"Why Mistakes Make Students Better"

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PUSH-UP CHALLENGE THURSDAY!

\[(x + 6)^2 = x^2 + 36\]

PROVE ME RIGHT OR WRONG!!!!!!
TEST/QUIZ CORRECTIONS

Students may correct any quiz or test problem worth two or more points.

Corrections will ONLY be accepted if:
- They are done on this sheet (or separate piece of paper) and stapled to the front of the test/quiz.
- All work has been shown or mistake has been explained.

When ALL corrections have been made, students will receive one point per question corrected.

Extra help for corrections is available during tutorials.
Due: 3 days after quiz/test returned

# ___

# ___

More on back →
6th Grade Answer Group Work

Ladies and gentlemen,

Here is some answers my students from last year submitted to me. Please look over each question as a group and decide if it is correct. If it is correct, please a checkmark next to it. If it is not correct, please correct it as a group.

1. \[ \frac{2}{3} + \frac{1}{3} = \frac{3}{6} \]

2. \[ \frac{2}{3} \times \frac{1}{3} = \frac{2}{9} \]

3. \[ \frac{3}{5} + \frac{6}{7} = \frac{9}{12} \]

4. \[ \frac{7}{8} - \frac{3}{8} = \frac{4}{0} \]

5. \[ 0.567 \times 6 = 3.402 \]

6. \[ 13 - 4.987 = 4.974 \]
Solve to see if the statement is true. If false, insert parentheses to make statement true.

Ex 1)  \[ 6 \times 3^2 - 7 + 9 = 38 \]

Work from the inside out following the rules for PEMDAS.

\[ 2 \left[ 4 + 3 \left( 70 \div 2 - 5 \left[ 3 + 2 \times 1 \right] \right) \right] \]
Now you try !!!!!

\[ 15 + 3 \left[ 90 - 2 \left( 5 + 3 \left[ 10 \div 2 + 1 \right] \right) + 5 \right] \]
Simplify the following. Show Work.

1) \(10 + 2[40 - 3(15 \div 5 + 3^2)]\)  
2) \(100 - 5(12 - 10 + 1) + 3[2^3 + 4(3 + 2 \cdot 4)]\)

3) \(\frac{(8+4) - 4(9+3)^0}{3 \cdot 2^3 - 15 - 5}\)

Insert parenthesis so the following are true. PROVE your answer.

4) \(3^2 - 6 + 8 \div 2 \cdot 4 = 4\)
5) \(20 + 6 \cdot 2 + 14 \div 2 = 59\)
CHALLENGE: "4's"

Use four 4's to make all the numbers from 0 to 25.

Use order of operations and any of the mathematical signs below.

\[ + \quad - \quad \times \quad \div \quad \sqrt{} \quad ! \quad [ ] \]

Ex) \quad 4 + \frac{4+4}{4} = 6

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Can you make 33, 39, or 41?
Lesson  Polynomials

The following was a problem submitted by one of my Pre-Algebra students last year. Please look over the problem as a group. If the problem is OK, just put a check on your paper. If there is an error, please discuss what the error is and make the correct changes.

\[(4x^3 + 4x^2 - 8x) - (8x^2 - 16x + 4) =\]
\[4x^3 + 4x^2 - 8x - 8x^2 - 16x - 4 =\]
\[4x^3 + 12x^2 - 24x - 4\]
SKILL PRACTICE
Find and correct four errors on Barbara's quiz.

INEQUALITY QUIZ

Solve each inequality and graph the solution.

1. \[ y + 3 > 4 \]
   \[ y + 3 - 3 > 4 - 3 \]
   \[ y > 1 \]

2. \[ -y < 5 \]
   \[ y > -5 \]

3. \[ 3y \geq -9 \]
   \[ y \geq -3 \]

4. \[ -2y \leq 8 \]
   \[ y \geq -4 \]

5. \[ \frac{y}{3} > -2 \]
   \[ y > -6 \]

6. \[ \frac{-y}{2} \leq 1 \]
   \[ y \geq -2 \]

7. \[ y - 7 \leq -6 \]
   \[ y \leq 1 \]

8. \[ -y \geq -2 \]
   \[ y \leq 2 \]

9. \[ 5y > 15 \]
   \[ y > 3 \]

10. \[ -4y < 2 \]
    \[ y > \frac{1}{2} \]

11. \[ \frac{y}{8} \geq \frac{1}{2} \]
    \[ y \geq 4 \]

12. \[ \frac{-y}{3} \leq 2 \]
    \[ y \geq -6 \]
CRITICAL THINKING SKILLS

1. IS IT POSSIBLE FOR FOUR CONSECUTIVE EVEN NUMBERS TO HAVE A SUM THAT IS TEN MORE THAN THE SUM OF THE SMALLEST TWO NUMBERS? IF SO, TELL HOW MANY SOLUTION(S) THERE ARE. IF THERE ARE NO SOLUTIONS, TELL WHY NOT.

2. FIND THREE CONSECUTIVE INTEGERS SUCH THAT THREE TIMES THE SMALLEST IS EQUAL TO THE MIDDLE NUMBER INCREASED BY THE GREATEST NUMBER.

3. FIND THREE CONSECUTIVE INTEGERS WHOSE SUM IS 87.
Notes Lesson ___  

Equations Activity

With your group, solve the following problems. They are not all correct. The ones that are correct, place a check next to them. For the ones that are incorrect, re-do the problems so that they are correct.

1. \[2x - 11x = -27\] \{answer is 3\}  
2. \[0 = \frac{8 - 2x}{5}\] \{answer is 4\}

3. \[2(x + 8) - 9 = 5\] \{answer is 3\}  
4. \[19 + 3(x - 5) = -2\] \{answer is \(\frac{32}{3}\)\}

5. \[(5 - x) + (6 - x) - (5 - x) = 0\] \{answer is 6\}
6. \[4(x + 8) - 7 = 17\] \{answer is -5\} \hspace{1cm} 7. \[32 = 2x - 3x + 5x\] \{answer is 8\}

8. \[-9 - 3(2x - 1) = -18\] \{answer is 5\} \hspace{1cm} 9. \[-10 + 4(3x + 10) = 18\] \{answer is -1\}

10. \[5(x - 7) + 2[x - 3(x - 5)] = 0\] \{answer is 3\}
Lesson  Honors Age Problem

1. Next year, Lisa will be twice as old as Steve will be. Four years ago, Lisa was three times as old as Steve was. How old is each of them now?

