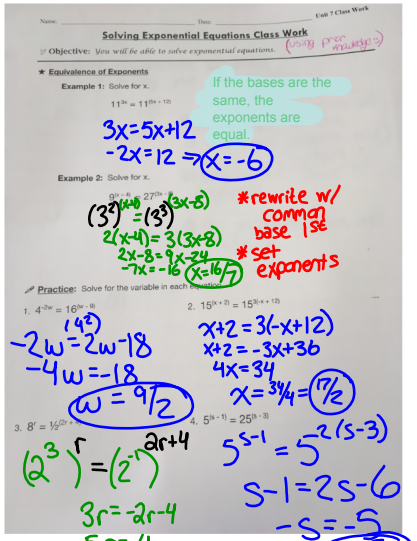


Name: _____ Date: _____ Unit 7 Class Work

Solving Exponential Equations Class Work

Objective: *You will be able to solve exponential equations.* (using prev knowledge)

★ Equivalence of Exponents

Example 1: Solve for x.

$11^{3x} = 11^{(5x+12)}$

If the bases are the same, the exponents are equal.

$3x = 5x + 12$

$-2x = 12 \Rightarrow x = -6$

Example 2: Solve for x.

$9^{(x+8)} = 27^{(3x-8)}$

$(3^2)^{(x+8)} = (3^3)^{(3x-8)}$

$2(x+4) = 3(3x-8)$

$2x - 8 = 9x - 24$

$-7x = -16 \quad x = 16/7$

*rewrite w/ common base 1st

*set exponents

Practice: Solve for the variable in each equation.

1. $4^{-2w} = 16^{(w-9)}$

(4^2)

$-2w = -2w - 18$

$-4w = -18$

$w = 9/2$

2. $15^{(x+2)} = 15^{3(-x+12)}$

$x + 2 = 3(-x + 12)$

$x + 2 = -3x + 36$

$4x = 34$

$x = 34/4 = 17/2$

3. $8^r = \frac{1}{2}^{(2r+4)}$

$(2^3)^r = (2^{-1})^{(2r+4)}$

$3r = -2r - 4$

$5r = -4$

$r = -4/5$

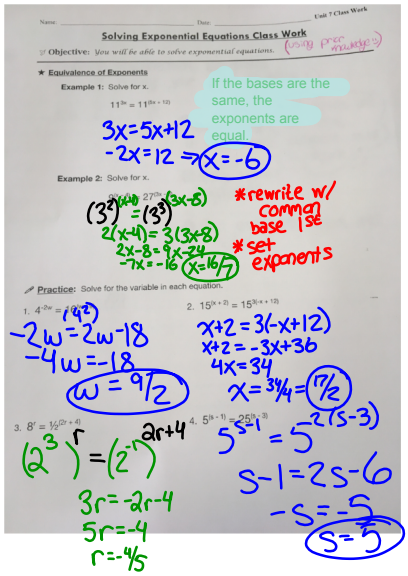
4. $5^{(s-1)} = 25^{(s-3)}$

$5^{s-1} = 5^{2(s-3)}$

$s - 1 = 2s - 6$

$-s = -5$

$s = 5$



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HW

Solve each equation.

1. $93^{3x+2} = 93^{-4(x+5)}$

2. $36^{5x-1} = \left(\frac{1}{216}\right)^{3x}$

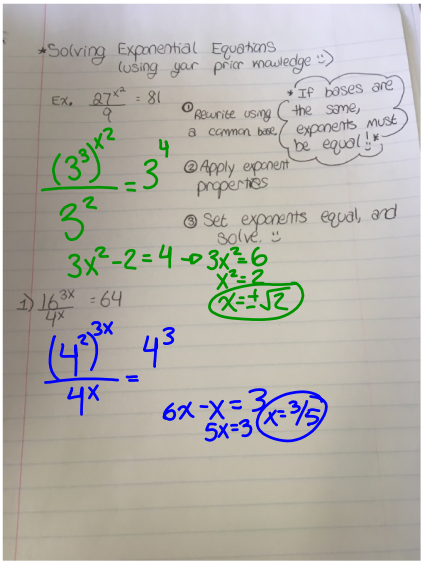
3. $343^{2x+7} = 49^{-4x-9}$

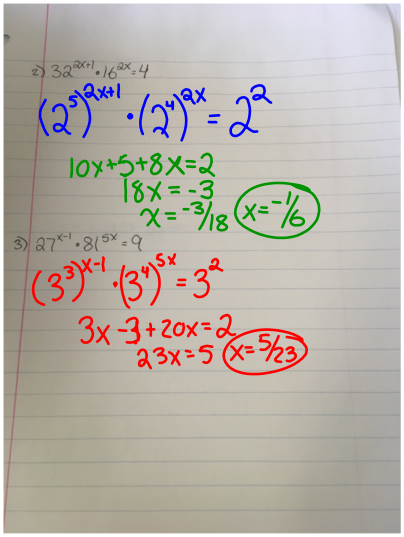
4. $32^{-(5x+3)} = \left(\frac{1}{2}\right)^{8}$

