

## What's Going On?

**Checking In**

**Minds on**

Sketch it!

**Action!**

Desmos Investigation

**Consolidation**

Polynomial or Not

**Learning Goal - I will be able to describe the features of polynomial graphs in factored form.**

## Minds on

### Sketch It

Whiteboards Please

$$f(x) = 2(x - 1)(x + 4)$$

$$f(x) = -(x - 4)^2$$

$$f(x) = 2(x - 3)$$

$$3x + 2 = 0$$
$$x = -\frac{2}{3}$$

$$f(x) = (3x + 2)(5x - 2) \quad x = -\frac{2}{5}$$

**Action!**

## Desmos Investigation

**Action!**

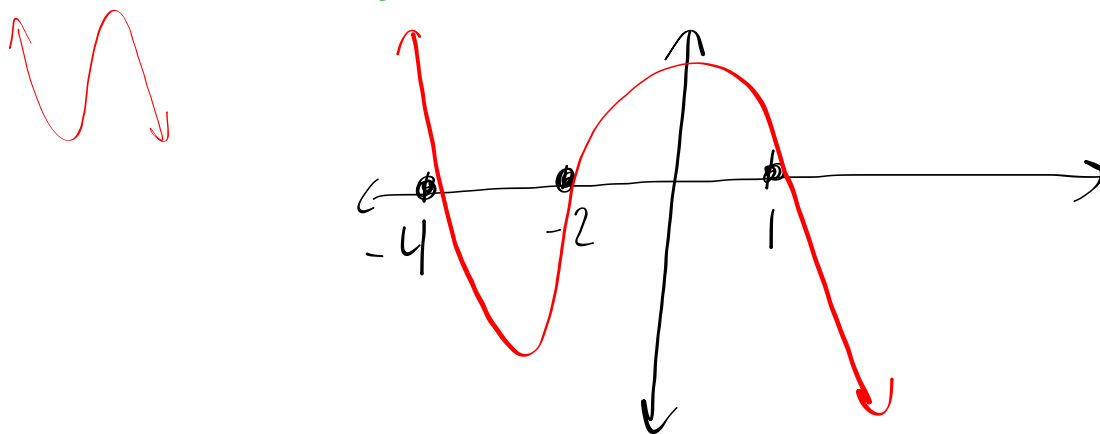
## Follow Up

In the functions above we have linear factors  $(x - r)$ , squared factors  $(x - r)^2$ , and cubed factors  $(x - r)^3$ . For each question below, sketch a graph with your answer.

What do you notice about the graph where we have linear factors?

$$f(x) = -2(x-1)(x+2)(x+4)$$

zeroes cut x-axis as a line

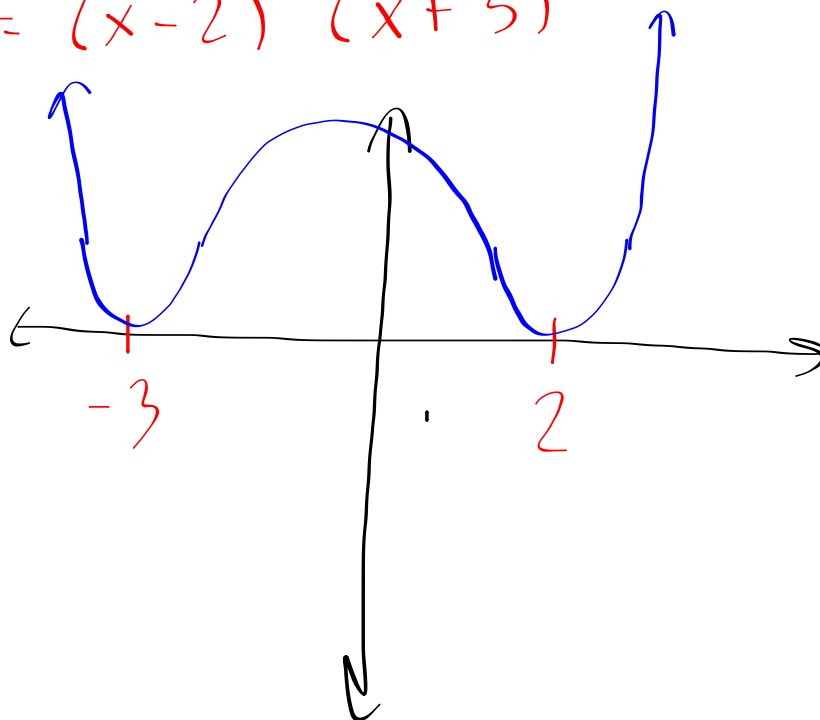


**Action!**

## Follow Up

What do you notice about the graph where we have squared factors?