2. A father, being asked his age and that of his son said: “If you add four to my age and divide the sum by four, you will have my son’s age. But six years ago I was 7.5 times as old as my son.” Find their ages now.
Lesson  Graphing Mistakes

Directions: Find the mistakes on the following problems. Remember, not all of the problems have mistakes. If it is correct, just say “CORRECT” next to the problem. If it is wrong, explain why it is wrong and THEN correct the mistake.

1. (4, 6), (-5, 9)  1. \( m = -\frac{1}{3} \) (slope)

2. (4, 6), (-5, 9)  2. \( x + 3y = 32 \) (standard form)

3. 6x - 3y = 30  3. x int = (0, -10)
   y int = (5, 0)
4. True or False? The point (4, 0) is on the y axis?

5. True or False? The point (5, -3) is in quadrant 4?

6. True or False? The abscissa is ALWAYS the x coordinate?

7. True or False? A point that has a positive x coordinate is ALWAYS in quadrant 1?
8. Place the following problem in slope intercept form and then graph it.

(4, 7), (4, -7)

8. \( x = 4 \) (equation)

9. Write the equation of the line given the following:

\[ m = -\frac{3}{4} \] passing through the point (8, -12)

9. \( y = -\frac{3}{4}x - 6 \)
10. (-4, 8), (-6, -12)

10. $m = 10$

11. Find the value of "y" in the following problem:

$(6, 8), (-4, y) \text{ and } m = \frac{1}{2}$

11. $y = 3$

12. Write the equation of a line perpendicular to the equation $y = \frac{2}{3}x + 8$ passing through the point (6, -4).

12. $y = -\frac{3}{2}x$
13. True or False? Perpendicular lines ALWAYS have different y-intercepts?

14. True or False? The slope of a line through (0, 3) and (4, 0) is \(\frac{3}{4}\)?

15. True or False? Parallel line SOMETIMES have the same slopes?

16. True or False? Slopes that have zero slopes have horizontal graphs?
Lesson  Mistakes with Rational Exponents

In the following problems, simplify. If the answer is incorrect, then explain why it is incorrect and correct the problem:

1. \((x^4)^\frac{3}{2} = x^6\)  
2. \((\frac{x^3}{2})^{-2} = x^3\)

3. \((27x^6)^\frac{5}{3} = 27x^{10}\)  
4. \((9x^4)^{0.5} = 3x^2\)

5. \((25x^6)^{-1.5} = \frac{1}{125x^9}\)  
6. \((216x^9)^{\frac{1}{3}} = \frac{1}{6x^3}\)
Lesson Honors LAB on Exponents

On this Lab, there are 11 mistakes. Work with your peers to find those mistakes. Make sure you leave NO negative exponents in your solutions. If the problems are wrong, show the correct answers:

1. \( \left( \frac{x^{-5}}{x^{-3}} \right)^4 \times \left( \frac{x^6}{x^{-4}} \right)^6 \div \left( \frac{x^{11}}{x^7} \right)^2 = x^{56} \)

2. \( \left( \frac{x^6x^2x^{-11}}{x^{-13}} \right)^4 = x \)

3. \( (2x)(4x^3) + (-3x^2)(5x^2) = 23x^4 \)

4. \( \frac{16x^{-3}y^{-2}}{19x^{-5}y^{-1}} = \frac{19x^2}{16y} \)

5. \( (6x^5)(2x^2) - (3x^4)(4x)^3 = 0 \)

6. \( (3x^n)^2(x^2)^n = 9x^{4n} \)
7. \((2x^3y)^3(3x^2y^2)^2 = 6x^{13}y^7\)

8. \((-2)^5x^5(3x^3)(4y)2y = -768x^8y^2\)

9. \([-(-4xy^3z^5)^{-2}]^0 + \frac{6x^4}{11x^4} = 2\frac{5}{6}\)

10. \(\frac{7^{-4} \times 7^{-8}}{7^{-6}} = \frac{1}{117,649}\)

11. \(2x(3x^2 - 4x) + 8x^2 = 6x^3\)

12. \(\frac{4^3}{4^5} = 4\)
13. One printing machine works twice as fast as another. When both machines are used, they can print a magazine in 3 hours. How many hours would each machine require to do the job alone?

   Machine 1 = 4.5 hours   Machine 2 = 9 hours

14. Bicyclists Nicole and Leili started at noon from points 60 miles apart and rode toward each other, meeting at 1:30 pm. Nicole’s speed was 4 mph greater than Leili’s speed. What was Nicole’s speed?

   Nicole = 18 mph

15. Natalie took a photo of Bruce break-dancing. She shared it with 5 of her friends. Each of those friends shared it with 4 other friends each. How many people will have seen Bruce photo after 10 days?

   5,242,800 views
16. \((-6)^3 + (6)^3 - (-6)^3 = -216\)

17. \((3x^2y)^3(2xy)^3 = 216x^8y^6\)

18. \(\frac{3^5 	imes 4^6 	imes 5^7}{4^8 	imes 5^6 	imes 3^2} = \frac{135}{16}\)

19. \((6x^3y^5)^{-1} + (3x^2y^5)^0 = \frac{1}{6x^2y^5}\)

20. \(\frac{2x^{-4}}{3^{-1}y^2} = \frac{6}{x^4y^2}\)

21. \(\frac{2yz}{15} \times \left(\frac{3z}{y}\right)^3 = \frac{18x^4}{5y^2}\)
22. At 8:00 am, the Smiths left a campground, driving at 48 mph. At 8:20 am, the Garcías left the same campground and followed the same route, driving at 60 mph. How long does it take the Garcías to overtake the Smith’s?

