Your Name

Mrs. Theo

2/8/22

Notes

Multiplying Binomials and Trinomials

Recall: Distributive Property- when a number on the outside of parenthesis is multiplied to each number or variable separated by an addition/subtraction sign within the parenthesis.

$3(x + 2) \Rightarrow 3(x)+3(2) \rightarrow 3x+6$ Yes

$x+2+x+2+x+2$

$3x+2$ No

$(x+2)^3$

$(x+2)(x+2)(x+2)$

$x^3+\ldots+2^3$

Multiply using Distribution-

When a monomial outside parenthesis is multiplied to each term inside the parenthesis.

*Remember, when variables are multiplied it will effect the exponents. add exponents

$x(5x + x^2)$

$1x^1(5x^1) + x(x^2)$

$1 \cdot 5 \cdot x \cdot x + x \cdot x \cdot x$

$5x^2 + x^3$

$-3x(4x^2 - 5x + 2)$

$-3x(4x^2)+(-3x)(-5x)+(-3x)(2)$

$-12x^3 + 15x^2 - 6x$

$-2xy(2y + 4x^2)$

$-2 \cdot 2x \cdot y \cdot y + -2 \cdot 4x \cdot x^2 \cdot y$

$-4xy^2 - 8x^3y$

$2x^2y^2(3xy + 2y + 5x)$

$2x^2y^2(3xy)+(2x^2y^2)(2y)+(2x^2y^2)(5x)$

$6x^3y^3 + 4x^2y^3 + 10x^3y^2$

$2x^2y^2 \cdot 5x$

$2 \cdot 5 \cdot x^2 \cdot x \cdot y^2$

Simplifying -Distributing (add exponents) and combining like terms

Ex. $x(3x - 4) - 5x$

$3x^2 - 4x - 5x$

$3x^2 - 9x$

~~Ex. $x(3x - 4) - 5x$~~

Let's take turns!

Ex. $6x^2(3x^2 + 2x - 6) - 3x(2x + x^2 + 3)$

$18x^4 + 12x^3 - 36x^2 - 6x^2 - 3x^3 - 9x$

$18x^4 + 9x^3 - 42x^2 - 9x$

$-a^2(4a^2 - 5a) + 2a(3a + 6)$

$-4a^4 + 5a^3 + 6a^2 + 12a$

For Stamps!

$3pq(5p + 2q) - (2p^2q - 8q^2p + 1p^2)$

$15p^2q + 6pq^2 - 2p^2q + 8pq^2 - p^2$

$13p^2q + 14pq^2 - p^2$

$5y(x^3 + 2xy + y^2) + xy(4x^2 - xy - 2y) - 3y^3$

$9yx^3 + 8xy^3 + 2y^3 - x^2y^2$

Homework

Name _____

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3-2 Multiplying Polynomials Homework

Find each product.

1. $2y^2(y^2 - 6y + 5)$ 2. $-x(2x^3 - x^2 + 6x - 8)$ 3. $-3x(x^2 - 7x - 6)$

$2y^2(y^2) + 2y^2(-6y) + 2y^2(5)$

$2y^4 - 12y^3 + 10y^2$

$\sqrt[6]{7^2 x}$

$\sqrt[6]{7^2}\ \sqrt[6]{x}$

$7^{2/6}\ x^{1/6}$

$243^{\frac{3}{5}}$

$(\sqrt[5]{243})^3$

$(3)^3$

27

$\sqrt[3]{81 x^{12} y^7} \rightarrow \sqrt[3]{3\cdot3\cdot3}\sqrt[3]{x^4\cdot x^4\cdot x^4}\sqrt[3]{y^6\cdot y^1}$

$\sqrt[3]{27}\sqrt[3]{3}\ x^{4/3}\ y^{6/3}\sqrt[3]{y}$

$3x^4y^2\sqrt[3]{3y}$

$\sqrt[2]{\frac{48a^7}{25b^8}}$

$\frac{\sqrt[2]{16\cdot3\cdot a^6\cdot a}}{\sqrt[2]{25}\ b^{8/2}}$

$\frac{4a^{6/2}\sqrt{3a}}{5\ b^4}$

$\frac{4|a^3|\sqrt{3a}}{5\ b^4}$

if even roots and reduced exponent is odd, need abs. val.

$x \cdot x = x^{1+1}$

$\frac{x}{x} = x^{1-1}$

look for Perfect cubes

Perfect squares

$\sqrt[3]{250} + \sqrt[3]{54} + \sqrt[2]{72}$

$\sqrt[3]{125\cdot2} + \sqrt[3]{27\cdot2} + \sqrt[3]{36\cdot2}$

$5\sqrt[3]{2} + 3\sqrt[3]{2} + 6\sqrt{2}$

$8\sqrt[3]{2} + 6\sqrt{2}$

Recall: Distributive Property- when a number on the outside of parenthesis is multiplied to each number or variable separated by an addition/subtraction sign within the parenthesis.

