

10th Grade Assignment – Week #19

Announcements

- *What level are you in? It's your decision!* This will only make a difference regarding the “Individual Work”. There are actually two different *Algebra Review* units in my workbook – “Section A” and “Section B”. The Section A is the normal unit; Section B is for those who have a strong algebra background, and would like an extra challenge. During this unit, you should either do the Section A unit, or the Section B unit – don't do both!
- *Why is this unit important?* This unit is a concise summary of the most important algebra topics that I teach in my 9th grade Math Academy – topics that typically appear in an *Algebra I* course. For those who have had these topics (in 9th grade, or before), this unit will serve as an important review. For those who feel a bit weak with these topics, or have not seen some of these topics, this will be a valuable chance to “catch up” – although it may require some extra effort. More than any other unit this year, this *Algebra Review* unit is important in terms of preparation for your future math studies.
- *Test!* There will be an important test at the end of this three-week unit. I strongly recommend earning a grade of at least a B on this test before enrolling in our 11th grade Math Academy, or enrolling in any *Algebra II* or *Precalculus* course. You can retake the test at a later time if you do not achieve a B in your first attempt.

Group Assignment for either Tuesday or Thursday

(**Note:** The *Mensuration* problem sets were included in last week's assignment.)

- From the **Mensuration** unit, **Problem Set #3**, try these problems:
#6b, 6c, 6d – also, find the ratios of the areas of the circles.
#8 This is a big challenge – but you should really try it! I recorded an extra lecture (W19 L3) just for this problem – where I go over three different methods for solving it. You should watch the lecture after you have tried to solve it in your group.
- From the **Mensuration** unit, **Problem Set #4**, try these problems:
#8, 10, 14
#12, 13 (these are challenging!)

Individual Work

- Do what you can!

From Algebra Review “Section A” Choose problems to do from the following:

- **Problem Set #2:** Pr #1-10, 22, 24-32, 34-43
- **Problem Set #3:** Pr #2, 4, 5, 6, 8, 10-18, 28-30, 32-39, 41, 42
- **Problem Set #4:** Pr #1-6, 11-36

From Algebra Review “Section B” Choose problems to do from the following:

- **Problem Sets #1-3:** Any of these problems!
- Finish anything from the “Group Assignment” that your group doesn't complete.

Problem Set #2

Simplify.

- 1) $3x^2 + 4x^2$
- 2) $(3x^2)(4x^2)$
- 3) $5x^3 - 7x^3 + 2x^4$
- 4) $(5x^3)(x^4)$
- 5) $(x^3)^4$
- 6) $(x^3)(x^3)(x^3)(x^3)$
- 7) 7^2
- 8) 7^{-2}
- 9) $(\frac{3}{4})^2$
- 10) $(\frac{3}{4})^{-2}$
- 11) $\sqrt{121}$
- 12) $\sqrt{8}$
- 13) $3\sqrt{4}$
- 14) $\sqrt{24}$
- 15) $\sqrt{17}$
- 16) $\sqrt{3} \cdot \sqrt{12}$
- 17) $\sqrt{200}$
- 18) $\frac{-2+2}{2}$
- 19) $\frac{-2+2x}{2}$
- 20) $\frac{2+4x+10y}{2}$
- 21) $\frac{-2+2\sqrt{2}}{2}$

Find the Common Solution.

- 22) $3x + y = 4$
 $2x - y = 11$
- 23) $y = 2x + 1$
 $x + y = 7$

Solve. (Show work on a separate sheet.)

- 24) $x + 5 = 2x - 7$
- 25) $4(x - 1) = 3 + 3(x + 2)$
- 26) $x^2 + 10x - 24 = 0$
- 27) $x^2 = 81$
- 28) $3x^2 + 7x - 3$
 $= (3x + 1)(x - 1)$
- 29) $3(x + 1) + 4$
 $= 5 - 2(x - 1)$
- 30) $\frac{3}{7}x = \frac{4}{5}$
- 31) $\frac{1}{2}x + 3 = \frac{2}{3}x - 5$
- 32) $\frac{4}{x+3} = \frac{-3}{x+6}$
- 33) A rectangle's width is half its length. Its area is 72 square feet. Find its dimensions.

Factor.