1 hour and 40 minutes

23. You invest $150,000 in a savings account. The account pays a 3% interest rate compounded quarterly for 6 years. How much money will be in the account at the end of 6 years?

$304,919.12

24. Zach can load his truck in 24 minutes. If his brother helps him, it takes them 15 minutes. How long does it take Zach’s brother to load the truck by himself?

45 minutes
The Socratic Method

Discuss with each other different ways that you can factor the same problem. Prove your answer by showing all of your work:

\[ 3x^2 + 7x - 6 \]
What’s Wrong with this Proof?

Below, you will find a classic “proof” that 2 = 1. Wait, what?! Yes, you read that correctly: according to this “proof”, 2 is equal to 1. But it can’t be, right? So what’s wrong with the deductive reasoning you see below?

<table>
<thead>
<tr>
<th>Argument</th>
<th>Reason</th>
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<tbody>
<tr>
<td>Let $a = b$</td>
<td>Given</td>
</tr>
<tr>
<td>$a^2 = ab$</td>
<td>Multiply both sides by $a$</td>
</tr>
<tr>
<td>$a^2 + a^2 = a^2 + ab$</td>
<td>Add $a^2$ to both sides</td>
</tr>
<tr>
<td>$2a^2 = a^2 + ab$</td>
<td>Combine like terms</td>
</tr>
<tr>
<td>$2a^2 - 2ab = a^2 + ab - 2ab$</td>
<td>Subtract $2ab$ from both sides</td>
</tr>
<tr>
<td>$2a^2 - 2ab = a^2 - ab$</td>
<td>Combine like terms</td>
</tr>
<tr>
<td>$2(a^2 - ab) = 1(a^2 - ab)$</td>
<td>Factor</td>
</tr>
<tr>
<td>$\frac{2(a^2 - ab)}{(a^2 - ab)} = \frac{1(a^2 - ab)}{(a^2 - ab)}$</td>
<td>Divide both sides by $(a^2 - ab)$</td>
</tr>
</tbody>
</table>

$2 = 1$

Q.E.D.
Honors Geometry

Solve for "x" and "y"

31. Find the value of x and y.

\[ \text{Diagram with angles marked as } x^\circ, y^\circ, x^\circ, y^\circ. \]
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Due: 3 days after quiz/test returned
Lesson 27 Honors Algebra Exponent

1. Solve for $x$:

$$3^2 \cdot 3^4 \cdot 3^5 = 3^x$$

$$x = \frac{11}{3}$$

2. Solve for $y$:

$$\frac{(2^3)^4 \cdot (2^2)^y}{2^{10}} = \frac{2^{22}}{2^{10}}$$

$$y = \frac{5}{2}$$

For questions #3 – 10, simplify the following. Make sure that all answers have positive exponents:

3. $x^{-7}$

$$\frac{1}{x^7}$$

4. $6^4 \cdot 6^7 \cdot 6^5 \cdot 6^{-6}$

$$6^0$$

5. $x^{-4}$

6. $(x^2y)^5(3x)(y^4)$

$$x^{16}y^5 \cdot 3x^1 \cdot y^4$$

$$3x^y^9$$

7. $(xy^2)^2(5y^3)^3$

$$x^4y^6 \cdot 125y^9$$

8. $6x^{-5}$

$$\frac{6y^2}{11y^2}$$

9. $\frac{[(x^5y^7z^{11})]^3}{7y^{-3}}$

$$\frac{x^{15}y^{21}z^{33}}{7y^{-3}}$$

10. $(5x)^0 \cdot y^6 \cdot xy^4$

$$xy^{16}$$
11. Compare the following values:

A

\[-4^2\]

B

\[(-4)^2\]

Circle the letter of the correct answer:

(a) A is greater than B
(b) A is less than B
(c) A is equal to B
(d) There is not enough information

For questions #12 – 19, evaluate the following. Make sure that all answers have positive exponents:

12. \[\frac{\frac{3^3}{3^5}}{3^2}\]

13. \[(-3x)^3(2y)^2\]

14. \[(-3)^0(2x^{-1}y^{-1})^3\]

15. \[(-6x^3y^2)(2y)(-x^3)\]

16. \[\frac{5^{-4} \cdot 5^{-5}}{5^{-6}}\]

17. \[\frac{8x^2y^2}{x^2y} \cdot \frac{4xy^2}{x^3y}\]
18. $6x^2y^3 \cdot -4xy$

$= -24x^3y^4$

19. $\frac{4^6 \cdot 7^6}{4^8 \cdot 7^4}$

$= \frac{4^2 \cdot 7^2}{1}$

$= 16 \cdot 49$

$= 784$

20. Compare the following values:

<table>
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<tr>
<th>A</th>
<th>B</th>
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<tbody>
<tr>
<td>$\frac{5^2 \cdot x^2}{y^2}$</td>
<td>$(5^{-1}x^4)^2$</td>
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</table>

Circle the letter of the correct answer. Assume that $x > 1$ in both boxes:

a. A is greater than B
b. A is less than B
c. A is equal to B
d. There is not enough information

21. $(3x^5)(5x^3) - (6x^2)(x^6)$

$= 15x^8 - 6x^8$

22. $(6y^5)(2y^2) - (3y^4)(4y^3) - (7y)^0$

$= 12y^7 - 12y^7 - 1$
6th Grade Answer Group Work

Ladies and gentlemen,

Here are some answers my students from last year submitted to me. Please look over each question as a group and decide if it is correct. If it is correct, place a checkmark next to it. If it is not correct, please correct it as a group.