$3x(x + 2) \Rightarrow 3x(x) + 3x(2)$

$3x^2 + 6x$

Review

Multiply Polynomials using Distribution-

Each term in the parenthesis gets multiplied with each term in the other parenthesis.

*Remember, when variables are multiplied it will increase the exponents.

$(x - 1)(x + 3)$

Distribute: $x(x) + x(3) + -1(x) + -1(3)$

combine like terms: $x^2 + 3x - x - 3$

$x^2 + 2x - 3$

$(3x + 1)(2x + 4)$ A= Box or Table Method

	$2x$	4
$3x$	$6x^2$	$12x$
1	$2x$	4

$6x^2 + 2x + 12x + 4$

$6x^2 + 14x + 4$

$(x+2)(5x + 1)$

$5x^2 + 1x + 10x + 2$

$5x^2 + 11x + 2$

$(x^2 + 2)(4x - 6)$

$4x^3 - 6x^2 + 8x - 12$

Sharing is Caring! Let's each do a step!

$(-3x+4x^2)(-5x + 2)$

$15x^2 + -6x + -20x^3 + 8x^2$

$23x^2 - 6x - 20x^3$

$-20x^3 + 23x^2 - 6x$

$(-2x+y)(2y + 4x^2)$

$-4xy + -8x^3 + 2y^2 + 4x^2y$

$-8x^3 + 4x^2y - 4xy + 2y^2$

$(2x+5)(3xy + 2y + 5x)$

$6x^2y + 4xy + 10x^2 + 15xy + 10y + 25x$

$6x^2y + 19xy + 10x^2 + 10y + 25x$

Simplifying -Distributing and combining like terms

Ex. $(x+2)(3x - 4) - 5x$

$3x^2 - 4x + 6x - 8 - 5x$

$3x^2 - 3x - 8$

Board Work!

Ex. $(3x + 6)(3x - 6) - (3x - 2)(x + 3)$

$(9x^2 - 18x + 18x - 36) - (3x^2 + 9x - 2x - 6)$

$9x^2 - 36 - 3x^2 - 7x + 6$

$6x^2 - 7x - 30$

Workbook 3-2

A. $(2m + 5)(3m^2 - 4m + 2)$

$2m(3m^2) + 2m(-4m) + 2m(2) + 5(3m^2) + 5(-4m) + 5(2)$

$6m^3 - 8m^2 + 4m + 15m^2 - 20m + 10$

$6m^3 + 7m^2 - 16m + 10$

B. $(mn + 1)(mn - 2)(mn + 4)$

$(m^2n^2 - 2mn + mn - 2)(mn + 4)$

$(m^2n^2 - mn - 2)(mn + 4)$

$m^3n^3 + 4m^2n^2 - m^2n^2 - 4mn - 2mn - 8$

$m^3n^3 + 3m^2n^2 - 6mn - 8$

a. $(6n^2 - 7)(n^2 + n + 3)$

$6n^4 + 6n^3 + 18n^2 - 7n^2 - 7n - 21$

$6n^4 + 6n^3 + 11n^2 - 7n - 21$

b. $(mn + 1)(m^2n - 1)(mn^2 + 2)$

$(m^3n^2 - mn + m^2n - 1)(mn^2 + 2)$

$m^4n^4 + 2m^3n^2 - m^2n^3 - 2mn + m^3n^3 + 2m^2n - mn^2 - 2$

$m^4n^4 + m^3n^3 + 2m^3n^2 - m^2n^3 + 2m^2n - mn^2 - 2mn - 2$

Workbook 5-2

Multiplying Polynomials with Radicals

What is the reduced radical form of the product?

