## Math Virtual Learning

## Algebra 2A

Evaluating and Composing Polynomial Function

## April 30, 2020

# Lesson: <br> Composing Polynomials 

## Learning Target:

LT D3 I can evaluate polynomial functions.
Objective:
Students will be able to compose polynomial functions.

## Warm Up

Given: $f(x)=x+3 g(x)=x^{2}-4$
Find:

1. $(f+g)(x)$
2. $(g-f)(x)$
3. $(g \circ f)(x)$

## Warm Up Answers

$$
\begin{aligned}
& \text { 1. } x^{2}+x-1 \\
& \text { 2. } x^{2}-x-7 \\
& \text { 3. } x^{2}+6 x+5
\end{aligned}
$$

## Lesson

Today we will continue practicing setting up polynomial functions from word problems. If you need to, review the video below:

## Polynomial word problem: area of a window

## Practice Problems

1. Sam is going to build a pool in his backyard. He wants it to be twice as long as it is wide and he wants a 5 foot deck all the way around. Write a polynomial function for him to use in trying to decide the dimensions that will fit in his yard.
2. The side of a cube is $(2 x-5)$. Write an expression for the volume of the cube.
3. John has an apple grove with x number of trees. He had to cut down 5 trees. Each of the remaining trees produced 210 apple each. If his harvest produced 41,790 apples, how many trees did he initially have?
4. Sam is going to build a pool in his backyard. He wants it to be twice as long as it is wide and he wants a 5 foot deck all the way around. Write a polynomial function for him to use in trying to decide the dimensions that will fit in his yard.


Dimensions of the Pool:
width $-x$
length $-2 x$ twice long

To include the deck add 5 feet to each side

$$
\begin{aligned}
& \text { width }-x+5+5=x+10 \\
& \text { length }-2 x+5+5=2 x+10
\end{aligned}
$$

To find area: (width) (length

$$
\begin{aligned}
A(x) & =(x+10)(2 x+10) \\
& =3 x^{2}+10 x+20 x+100 \\
A(x) & =3 x^{2}+30 x+100
\end{aligned}
$$

$$
\begin{aligned}
\text { To find perimeter } & =2(\text { width })+2(\text { length }) \\
P(x) & =2(x+10)+2(2 x+10) \\
& =2 x+20+4 x+20 \\
P(x) & =6 x+40
\end{aligned}
$$

2. The side of a cube is $(2 x-5)$. Write an expression for the volume of the cube.


Volume of cube $=$ sidelength ${ }^{3}$

$V(x)=(2 x-5)^{3}$

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

$$
=\left(4 x^{2}-10 x-10 x+25\right)(2 x-5)
$$

$=\left(4 x^{2}-20 x+25\right)(2 x-5)$
$4 x^{2}-20 x-25$

$$
\begin{array}{|c|c|c|c|}
\hline 2 x & 8 x^{3} & -40 x^{2} & 50 x \\
\hline-5 & -20 x^{2} & 100 x & 125 \\
\hline
\end{array}
$$

$$
=8 x^{3}-40 x^{2}-20 x^{2}+50 x+100 x+125
$$

$$
V(x)=8 x^{3}-60 x^{2}+150 x+125
$$

3. John has an apple grove with x number of trees. He had to cut down 5 trees. Each of the remaining trees produced 210 apple each. If his harvest produced 41,790 apples, how many trees did he initially have?
$x=$ initial $\#$ of trees.
4. He cut down 5 .
5. 210 apple per tree

$$
\begin{gathered}
x-5 \\
210(x-5)
\end{gathered}
$$

3. Total apples
4. Now solve for

$$
41,790=210(x-5)
$$

the initial \#

$$
41,790=210 x-1050
$$

$$
+1050+1550
$$

$$
\frac{42840}{210}=\frac{214 x}{210}
$$

Starting number of trees $204=x$

## Additional Practice with Word Problems

The link below has some good example problems for you to look through at the beginning of the packet. The please work on the practice word problems on page 5 of the packet. You will find the answers to the questions at the bottom of the page.

## How to Work Word Problems in Algebra