1. \( \frac{2}{3} + \frac{1}{3} = \frac{3}{6} \)
   \( \frac{2}{3} \times \frac{1}{3} = \frac{2}{9} \)

2. \( \frac{2}{3} \times \frac{1}{3} = \frac{2}{9} \)

3. \( \frac{x}{3} + \frac{6}{5} = \frac{9}{12} \)
   \( \frac{21}{35} + \frac{30}{35} = \frac{51}{35} = \frac{16}{5} \)

4. \( \frac{7}{8} - \frac{3}{8} = \frac{4}{8} \)
   \( \frac{7}{8} - \frac{3}{8} = \frac{1}{8} \)

5. \( 0.567 \times 6 = 3.402 \)

6. \( 13 - 4.987 = 4.974 \)
NOTES: Parenthesis / Nesting [ ( ) ]

Solve to see if the statement is true. If false, insert parentheses to make statement true.

Ex 1) \[ 6 \times 3^2 - 7 + 9 = 38 \]
\[ 6 \times 9 - 7 + 9 = 38 \]
\[ 54 - 7 + 9 \]
\[ 47 + 9 \]
\[ 56 = 38 \]

Ex 2) \[ 6 \times 3^2 - (7 + 9) = 38 \]
\[ 6 \times 9 - 16 = 38 \]
\[ 54 - 16 = 38 \]
\[ 38 = 38 \]

Work from the inside out following the rules for PEMDAS.

\[ 2 \left[ 4 + 3 \left( \frac{70}{2} - 5 \left[ 3 + 2 \times 1 \right] \right) \right] \]
\[ 2 \left[ 4 + 3 \left( \frac{70}{2} - 5 \left[ 5 \right] \right) \right] \]
\[ 2 \left[ 4 + 3 \left( 35 - 25 \right) \right] \]
\[ 2 \left[ 4 + 3 \left( 10 \right) \right] \]
\[ 2 \left[ 4 + 30 \right] \]
\[ 2 \left[ 34 \right] \]
\[ 68 \]
Now you try!!!!

\[ 15 + 3 \left[ 90 - 2 \left( 5 + 3 \left[ 10 \div 2 + 1 \right] \right) + 5 \right] \]

\[ = 15 + 3 \left[ 90 - 2 \left( 5 + 3 \left[ 6 \right] \right) + 5 \right] \]

\[ = 15 + 3 \left[ 90 - 2 \left( 23 \right) + 5 \right] \]

\[ = 15 + 3 \left[ 90 - 98 + 5 \right] \]

\[ = 15 + 3 \left[ 0 + 5 \right] \]

\[ = 15 + 3 \left[ 5 \right] \]

\[ = 15 + 15 \]

\[ = 30 \]

\[ = 162 \]
Simplify the following. Show Work.

1) \(10 + 2[40 - 3(15 \div 5 + 3^2)]\)

\[
10 + 2 \left[ 40 - 3 \left( \frac{15}{5} + 3^2 \right) \right]
\]

\[
10 + 2 \left[ 40 - 3 \left( \frac{15}{5} + 9 \right) \right]
\]

\[
10 + 2 \left[ 40 - 3(12) \right]
\]

\[
10 + 2 \left[ 40 - 36 \right]
\]

\[
10 + 2 \left[ 4 \right]
\]

\[
10 + 8 \quad \text{(18)}
\]

\[
\frac{32 - 4}{8 + 24 - 4(9)^0}
\]

\[
\frac{(8+4) - 4(9+3)^0}{3 \cdot 2^2 - 15 - 5}
\]

\[
\frac{24 - 15 - 5}{9 - 5}
\]

\[
y = 7
\]

2) \(100 - 5(12 - 10 + 1) + 3[2^3 + 4(3 + 2 \cdot 4)]\)

\[
100 - 5(12 - 10 + 1)
\]

\[
100 - 5(12)
\]

\[
100 - 5(11)
\]

\[
100 - 15 + 3(8 + 4 \cdot 4)
\]

\[
100 - 15 + 3(8 + 16)
\]

\[
100 - 15 + 3(24)
\]

\[
85 + 156
\]

\[
241
\]

Insert parenthesis so the following are true. PROVE your answer.

4) \(3^2 - 6 + 8 \div (2 \cdot 4) = 4\)

\[
9 - 6 + 8 \div 8 = 4
\]

\[
\frac{3 + 8}{8} = 4
\]

\[
3 + 1 = 4
\]

\[
y = 4
\]

5) \((20 + 6) \div 2 + 14 \div 2 = 59\)

\[
26 \div 2 + 7
\]

\[
52 + 7
\]

\[
59 = 59
\]
CHALLENGE: "4's"

Use **four 4's** to make all the numbers from 0 to 25.

Use order of operations and any of the mathematical signs below.

\[ + \quad - \quad \times \quad \div \quad \sqrt{\quad} \quad ! \quad [\quad] \]

Ex) \[ 4 + \frac{4+4}{4} = 6 \]

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<td>0</td>
<td>(4 + 4 - 4 - 4)</td>
<td>13</td>
<td>(\frac{4!}{\sqrt{4}} + \frac{4}{4})</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>(\frac{4}{4} \div 4)</td>
<td>14</td>
<td>(4 + 4 + 4 + \sqrt{4})</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>(4 + 4 - 4 - \sqrt{4})</td>
<td>15</td>
<td>(4 \times 4 - \frac{4}{4})</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>(4 + \frac{4}{4} - \sqrt{4})</td>
<td>16</td>
<td>(\frac{4}{4} \times 4 \times 4)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>(\sqrt{4} + \sqrt{4} \div \frac{4}{4})</td>
<td>17</td>
<td>(4 \div 4 + 4 \times 4)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>((4 \times 4 + 4) \div 4)</td>
<td>18</td>
<td>(4! - 4 - 4 + \sqrt{4})</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>(4 \div \frac{4}{4} + \sqrt{4})</td>
<td>19</td>
<td>(4! - 4 - \frac{4}{4})</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>(4 + \frac{4}{4} + \sqrt{4})</td>
<td>20</td>
<td>(4 \times 4 + \sqrt{4} + \sqrt{4})</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>$\sqrt{u} + \sqrt{u} + \sqrt{u} + \sqrt{u}$</td>
<td>21</td>
<td>$u^4 - 4 + \frac{u}{4}$</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>$u + u - u \div u$</td>
<td>22</td>
<td>$u \times u + u + \sqrt{u}$</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>$u + u + u - \sqrt{u}$</td>
<td>23</td>
<td>$u^4 - \sqrt{u} + \frac{u}{u}$</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>$\frac{u^4}{u} - \frac{u}{u}$</td>
<td>24</td>
<td>$u + u \div (u \times u)$</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>$u + u + \sqrt{u} + \sqrt{u}$</td>
<td>25</td>
<td>$u^4 + \sqrt{u} - \frac{u}{u}$</td>
<td></td>
</tr>
</tbody>
</table>