- 34) $x^2 + 5x + 6$
- 35) $x^2 - 5x + 6$
- 36) $x^2 + 5x - 6$
- 37) $x^2 - 5x - 6$
- 38) $x^2 + 14x + 49$
- 39) $x^2 - 14x + 49$
- 40) $x^2 + 11x - 60$
- 41) $2x^2 + 22x - 120$
- 42) $x^2 - x - 42$
- 43) $x^2 - 36$
- 44) It takes Bob 40 minutes to travel to work. If Bob's work is 35 miles away...
 - a) What is Bob's average speed in mph?
 - b) Give a formula that relates speed, distance and time.

Problem Set #3

Factor.

- 1) $x^2 + 13x - 36$
- 2) $x^2 - 7x + 12$
- 3) $x^6 - 7$
- 4) $2x^6 - 8$
- 5) $x^4 - 16$
- 6) $x^2 - 13x + 40$
- 7) $x^8 - 361$
- 8) $x^2 + 2x - 63$

Perfect Squares.

- 9) List out all perfect squares from 1 to 400.
(i.e., 1, 4, 9, 16, 25, ...).

Simplify.

- 10) $3x^5 - 9x^5$
- 11) $(3x^5)(9x^5)$
- 12) $(5x^2)^4$
- 13) $2x^2 + 5x^3$
- 14) $3x^2y^3 + 7x^2y^3 + 6x^3y^2$
- 15) 4^{-2}
- 16) $(\frac{3}{5})^3$
- 17) $(\frac{5}{3})^3$
- 18) $(\frac{3}{5})^{-3}$
- 19) $5 \pm \sqrt{36}$
- 20) $\sqrt{48}$
- 21) $\sqrt{72}$
- 22) $\sqrt{24}\sqrt{6}$
- 23) $2\sqrt{18}$
- 24) $3\sqrt{5} + 9\sqrt{5}$
- 25) $\frac{2 \pm 4}{2}$

- 26) $\frac{-5 \pm \sqrt{125}}{5}$
- 27) $\frac{14 \pm \sqrt{196 - 4(7)(4)}}{2(7)}$
- 28) $\frac{18x + 9y}{9}$
- 29) $\frac{9x + 12y}{3}$

Find the Common Solution.

- 30) $9x + 2y = 14$
 $x - y = 4$
- 31) $x = 7y - 1$
 $2x - y = 102$

Solve.

- 32) $3(x - 4) = 2 + 5(3x - 2)$
- 33) $8(3x - 2 - 5x) - 3(3 - x)$
 $= 5(4x - 1) - 7$
- 34) $x^2 - 3x - 28 = 0$
- 35) $x^3 - 3x^2 - 28x = 0$
- 36) $x^2 = 324$
- 37) $x^2 - 324 = 0$
- 38) $x^2 - 5x = 0$
- 39) $(x + 4)(x - 1)$
 $= x^2 + 5x - 19$
- 40) $\frac{15}{17}x + \frac{1}{34}x = -\frac{9}{34}x - \frac{19}{17}$
- 41) $\frac{x}{4} = \frac{16}{x}$
- 42) $\frac{5}{x+1} = \frac{3}{x-1}$
- 43) A square and a rectangle (with a perimeter of 68 cm) have equal area. The height of the rectangle is 30 cm less than the width. Find the square's edge.

Problem Set #4

Simplify.

- 1) $5x^4 - 9x^4$
- 2) $(5x^4)(9x^4)$
- 3) $7a^3b^4 + 4a^3b^3 - 6b^4a^3$
- 4) 10^{-3}
- 5) $\frac{x^4}{x^3}$
- 6) $x^4 x^{-3}$
- 7) $\sqrt{200}$
- 8) $\frac{3 \pm \sqrt{256}}{13}$
- 9) $\frac{2}{\sqrt{2}}$

Perfect Squares.

- 10) Fill in the following chart. Save this for future reference:

$1^2 =$	$2^2 =$
$3^2 =$	$4^2 =$
$5^2 =$	$6^2 =$
$7^2 =$	$8^2 =$
$9^2 =$	$10^2 =$
$11^2 =$	$12^2 =$
$13^2 =$	$14^2 =$
$15^2 =$	$16^2 =$
$17^2 =$	$18^2 =$
$19^2 =$	$20^2 =$

Factor.