A. $\sqrt[3]{7}(2 - \sqrt[3]{49})$

$2\sqrt[3]{7} - \sqrt[3]{7 \cdot 49}$

$7 \cdot 7 \cdot 7$

$2\sqrt[3]{7} - 7$

B. $(2x - \sqrt{3})(2x - \sqrt{3})$

$(2x-\sqrt{3})^2$

$4x^2 - 2x\sqrt{3} - 2x\sqrt{3} + \sqrt{3 \cdot 3}$

$\sqrt{9}$

$4x^2 - 4x\sqrt{3} + 3$

Conjugate

a. $(x - \sqrt{10})(x + \sqrt{10})$

not under, is under

$x^2 + 1x\sqrt{10} - 1x\sqrt{10} - \sqrt{10 \cdot 10}$

$x^2 - 10$

middle terms get canceled

b. $\sqrt{6}(5 + \sqrt{3})$

not under, is under

$5\sqrt{6} + \sqrt{18}$

$5\sqrt{6} + \sqrt{9 \cdot 2}$

$5\sqrt{6} + 3\sqrt{2}$

Workbook 3-2

$4a(3a^3 + 2a^2) - 6a^2(+7)(-a^3 - 5a)$

$12a^4 + 8a^3 - (-6a^5 - 30a^3 - 7a^3 - 35a)$

$12a^4 + 8a^3 + 6a^5 + 30a^3 + 7a^3 + 35a$

$6a^5 + 12a^4 + 45a^3 + 35a$

Workbook 3-2

Carolina makes wind chimes to sell at the local street market. As Carolina produces a greater number of wind chimes, she can lower the price per unit. The function $v(x) = 48 - 2x$ relates the price v to the number produced x. The cost c of making x wind chimes can be represented with the function $c(x) = 12x + 64$.

How many wind chimes should Carolina sell each week to maximize her profit P? # of wind chimes sold a week to max profit P.?

Formulate

Write a function for revenue, R, by multiplying the price $v(x) = 48 - 2x$ of each item by the number sold x.

Revenue = Total $ made
= Price • # of units sold
$= (48-2x) \cdot x$
$R(x) = 48x - 2x^2$

Then write the function for profit P.

Profit = Revenue - Cost

$P(x) = R(x) - c(x)$ Profit = Revenue − Cost

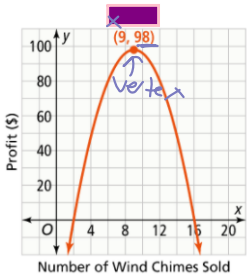
$P(x) = (48x - 2x^2) - (12x + 64)$
$= 48x - 2x^2 - 12x - 64$
$P(x) = -2x^2 + 36x - 64$

Carolina's profit function is $P(x) = -2x^2 + 36x - 64$.

Interpret

Carolina's profit is modeled by a quadratic function. The domain of the function is the set of whole numbers. Her maximum profit corresponds to the vertex of the graph. Carolina's best business plan is to produce and sell 9 wind chimes per week, for a weekly profit of $98.

START OVER



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3-2 Multiplying Polynomials Homework

Find each product.

1. $2y^2(y^2 - 6y + 5)$
2. $-x(2x^3 - x^2 + 6x - 8)$
3. $-3x(x^2 - 7x - 6)$

Use a table to find each product.

4. $(2x - 4)(3x + 5)$
5. $(x - 3)(3x - 6)$
6. $(x + 3)(5x - 4)$

$5x^2 - 4x + 15x - 12$
$5x^2 + 11x - 12$

Find each product.

7. $(x - 7)(x - 2)$
8. $(2x + 3)(3x - 2)$
9. $(x - 6)(3x - 4y)$

$3x^2 - 4xy - 18x + 24y$

2 · 3

10. $(x + 4)(x^2 + 7x - 8)$
11. $(3x - 4)(2x^2 + 5x + 4)$
12. $(-2x^2 + 5)(x^3 - 8x - 6)$

$x^3 + 7x^2 - 8x - 4x^2 - 28x + 32$
$x^3 + 3x^2 - 36x + 32$

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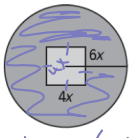
13. A circular flower garden surrounds a sculpture on a square base as shown. What is an expression for the area of the flower garden?



Radius = 6x
Center to side

A_G = Circle area - Square area

$= (\pi r^2) - (bh)$

$= \pi(6x)^2 - (4x)(4x)$

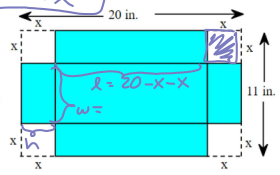
$\pi \cdot 36x^2 - 16x^2$

$113.097x^2 - 16x^2$

$A_G = 97.097x^2$

14.

A box is to be made out of a rectangular piece of cardboard that is 11 inches wide and 20 inches long. Squares x inches on a side are cut out of the corners and the sides are bent upwards.



Write and simplify an expression for the

Length: $20-2x$ Width: $11-2x$ and Height: x of the box.

Then write an simplify an expression for the Volume of the box V=_____

Remember: Volume = (Length)(Width)(Height)

$(20-2x)(11-2x)$

Name Key enVision Algebra 1

3-2 Multiplying Polynomials Homework

Find each product.

1. $2y^2(y^2 - 6y + 5)$ → $2y^4 - 12y^3 + 10y^2$
2. $-x(2x^3 - x^2 + 6x - 8)$ → $-2x^4 + x^3 - 6x^2 + 8x$
3. $-3x(x^2 - 7x - 6)$ → $-3x^3 + 21x^2 + 18x$

Use a table to find each product.