Can you make 33, 39, or 41?
Lesson 22 Pop Quiz On polynomials

25. Correct the Error
There is an error in the student work below.
\[ (4x^3 + 4x^2 - 8x) - (18x^2 - 16x + 4) = \]
\[ = 4x^3 + 4x^2 - 8x - 18x^2 + 16x - 4 \]
\[ = 4x^3 + 12x^2 - 24x - 4 \]

What is the error?

\[ \frac{(4x^2 + 4x - 8x)}{1} + (-8x^2 + 16x + 4) \]

\[ 4x^3 - 4x^2 + 8x - 4 \]

\[ (4x^3 + 4x^2 - 8x) - \frac{8x^2 + 16x + 4}{1} \]

\[ = 4x^3 + 4x^2 - 8x - 8x^2 + 16x - 4 \]
\[ = 4x^3 + 12x^2 + 24x - 4 \]

They didn't distribute the negative sign. Also they put 4 - 8 = 12. To fix it, you distribute and follow the signs.
SKILL PRACTICE
Find and correct four errors on Barbara’s quiz.

INEQUALITY QUIZ
Solve each inequality and graph the solution.

1. \[ y + 3 > 4; \]
   \[ y + 3 - 3 > 4 - 3 \]
   \[ y > 1 \]

2. \[-y < 5\]
   \[ y > -5 \]

3. \[ 3y \geq -9 \]
   \[ y \geq -3 \]

4. \[-2y \leq 8\]
   \[ y \geq -4 \]

5. \[ \frac{y}{3} > -2 \]
   \[ y > -6 \]

6. \[ \frac{y}{2} \leq 1 \]
   \[ y \leq 2 \]

7. \[ y - 7 \leq -6 \]
   \[ y \leq 1 \]

8. \[-y \geq -2\]
   \[ y \leq 2 \]

9. \[ 5y > 15 \]
   \[ y > 3 \]

10. \[-4y < 2\]
    \[ y > -\frac{1}{2} \]

11. \[ \frac{y}{8} \geq \frac{1}{2} \]
    \[ y \geq 4 \]

12. \[ \frac{y}{3} \leq 2 \]
    \[ y \geq 6 \]

   Should be solid circle
CRITICAL THINKING SKILLS

1. Is it possible for four consecutive even numbers to have a sum that is ten more than the sum of the smallest two numbers? If so, tell how many solution(s) there are. If there are no solutions, tell why not.

   1st: \( x \)
   2nd: \( x + 2 \)
   3rd: \( x + 4 \)
   4th: \( x + 6 \)

   \[ x + x + 2 + x + 4 + x + 6 = 10 + x + x + 2 \]
   \[ 4x + 12 = 12x + 12 \]
   \[ -12 \]
   \[ 4x = 12x \]
   \[ -2x \]
   \[ x = 0 \]

   1 solution

2. Find three consecutive integers such that three times the smallest is equal to the middle number increased by the greatest number.

   1st: \( x \)
   2nd: \( x + 1 \)
   3rd: \( x + 2 \)

   \[ 3(x) = x + 1 + x + 2 \]
   \[ 3x = 2x + 3 \]
   \[ -2x \]
   \[ x = 3 \]

3. Find three consecutive integers whose sum is 87.

   1st: \( x \)
   2nd: \( x + 1 \)
   3rd: \( x + 2 \)

   \[ x + x + 1 + x + 2 = 87 \]
   \[ 3x + 3 = 87 \]
   \[ -3 \]
   \[ 3x = 84 \]
   \[ \frac{84}{3} \]
   \[ \frac{26}{3} \]
Notes Lesson ___  

Equations Activity

With your group, solve the following problems. They are not all correct. The ones that are correct, place a check next to them. For the ones that are incorrect, re-do the problems so that they are correct.

1. \[2x - 11x = -27\] (answer is 3)
   \[
   \frac{-9x}{-9} = \frac{27}{-9}
   \]
   \[x = -3\]
   
2. \[0 = \frac{8 - 2x}{5}\] (answer is 4)
   \[
   0 = \frac{8 - 2x}{5} + \frac{2x}{5}
   \]
   \[2x = \frac{8}{2}\]
   \[x = 4\]

3. \[2(x + 8) - 9 = 5\] (answer is 3)
   \[
   2x + 16 - 9 = 5
   \]
   \[2x + 7 = 5\]
   \[\frac{2x}{2} = \frac{7}{2}\]
   \[x = \frac{7}{2}\]

4. \[19 + 3(x - 5) = -2\] (answer is \(\frac{32}{3}\))
   \[
   19 + 3x - 15 = -2
   \]
   \[4 + 3x = -2\]
   \[\frac{3x}{3} = -\frac{6}{3}\]
   \[x = -2\]

5. \[(5 - x) + (6 - x) - (5 - x) = 0\] (answer is 6)
   \[
   5 - x + 6 - x - 5 + x = 0
   \]
   \[-x + 6 = 0\]
   \[x = 6\]
   \[x = 6\]
6. $4(x + 8) - 7 = 17 \{\text{answer is -5}\}$
   
   \[
   \begin{align*}
   4x + 32 - 7 &= 17 \\
   4x + 25 &= 17 \\
   4x &= -8 \\
   x &= -2
   \end{align*}
   \]

8. $-9 - 3(2x - 1) = -18 \{\text{answer is 5}\}$
   
   \[
   \begin{align*}
   -9 - 6x + 3 &= -18 \\
   -6x - 6 &= -18 \\
   -6x &= -12 \\
   x &= 2
   \end{align*}
   \]