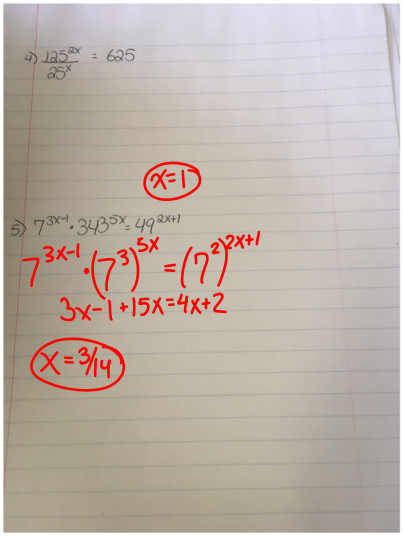
Solutions

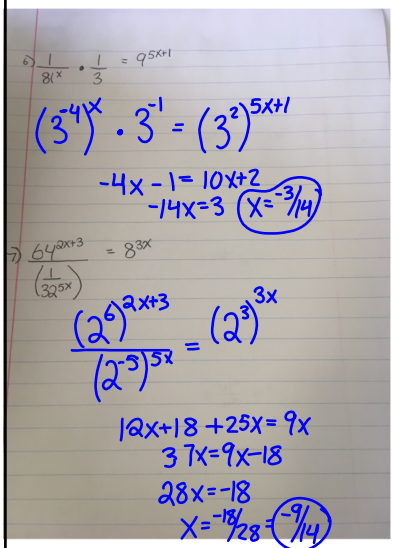
1. -22/7
2. 2/19
3. -39/14
4. -7/25

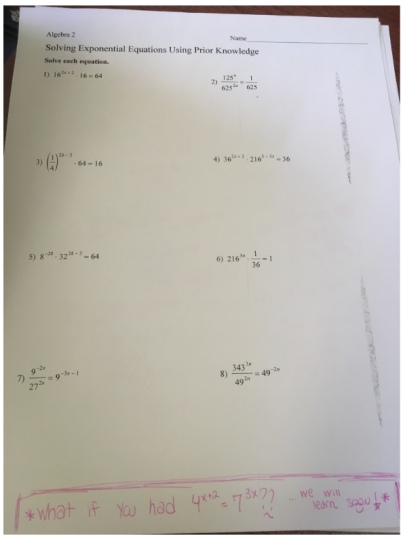
Apr 3-10:37 AM




2) $32^{2x+1} \cdot 16^{2x} = 4$
$(2^5)^{2x+1} \cdot (2^4)^{2x} = 2^2$
$10x+5+8x=2$
$18x=-3$
$x=-3/18$ $x=-1/6$
3) $27^{x-1} \cdot 81^{5x} = 9$
$(3^3)^{x-1} \cdot (3^4)^{5x} = 3^2$
$3x-3+20x=2$
$23x=5$ $x=5/23$


4) $\frac{125^{2x}}{25^x} = 625$
$x=1$
5) $7^{3x-1} \cdot 343^{5x} = 49^{2x+1}$
$7^{3x-1} \cdot (7^3)^{5x} = (7^2)^{2x+1}$
$3x-1+15x=4x+2$
$x=3/14$




Algebra 2 Name

Solving Exponential Equations Using Prior Knowledge

Solve each equation.

1) $16^{2x+2} \cdot 16 = 64$

2) $\frac{125^x}{625^{2x}} = \frac{1}{625}$

3) $\left(\frac{1}{4}\right)^{3x-3} \cdot 64 = 16$

4) $36^{2x+3} \cdot 216^{3-3x} = 36$

5) $8^{-2x} \cdot 32^{2x-3} = 64$

6) $216^{3x} \cdot \frac{1}{36} = 1$

7) $\frac{9^{-2x}}{27^{2x}} = 9^{-3x-1}$

8) $\frac{343^{3x}}{49^{2x}} = 49^{-2x}$

what if you had $4^{x+2} = 7^{3x-7}$ ... we will learn soon!