4. $(2x - 4)(3x + 5)$

$2x(3x) + 2x(5) + (-4)(3x) + (-4)(5)$

$6x^2 + 10x - 12x - 20$

$6x^2 - 2x - 20$

5. $(x - 3)(3x - 6)$

×	$3x^2$	$-6x$
-3	$-9x$	$+18$

$3x^2 - 15x + 18$

6. $(x + 3)(5x - 4)$ → $5x^2 + 11x - 12$

Find each product.

7. $(x - 7)(x - 2)$ → $x^2 - 9x + 14$
8. $(2x + 3)(3x - 2)$ → $6x^2 + 5x - 6$
9. $(x - 6)(3x - 4y)$ → $3x^2 - 4xy - 18x + 24y$

10. $(x - 4)(x^2 + 7x - 8)$

$x(x^2) + x(7x) + x(-8) + (-4)(x^2) + (-4)(7x) + -4(-8)$

$x^3 + 7x^2 - 8x - 4x^2 - 28x + 32$

$x^3 + 3x^2 - 36x + 32$

11. $(3x - 4)(2x^2 + 5x + 4)$ → $6x^3 + 7x^2 - 8x - 16$

12. $(-2x^2 + 5)(x^3 - 8x - 6)$

×	x^3	$-8x$	-6
$-2x^2$	$-2x^5$	$+16x^3$	$+12x^2$
5	$5x^3$	$-40x$	-30

$-2x^5 + 21x^3 + 12x^2 - 40x - 30$

Name _____ enVision Algebra 1

13. A circular flower garden surrounds a sculpture on a square base as shown. What is an expression for the area of the flower garden?

$A = \pi r^2 - bh$

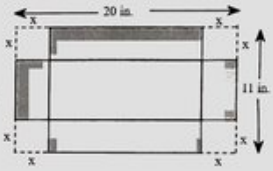
$A = \pi(6x)^2 - 4x(4x)$

$A = 36\pi x^2 - 16x^2$

$A = (36\pi - 16)x^2$

14.

A box is to be made out of a rectangular piece of cardboard that is 11 inches wide and 20 inches long. Squares x inches on a side are cut out of the corners and the sides are bent upwards.



Write and simplify an expression for the

Length: $11-2x$ Width: $20-2x$ and Height: x of the box.

Then write an simplify an expression for the Volume of the box V= $4x^3 - 62x^2 + 220x$

Remember: Volume = (Length)(Width)(Height)

$V = (11-2x)(20-2x)(x)$

$V = (220 - 22x - 40x + 4x^2)(x)$

$V = 4x^3 - 62x^2 + 220x$

Name _____

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3-2 Review

Adding, Subtracting and Multiplying Polynomials and Radicals

1. Subtract $(3t^3b + 8t^2 - tb - 4) - (2a^2b - 3t^2 + 17tb)$.

- get rid of ( ) distribute subtraction
- all signs flip
- combine like terms

$3t^3b + 8t^2 - tb - 4 - 2a^2b + 3t^2 - 17tb$

2. Multiply $(2x - 5)^2$

- expand 1st

$(2x-5)(2x-5)$

$4x^2 - 20x + 25$

conjugate! same thing different signs = cancel middle terms

3. Multiply $(4\sqrt{3y} - 2)(4\sqrt{3y} + 2)$.

- when all multiplied reorganize
- if not under $\sqrt{}$ put together
- if under $\sqrt{}$ put together
- radicals month
- ÷ exponents
- power
- index

$4 \cdot \sqrt{3y} \cdot 4 \cdot \sqrt{3y}$

$4 \cdot 4 \cdot \sqrt{3y} \cdot \sqrt{3y}$

$16\sqrt{3 \cdot 3 \cdot y \cdot y}$

$16\sqrt{9y^2}$

$16 \cdot 3y$

$48|y|$

- if even root → odd exponent need absolute value

4. Multiply $(3x - 6)(5x^2 + 3x - 1)$

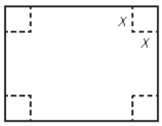
$48|y| + 8\sqrt{3y} - 8\sqrt{3y} - 4$

$48|y| - 4$

$15x^3 + 21x^2 - 21x + 6$

5. Myjae is constructing an open box from a piece of cardboard that is 12 in. wide and 18 in. long. Myjae cuts squares of equal size from each corner of the cardboard, and then folds up the sides of the box. Label the diagram.

Write and simplify a polynomial function V for the volume of the box in terms of x.



$V(x) = (12-2x)(18-2x)x$

$V(x) = 4x^3 - 60x^2 + 216x$