9. $-10 + 4(3x + 10) = 18 \{\text{answer is -1}\}$
   
   \[
   \begin{align*}
   -10 + 12x + 40 &= 18 \\
   12x &= 30 \\
   x &= -1
   \end{align*}
   \]

10. $5(x - 7) + 2[x - 3(x - 5)] = 0 \{\text{answer is 3}\}$
    
    \[
    \begin{align*}
    5x - 35 + 2[x - 3x + 15] &= 0 \\
    5x - 35 + 2[-2x + 15] &= 0 \\
    5x - 35 - 4x + 30 &= 0 \\
    x - 5 &= 0 \\
    x &= 5
    \end{align*}
    \]
Lesson 22 Honors Age Problem

1. Next year, Lisa will be twice as old as Steve will be. Four years ago, Lisa was three times as old as Steve was. How old is each of them now?

<table>
<thead>
<tr>
<th></th>
<th>Next Year</th>
<th>Now</th>
<th>Four Years Ago</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lisa</td>
<td>2x</td>
<td>2x-1</td>
<td>2x-5</td>
</tr>
<tr>
<td>Steve</td>
<td>x</td>
<td>x-1</td>
<td>x-5</td>
</tr>
</tbody>
</table>

\[
2x - 5 = 3(x - 5) \\
2x - 5 = 3x - 15 \\
-2x = -10 \\
-5 = x + 15 \\
10 = x \\

Lisa (2x-1) \rightarrow 2x = 19
\]

\[
2x = 19 \\
2x - 5 = 3x - 15 \\
-2x = -10 \\
-5 = x + 15 \\
10 = x \\

Steve (x-1) \rightarrow x = 9
\]

2. A father, being asked his age and that of his son said: “If you add four to my age and divide the sum by four, you will have my son’s age. But six years ago I was 7.5 times as old as my son.” Find their ages now.

<table>
<thead>
<tr>
<th></th>
<th>Now</th>
<th>6 Years Ago</th>
<th>Now</th>
</tr>
</thead>
<tbody>
<tr>
<td>Father</td>
<td>x</td>
<td>x-6</td>
<td>360</td>
</tr>
<tr>
<td>Son</td>
<td>x+y/4</td>
<td>x+y/4 - 6</td>
<td>10</td>
</tr>
</tbody>
</table>

\[
\text{Clear the Fraction} \\
8x - 4y = 15x + 60 - 360 \\
\]

\[
\frac{2x - 12 = \frac{15(x+y)}{4} - 90}{x = 360}
\]

\[
2x + 12 = 15(x+y) - 90 \\
2x = 15(x+y) - 90 \\
2x + 12 = 15(x+y) - 90
\]
Lesson 43 Graphing Mistakes

Directions: Find the mistakes on the following problems. Remember, not all of the problems have mistakes. If it is correct, just say “CORRECT” next to the problem. If it is wrong, explain why it is wrong and THEN correct the mistake.

1. $(4, 6), (-5, 9)$  
   \[ m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{9 - 6}{-5 - 4} = \frac{3}{-9} = -\frac{1}{3} \]  
   1. $m = -\frac{1}{3}$ (slope)  

2. $(4, 6), (-5, 9)$  
   \[ m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{9 - 6}{-5 - 4} = \frac{3}{-9} = -\frac{1}{3} \]  
   \[ y - 6 = -\frac{1}{3}(x - 4) \]  
   \[ 3y - 18 = -x + 4 \]  
   \[ x + 3y - 18 = 4 \]  
   \[ x + 3y = 22 \]  
   2. $x + 3y = 32$ (standard form)  

3. $6x - 3y = 30$  
   \[ \frac{6x}{6} = \frac{30}{6} \]  
   \[ x = 5 \]  
   \[ (5, 0) \]  
   \[ \frac{-3y}{3} = \frac{30}{3} \]  
   \[ y = -10 \]  
   \[ (0, -10) \]  
   3. $x$ int = $(0, -10)$  
   $y$ int = $(5, 0)$
4. True or False?  The point (4, 0) is on the y axis?

5. True or False?  The point (5, -3) is in quadrant 4?

6. True or False?  The abscissa is ALWAYS the x coordinate?

7. True or False?  A point that has a positive x coordinate is ALWAYS in quadrant 1?
   
   *Could also be on x axis or in quadrant 4.*
8. Place the following problem in slope intercept form and then graph it.

\[ (4, 7), (4, -7) \]

\[ \frac{y_2 - y_1}{x_2 - x_1} = \frac{-7 - 7}{4 - 4} = \text{undefined} \]

8. \( x = 4 \) (equation)

9. Write the equation of the line given the following:

\[ m = -\frac{3}{4} \text{ passing through the point } (8, -12) \]

\[ y + 12 = -\frac{3}{4}(x - 8) \]

\[ y + 12 = -\frac{3}{4}x + 6 \]

\[ y = -\frac{3}{4}x - 6 \]
10. \((-4, 8), (-6, -12)\)

\[ \frac{y_2 - y_1}{x_2 - x_1} = \frac{-12 - 8}{-6 + 4} = \frac{-20}{-2} = 10 \]

10. \(m = 10\)

11. Find the value of “\(y\)” in the following problem:

\((6, 8), (-4, y)\) and \(m = \frac{1}{2}\)

\[ \frac{y - 8}{-4 - 6} = \frac{1}{2} \]

\[ y - 8 = \frac{-10}{2} \]

\[ y = 3 \]

11. \(y = 3\)

12. Write the equation of a line perpendicular to the equation \(y = \frac{2}{3}x + 8\) passing through the point \((6, -4)\).

\[ m = -\frac{2}{3} \Rightarrow \frac{3}{2} \]

\[ m = \frac{3}{2} (6 - u) \]

\[ y + 4 = \frac{3}{2}(x - 6) \]

\[ y + 4 = \frac{3}{2}x - 9 \]

\[ y = \frac{3}{2}x - 13 \]

12. \(y = -\frac{2}{3}x\)
13. True or False? Perpendicular lines ALWAYS have different y-intercepts?