- 11) $x^2 - 7x - 144$
- 12) $4x^2 + 4x - 80$
- 13) $10x^2 - 50x - 500$
- 14) $x^3 + 7x^2 - 18x$
- 15) $x^6 - 9$
- 16) $x^6 + 9$

- 17) $x^3 - 9$
- 18) $5x^3 - 30x^2$
- 19) $5x^3 - 20x$
- 20) $10x^2 + 70x + 100$

Quadratic Formula

- 21) State the Quadratic Formula.
- 22) Solve both by factoring and by using the Quadratic Formula:
 - a) $x^2 + 3x + 2 = 0$
 - b) $2x^2 - 2x - 12 = 0$
- 23) Solve by using the Quadratic Formula:
 - a) $x^2 + 4x - 6 = 0$
 - b) $3x^2 + 13x + 4 = 0$

Solve.

- 24) $3 + 2x - (x - 5) = 1$
- 25) $-9(4 - 5x) + 7 = 0$
- 26) $x^2 + 11x + 28 = 0$
- 27) $x^2 + 20x + 100 = 0$
- 28) $x + 20x + 100 = 0$
- 29) $x^3 - 64x = 0$
- 30) $x^2 - 150 = -6$
- 31) $(x + 5)(x - 7) = (x + 6)(x - 1)$
- 32) $x^2 = -24x - 23$
- 33) $\frac{2}{3}x + \frac{4}{5} = 1 \frac{2}{3} - \frac{9}{5}$
- 34) $\frac{3}{4} = -\frac{5}{2}x$
- 35) $\frac{x}{x-1} = \frac{4}{x}$
- 36) $x^2 + 8x = 1$

Algebra Review – Section B

Problem Set #1

Simplify.

- 1) $2x^3 + 4x^3$
- 2) $(7x^4)(8x^5)$
- 3) $(3w^2)(5w^4)$
- 4) $5c^3 - 2c^3$
- 5) $(-6r^4)(-3r^4)$
- 6) $(4x^3)(3x^2)$
- 7) $3x^4 + 2x^3$
- 8) $3x^2y^3 + 2x^2y^3$
- 9) $(2x^3y^4)^2$
- 10) $(\frac{2}{3})^{-2}$
- 11) $\frac{2x^{-3}y^{-2}}{3x^5y^{-6}}$

Evaluate each expression
given $X=-1$; $Y=4$; $Z=-2$.

12) $3Z - 2XY^2$

Multiply.

- 13) $(x - 4)(2x - 5)$
- 14) $3x^3(4x^3 - 6x)$
- 15) $(x^3 + 6)(x^3 - 6)$
- 16) $(x - 6)^2$
- 17) $(x + 5)^3$

Find the Common Solution.

- 18) $y = 4x - 1$
 $5y - 6x = 30$

Factor.

- 19) $x^3 + 2x^2$
- 20) $x^2 - 10x + 24$
- 21) $x^2 + 10x - 24$
- 22) $x^6 - 4$
- 23) $x^4 + 16$
- 24) $x^5 - x$
- 25) $12x^3y^5 - 4x^2y^3$
- 26) $x^2 - 17x - 60$
- 27) $3x^4 + 18x^3 + 24x^2$

Solve.

- 28) $5 - 2(3x - 5) = 4x - 20$
- 29) $\frac{1}{3}X + \frac{2}{3} = \frac{3}{4}X - \frac{1}{2}$
- 30) $5 - 2(x + 3) = x - 6 + 2x - 10$
- 31) $x^2 + 20 = 12x$
- 32) $2x^2 - 25 = 7(x - 5)^2$
- 33) $(x - 5)(x + 8) = 2x^2 - 10x + 2$
- 34) $\frac{12}{4X+3} = \frac{5}{X-3}$
- 35) $\frac{5x-28}{5} - \frac{6x-3}{10} = -\frac{17}{2}$
- 36) Find two numbers such that their sum is 7 and the sum of their squares is 205.
- 37) Find the dimensions of a rectangle such that its perimeter is 31 feet and its area is 60 ft².

Problem Set #2

Simplify.

- 1) $a^5 + a^5$
- 2) $(a^5)(a^5)$
- 3) $6w^5 - 20w^5$
- 4) $5x^3 + 2x^5$

Evaluate the expression
given $X=-2$; $Y=-3$; $Z=4$

5) $X^2 + 2Y - 3Z$

Multiply.

- 6) $(x + 5)(x - 11)$
- 7) $(6x + 5)(3x + 4)$
- 8) $2x^5(4x^6 - 3x^3 + 7)$
- 9) $(x + 7)^2$
- 10) $(x^5 + 6y)(x^5 - 6y)$
- 11) $(x + 4)(x + 3)(x + 5)$

Simplify.

