Name: ______________________________ Per: _____

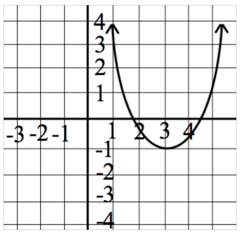
Algebra 2: 1st Semester Benchmark Exam

Example Sheet 4

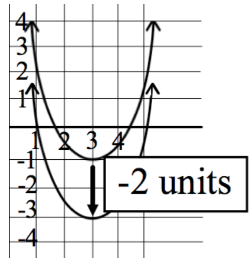
Study Guide Problem & Solution		New Example

Study Guide Problem & Solution

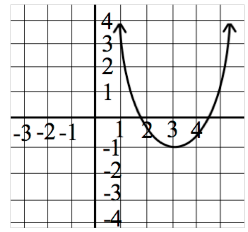
Use a table to translate the graph 2 units down.



MOVE THE GRAPH DOWN TWO UNITS.



41 New Example: Use a table to translate the graph 3 units left.



Find P(-4) using the Remainder Theorem.

P(x) = $x^4 + 3x^2 - 22x + 16$ for x = -4.

You have two options: Plug 'n' chug, or synthetic division.

Option 1:

P(-4) = $(-4)^4 + 3(-4)^2 - 22(-4) + 16 = 256 + 3(16) + 88 + 16$

P(-4) = 256 + 48 + 104 = 256 + 48 + 104 = ***408***

Option 2:

-4	1	0	3	-22	16
	↓	-4	16	-76	392
	1	-4	19	-98	***408***

The remainder is the answer. P(-4) = 408

42 Find P(-2) using the Remainder Theorem.

P(x) = $x^5 + 2x^3 - 17x + 11$ for x = -2.

Completely factor the expression $250x^5 + 54x^2y^3$.

A. $2x^2(5x + 3y)^3$

B. $2x^2(125x^3 + 27y^3)$

C. $2x^2(5x + 3y)(25x^2 - 15xy + 9y^2)$

D. $2x^2(5x + 3y)(25x^2 + 15xy + 9y^2)$

It says "completely factor," so more than one of the answer choices could equal the problem. The correct answer is the one that multiplies to the problem AND is more factored. To solve this problem, multiply each answer choice and check if it equals the original.

After I multiplied every answer choice, I found that

A. $2x^2(5x + 3y)^3 = 250x^5 + 450x^2y + 270xy^2 + 54x^3$ *Nope.*

B. $2x^2(125x^3 + 27y^3) = 250x^5 + 54x^2y^3$ *YES!!*

C. $2x^2(5x + 3y)(25x^2 - 15xy + 9y^2) = 250x^5 + 54x^2y^3$ *YES!!*

D. $2x^2(5x + 3y)(25x^2 + 15xy + 9y^2)$

$= 250x^5 + 150x^2y + 90xy^2 + 54x^2y^3$ *Nope.*

Both B and C work, but C has to be the answer, because it is factored more COMPLETELY.

Answer: C. $2x^2(5x + 3y)(25x^2 - 15xy + 9y^2)$

43 Completely factor the expression $40x^5 - 320x^2y^2$.

A. $5x^2(2x - 4y)^3$

B. $5x^2(8x^3 - 64y^3)$

C. $5x^2(2x - 4y)(4x^2 - 8xy + 16y^2)$

D. $5x^2(2x - 4y)(4x^2 + 8xy + 16y^2)$

Subtract. Write your answer in standard form.

$(6x^2 + 7x - 12) - (4x^2 - 22)$

Distribute the negative, and combine like terms.

$6x^2 + 7x - 12 - 4x^2 + 22 = 6x^2 - 4x^2 + 7x + 22 =$ $\boldsymbol{2x^2 + 7x + 22}$

44 Subtract. Write your answer in standard form.

$(4x^2 - 2x + 9) - (8x - 10)$

Simplify the expression $(6)^0(5)^{-3}$.

Anything to the power of 0 equals 1, so $6^0 = 1$

Negative exponents create a fraction, so $5^{-3} = \frac{1}{5^3}$

Multiply it out. $(6)^0(5)^{-3} = (1)\left(\frac{1}{5^3}\right) = \frac{1}{125}$

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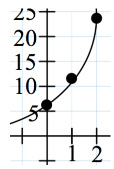
Simplify the expression $(7)^{-2}(4)^0(5)^1$.

Tell whether the function $y = 6(2)^x$ shows growth or decay. Then graph the function.

x	$y = 6(2)^x$	y
0	$y = 6(2)^0$	6
1	$y = 6(2)^1$	12
2	$y = 6(2)^2$	24

This function shows growth.



**Due to space issues, the x- and y- axes used different scales in the given image. Do not do this if the goal is to create a precise graph. It will create an inaccurate image.*

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Tell whether the function $y = 16(0.5)^x$ shows growth or decay. Then graph the function.

Solve $16^{x-2} = 64^x$.

The simplest solution to this problem is to cancel the bases by making them equal each other—find a base that they have in common. In this case, the common base is 4.

$16^{x-2} = 64^x$ **becomes** $(4^2)^{x-2} = (4^3)^x$

Now, multiply the powers. $4^{2x-4} = 4^{3x}$

Since the bases are the same, we can cancel them. $2x - 4 = 3x$

SOLVE!! $-4 = x$

Answer: x = −4

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Solve $27^{x+5} = 81^x$.

Which is the first incorrect step in simplifying $\log_2 \frac{8}{64}$?

Step 1: $\log_2 \frac{8}{64} = \log_2 8 + \log_2 64$ **-Should be <u>subtraction</u>**

Step 2: $= 3 + 6$

Step 3: $= 9$

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Which is the first incorrect step in simplifying $\log_5 \frac{25}{125}$?

Step 1: $\log_5 \frac{25}{125} = \log_5 25 - \log_5 125$

Step 2: $= 5 - 3$

Step 3: $= 2$

A student showed the following steps in his solution of the equation below, but his answer was not correct. Which is his first incorrect step in solving this equation?

$$\log_6(2x^2 + x - 6) - \log_6(2x - 3) = 4$$

Step 1: $\log_6(x+2)(2x-3) - \log_6(2x-3) = 4$

Step 2: $\log_6(x+2) = 4$

Step 3: $x + 2 = 24$ **x + 2 should equal 6^4 not (6)(4)!**

Step 4: $x = 22$

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A student showed the following steps in his solution of the equation, but his answer was not correct. Which was his first incorrect step in solving the equation?

$$\log_3(x+1)(x+4) + \log_3(x+1) = 5$$

Step 1: $\log_3(x+1)(x+4) + \log_3(x+1) = 5$

Step 2: $\log_3(x+4) = 5$

Step 3: $x + 4 = 15$

Step 4: $x = 11$

If x is a real number, for what values of x is the equation $\frac{3x-18}{3} = x - 6$ true?

A. all values of x C. no values of x

B. some values of x D. impossible to determine

Multiply both sides by 3 to get rid of the fraction.

$3x - 18 = 3(x - 6)$ **This is always true,**

$3x - 18 = 3x - 18$ **no matter what x equals.**

Answer: A. all values of x.

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If x is a real number, for what values of x is the equation $\frac{5x^2 + 20x}{5x} = x + 4$ true?

A. all values of x C. no values of x

B. some values of x D. impossible to determine