14. True or False? The slope of a line through (0, 3) and (4, 0) is \( \frac{3}{4} \)?

\[
\frac{0 - 3}{4 - 0} = \frac{-3}{4}
\]

15. True or False? Parallel line SOMETIMES have the same slopes?

\[ \downarrow \]

Always

16. True or False? Slopes that have zero slopes have horizontal graphs?
Lesson 51 Mistakes with Rational Exponents

In the following problems, simplify. If the answer is incorrect, then explain why it is incorrect and correct the problem:

1. \((x^4)^{\frac{3}{2}} = \quad \color{red}x^6\quad \checkmark \)

2. \((x^2)^{-2} = \quad \color{red}x^3\quad \checkmark \)

\[
\frac{1}{x^{\frac{3}{2}}} = \frac{1}{x^{\frac{3}{2}}} \cdot \frac{x^{\frac{1}{2}}}{x^{\frac{1}{2}}} = \frac{1}{x^{\frac{3}{2}}} \cdot \frac{x^{\frac{1}{2}}}{x^{\frac{1}{2}}} = \frac{1}{x}
\]

3. \((27x^6)^{\frac{5}{3}} = \quad \color{red}27x^{10}\quad \checkmark \)

\[
\sqrt[3]{27^5} = 3^5 = 243 \times 10
\]

4. \((9x^4)^{0.5} = \quad \color{red}3x^2\quad \checkmark \)

\[
(9x^4)^{\frac{1}{2}} = (9)^{\frac{1}{2}} \cdot x^{4 \cdot \frac{1}{2}} = 3x^2
\]

5. \((25x^6)^{-1.5} = \quad \color{red}\frac{1}{125x^9}\quad \checkmark \)

\[
\frac{1}{(25x^6)^{\frac{3}{2}}} = \frac{1}{25^{\frac{3}{2}}} \cdot x^{\frac{6}{2}} = \frac{1}{125} \cdot x^3
\]

6. \((216x^9)^{\frac{1}{3}} = \quad \color{red}\frac{1}{6x^3}\quad \checkmark \)

\[
\sqrt[3]{216x^9} = 6x^3
\]

\[
\frac{\sqrt{125x^9}}{5^2} = \frac{1}{125x^9}
\]

\[
\frac{2^{\frac{3}{2}} \cdot \frac{18}{2}}{25^{\frac{3}{2}} \cdot x^2} = \frac{1}{125x^9}
\]
Lesson Honors LAB on Exponents

On this Lab, there are 11 mistakes. Work with your peers to find those mistakes. Make sure you leave NO negative exponents in your solutions. If the problems are wrong, show the correct answers:

1. \( \left( \frac{x^{-5}}{x^{-3}} \right)^4 \times \left( \frac{x^8}{x^{-4}} \right)^6 \div \left( \frac{x^{11}}{x^7} \right)^2 = x^{56} \)

2. \( \left( \frac{x^6 \times x^{-11}}{x^{-13}} \right)^4 = x \)

3. \( (2x)(4x^3) + (-3x^2)(5x^2) = 23x^4 \)

4. \( \frac{16x^{-3}y^{-2}}{19x^{-5}y^{-1}} = \frac{19x^2}{16y} \)

5. \( (6x^5)(2x^2) - (3x^4)(4x)^3 = 0 \)

6. \( (3x^n)^2(x^2)^n = 9x^{4n} \)
\( (2x^3y)^3(3x^7y^2)^2 = 6x^{13}y^7 \)

\( (-2)^5x^5(3x^3)(4y^2) = -768x^8y^2 \)

\( [(-4xy^3z^5)^2]^0 + \frac{6x^4}{11x^4} = 2^{\frac{5}{6}} \)

\( \frac{7^{-4} \cdot 7^{-8}}{7^{-6}} = \frac{1}{117,649} \)

\( 2x(3x^2 - 4x) + 8x^2 = 6x^3 \)

\( \frac{4^3}{4^5} = 4 \)

\( \frac{y^3}{y^{5-y}} \)

\( \frac{y^3}{y^{-2}} \)

\( \frac{y^3}{y^{-2}} = y^{3+2} = y^5 = 1024 \)
13. One printing machine works twice as fast as another. When both machines are used, they can print a magazine in 3 hours. How many hours would each machine require to do the job alone?

Machine 1 = 4.5 hours  Machine 2 = 9 hours

$$2x \left( \frac{3}{x} + \frac{3}{2x} = 1 \right)$$

$$6 + 3 = 2x$$

$$2 \cdot \frac{2x}{2} = x = 4.5$$

14. Bicyclists Nicole and Leili started at noon from points 60 miles apart and rode toward each other, meeting at 1:30 pm. Nicole’s speed was 4 mph greater than Leili’s speed. What was Nicole’s speed?

Nicole = 18 mph  is Leili

<table>
<thead>
<tr>
<th></th>
<th>Rate</th>
<th>Time</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nicole</td>
<td>x + 4</td>
<td>1.5</td>
<td>1.5(x + 4)</td>
</tr>
<tr>
<td>Leili</td>
<td>x</td>
<td>1.5</td>
<td>1.5x</td>
</tr>
</tbody>
</table>

$$1.5(x + 4) + 1.5(x) = 60$$

$$3x + 6 + 1.5x = 60$$

$$4.5x = 54 \Rightarrow x = 12$$

15. Natalie took a photo of Bruce break-dancing. She shared it with 5 of her friends. Each of those friends shared it with 4 other friends each. How many people will have seen Bruce photo after 10 days?

$$5,242,800$$ views
16. \((-6)^3 + (6)^3 - (-6)^3 = -216\)

\((-6)^3 + (6)^3 - (-6)^3 = -216\)

\(\frac{-216 + 216}{216} = 216\)

17. \((3x^2y)^3(2xy)^3 = 216x^8y^6\)