- 12) $(5x^4)^2$
- 13) $(4x^3)(7x^3)$
- 14) $4x^3y^2 + 3x^3y^2$
- 15) $(4x^3y^2)(3x^3y^5)$
- 16) $5x^2 + 3x^3$
- 17) $(2x^4y^3)^3$
- 18) $\left(\frac{5}{6}\right)^{-2}$
- 19) $\frac{5x^{-1}y^3z^{-2}}{3y^{-2}}$

Factor.

- 20) $x^2 + 26x + 120$
- 21) $x^2 + 26x - 120$
- 22) $x^2 - 26x - 120$
- 23) $x^2 - 26x + 120$

- 24) $x^2 - 9x + 20$
- 25) $x^2 + 7x - 12$
- 26) $3x^2 + 13x + 14$
- 27) $x^4 - 3x^3 - 28x^2$
- 28) $x^6 - 81$
- 29) $y^2 - 40$
- 30) $x^4 + 25$
- 31) $x^7 - 16x^3$
- 32) $3x^2 + 33x - 36$

Solve.

- 33) $4X - 3 + 10X = 7 + 2X - 8$
- 34) $-\frac{4}{5}X - 5 = \frac{1}{2} - 3X$
- 35) $x^2 - 7x = 6x - 30$
- 36) $2x^2 + 3x - 6 = 0$
- 37) $4x^2 + 13x = 5x^2 - 30$
- 38) $x^2 + 10x = 7$
- 39) $\frac{x+3}{x} - \frac{16}{15} = \frac{x-3}{3x}$
- 40) $\frac{x+12}{6} - \frac{x-9}{15} = 5$

Find the Common Solution.

- 41) $x + 3y = 11$
 $3y - 4x = 31$
- 42) The following is an algebraic proof that $2=1$.
What is wrong with it?
Let $x = y$
 $x^2 = xy$
 $x^2 - y^2 = xy - y^2$
 $(x+y)(x-y) = y(x-y)$
 $x+y = y$
 $2y = y$
 $2 = 1$

Problem Set #3

Simplify.

- 1) $\sqrt{75}$
- 2) $\sqrt{750}$
- 3) $\sqrt{7500}$
- 4) $\sqrt{75000}$
- 5) $\sqrt{750000}$
- 6) $\frac{4}{\sqrt{3}}$
- 7) $\sqrt{36x^{36}}$
- 8) $\frac{12x^3y^2 - 10x^2y^4}{2xy}$
- 9) $\frac{x^2 + 11x + 24}{x^2 - 4x - 21}$
- 10) $\frac{14x}{21x^4}$
- 11) $\frac{4x^4y^2}{6x^8y^{-3}}$
- 12) $\left(\frac{4}{5}\right)^{-2}$
- 13) $(3x^{-2})^{-4}$
- 14) $\frac{3}{4xy^4} + \frac{2}{3x^2}$
- 15) $13x^4 + 10x^4$
- 16) $(8x^4)(10x^4)$
- 17) $(4x + 3y)(2x + 5y)$
- 18) $(4x - 3y)(2x + 5y)$
- 19) $(x + 20)^2$
- 20) $(x + 3)^3$

Factor.

- 21) $x^2 - 7x + 10$
- 22) $x^2 - 29x + 210$
- 23) $x^2 + 29x - 210$
- 24) $6x^3 + 8x^2$
- 25) $x^2 - 121$
- 26) $12x^4 + 8x^3 - 20x^2$
- 27) $x^3 - 9x$

Solve.

- 28) $\frac{-\frac{3}{4}}{2x-6} = \frac{\frac{3}{4}}{x-6}$
- 29) $16 + 4(2x - 4) = 8x$
- 30) $6 = 9 - (4x + 3) - 2x$
- 31) $6 - 4(7x - 2) = 5 - 28x$
- 32) $4x(x-5) = 3x(x-1) - 16$
- 33) $3x = x^2 - 54$
- 34) $x^2 + x = 5$
- 35) $0 = x^2 + 9x + 14$
- 36) $3x^2 = 8x + 4$
- 37) $\frac{x}{x-2} = \frac{x+3}{x}$
- 38) $\frac{2}{x} + \frac{1}{x-2} = 1$

Find the Common Solution.

- 39) $2x + 3y = 7$
 $5x - 2y = -11$
- 40) Jen and Fred started out 15 miles apart, and then began biking toward one another. Jen biked 3 mph faster than Fred. After 45 minutes they met and stopped for a picnic. How far did Jen bike?