)

\[
6 + 5i
\]
Ex. 7
\[(3 + 2i)(5 - 4i)\]
\[
\begin{array}{c|c|c}
3 & 2i \\
\hline
5 & 10i \\
\hline
-4i & -8i \\
\hline
\end{array}
\]
\[9 + 10 + 12i - 8i = 23 - 2i\]

Ex. 8
What number should be added to both sides to complete the square?
\[x^2 - 8x = 15\]
\[-\frac{8}{2} = (-4)^2 = \sqrt{16}\]
\[x^2 - 8x + 16 = 15 + 16\]
\[\sqrt{(x-4)^2} = \sqrt{31}\]
\[x - 4 = \pm \sqrt{31}\]
\[x = 4 \pm \sqrt{31}\]

Ex. 9
\[(3 - 4i)^2\]
\[
\begin{array}{c|c|c|c|c}
3 & -4i \\
\hline
9 & -12i \\
\hline
-4i & 16 \\
\hline
\end{array}
\]
\[-7 - 24i\]

Ex. 10
\[\frac{2i}{3+i} \left(1 + 3i\right)\]
\[= \frac{2(1)}{10} \frac{1 + 3i}{10}\]
\[= \frac{1 + 3i}{5}\]

\[\frac{3}{3i} - 1\]
\[\frac{a - i^2}{a + i} = 10\]
Ex. 1
\[
\frac{2}{27^{\frac{1}{3}}} = \sqrt[3]{27} \left( \frac{3}{27} \right)^{\frac{2}{3}} \quad (3)^2 = 9
\]

Ex. 2
\[
\frac{1}{X^{\frac{1}{2}}} = \frac{1}{\sqrt{X}} = 15 \quad \frac{1}{9}
\]

Ex. 3
If \( f(x) = 2x + 5 \) and \( g(x) = 3x - 7 \),

a) \( \text{find } g(f(x)) \)

\[
g(f(x)) = g(2x+5) = 3(2x+5) - 7 = 6x + 15 - 7 = 6x + 8
\]

b) \( \text{find } g(g(x)) \)

\[
2(3)+5 = 6+5 = 11
\]

Ex. 4
If \( f(x) = x^2 + 5x + 2 \) and \( g(x) = 2(x+1)^2 \), find \( f(x) + g(x) \)

\[
x^2 + 5x + 2 + 2(x+1)^2 = x^2 + 5x + 2 + 2(x^2 + 2x + 1) = 3x^2 + 9x + 4
\]

Ex. 5
Find the inverse of \( f(x) = 3x + 5 \)

\[
x = 3y + 5 \implies y = \frac{x-5}{3}
\]

Ex. 6
State the domain of \( f(x) = \frac{x+3}{x-5} \)

\[ \text{Domain: } x \neq 5 \text{ except } \mathbb{R} \]