\((3x^2y)^3(2xy)^3 = \frac{3^3 \cdot 2^3 \cdot x^6 \cdot y^3}{x^6 \cdot y^6} = \frac{216x^9y^6}{216x^9y^6} = 216x^9y^6\)

18. \(\frac{3^5 \cdot 4^6 \cdot 5^7}{4^6 \cdot 5^6 \cdot 3^2} = \frac{135}{16}\)

\(\frac{3^5 \cdot 4^6 \cdot 5^7}{4^6 \cdot 5^6 \cdot 3^2} = \frac{3 \cdot 5}{4^2} = \frac{15}{16}\)

19. \((6x^7y^5)^\frac{1}{1} + (3x^2y^5)^0 = \frac{1}{6x^2y^5}\)

\(\frac{1}{6x^2y^5} + 1 = \frac{1 + 6x^2y^5}{6x^2y^5}\)

20. \(\frac{2x^{-4}}{3^{-1}y^2} = \frac{6}{x^4y^2}\)

\(\frac{2 \cdot 3}{x^4y^2} = \frac{6}{x^4y^2}\)

21. \(\frac{2yz}{15} \times \left(\frac{3z}{y}\right)^3 = \frac{18z^4}{5y^2}\)

\(\frac{2y^2 \cdot 3^3 z^3}{15 \cdot y^3} = \frac{54y^2 z^3}{15y^3} = \frac{18z^4}{5y^2}\)
22. At 8:00 am, the Smiths left a campground, driving at 48 mph. At 8:20 am, the Garcias left the same campground and followed the same route, driving at 60 mph. How long does it take the Garcias to overtake the Smith’s?

\[
\begin{array}{|c|c|c|}
\hline
\text{Rate} & \times & \text{Time} = \text{Distance} \\
\hline
\text{Smiths} & 48 & x = 48(x) \\
\text{Garcias} & 60 & x - \frac{1}{3} = 60(x - \frac{1}{3}) \\
\hline
\end{array}
\]

1 hour and 40 minutes

\[
\begin{align*}
48x &= 60 \left(x - \frac{1}{3}\right) \\
48x &= 60x - 20 \\
-12x &= -20 \\
x &= \frac{10}{6} = \frac{5}{3} \\
1\text{hr.} + 40\text{min.}
\end{align*}
\]

23. You invest $150,000 in a savings account. The account pays a 3% interest rate compounded quarterly for 6 years. How much money will be in the account at the end of 6 years?

\[
150,000 \left(1 + \frac{.03}{4}\right)^{4(6)} = 179,462.03
\]

24. Zach can load his truck in 24 minutes. If his brother helps him, it takes them 15 minutes. How long does it take Zach’s brother to load the truck by himself?

\[
24 \left(\frac{15}{24} + \frac{15}{x} = 1\right)
\]

\[
15x + 360 = 24x - 15x
\]

\[
360 = 9x
\]

\[
x = 40\text{ minutes}
\]
Discuss with each other different ways that you can factor the same problem. Prove your answer by showing all of your work:

\[ 3x^2 + 7x - 6 \]

1. \( 3x^2 + 9x - 2x - 6 \)
   \[ (3x^2 + 9x)(-2x - 6) \]
   \[ 3x(x + 3) - 2(x + 3) \]
   \[ (3x - 2)(x + 3) \]

2. \( \left( \frac{3x + 9}{3} \right)(3x - 2) \)
   \[ \left( x + 3 \right)(3x - 2) \]

3. Guess + Check
What’s Wrong with this Proof?

Below, you will find a classic “proof” that $2 = 1$. Wait, what?! Yes, you read that correctly: according to this “proof”, 2 is equal to 1. But it can’t be, right? So what’s wrong with the deductive reasoning you see below?

**Argument**

Let $a = b$

$\text{Reason}$

Given

$a^2 = ab$

Multiply both sides by $a$

$a^2 + a^2 = a^2 + ab$

Add $a^2$ to both sides

$2a^2 = a^2 + ab$

Combine like terms

$2a^2 - 2ab = a^2 + ab - 2ab$

Subtract $2ab$ from both sides

$2a^2 - 2ab = a^2 - ab$

Combine like terms

$2(a^2 - ab) = 1(a^2 - ab)$

Factor

$(a^2 - ab)$(a^2 - ab)

Divide both sides by $(a^2 - ab)$

$2 = 1$

Q.E.D.

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Below, you will find a classic “proof” that $2 = 1$. Wait, what?! Yes, you read that correctly: according to this “proof”, 2 is equal to 1. But it can’t be, right? So what’s wrong with the deductive reasoning you see below?

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$\text{Reason}$

Given

$a^2 = ab$

Multiply both sides by $a$

$a^2 + a^2 = a^2 + ab$

Add $a^2$ to both sides

$2a^2 = a^2 + ab$

Combine like terms

$2a^2 - 2ab = a^2 + ab - 2ab$

Subtract $2ab$ from both sides

$2a^2 - 2ab = a^2 - ab$

Combine like terms

$2(a^2 - ab) = 1(a^2 - ab)$

Factor

$(a^2 - ab)$(a^2 - ab)

Divide both sides by $(a^2 - ab)$

$2 = 1$

Q.E.D.
Honors Geometry

Solve for “x” and “y”

31. Find the value of x and y.

Triangle #1
\[ x + y + y = 180 \]
\[ x + 2y = 180 \]

Triangle #2
\[ x + y + x + x = 180 \]
\[ 3x + y = 180 \]

Substitution
\[ x + 2y = 180 \]
Substitute 2x for y
\[ x + 2(2x) = 180 \]
\[ x + 4x = 180 \]
\[ 5x = 180 \]
\[ x = 36 \]

If \( 2x = y \), then
\[ 2(36) = y = 72 \]

Systems of Equations
\[ x + 2y = 180 \]
\[ -2(3x + y = 180) \]
\[ x + 2y = 180 \]
\[ -6x - 2y = -360 \]
\[ -5x = -180 \]
\[ x = 36 \]