Zeros look like parabolas on x-axis  
 $f(x) = (x-2)^2(x+3)^2$



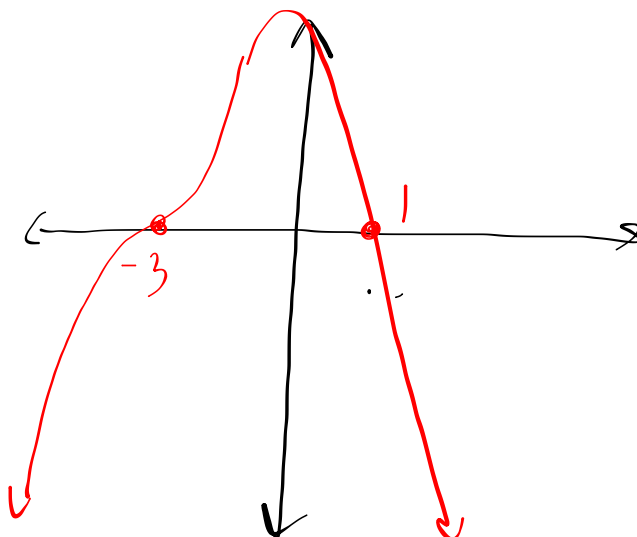
**Action!**

## Follow Up

What do you notice about the graph where we have cubed factors?

zeros look like a cubic crossing the x-axis

$$f(x) = -3(x-1)(x+3)^3$$

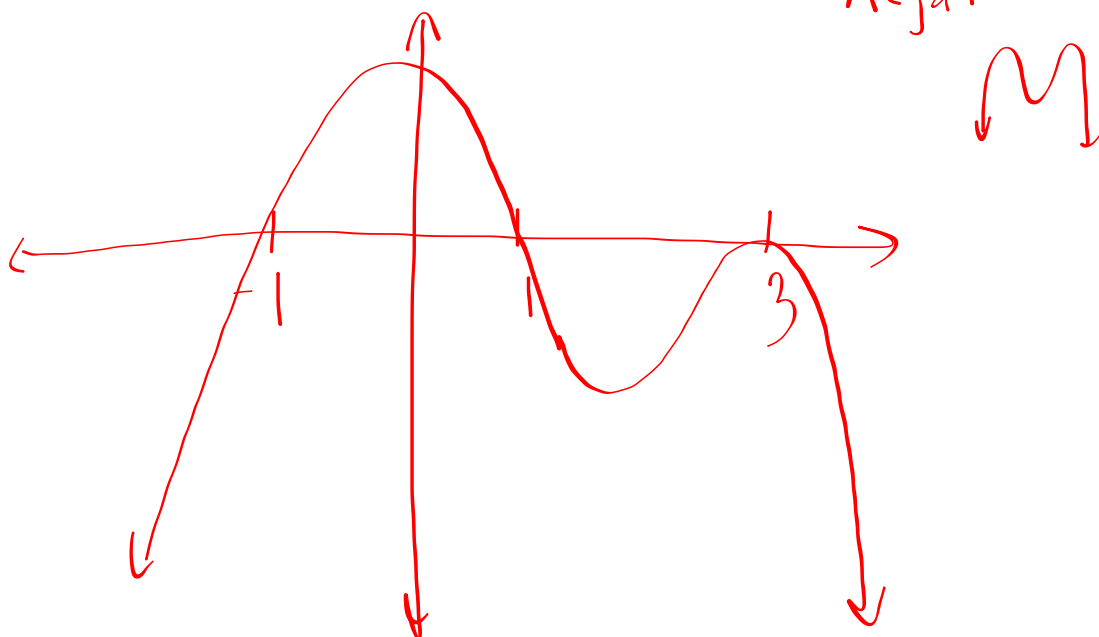


**Action!**

## Graphs from Equations

Use the information you gathered in the investigation to sketch a possible graph of the function  $f(x) = -(x + 1)(x - 1)(x - 3)^2$ .

*quartic  
negative*



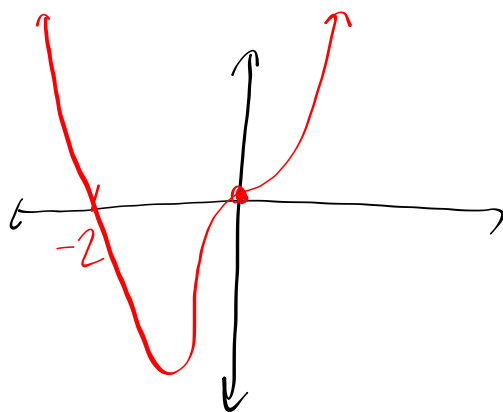
**Action!**

## Graphs from Equations

Sketch the graph of  $x^4 + 2x^3$ .

$$f(x) = x^3(x+2)$$

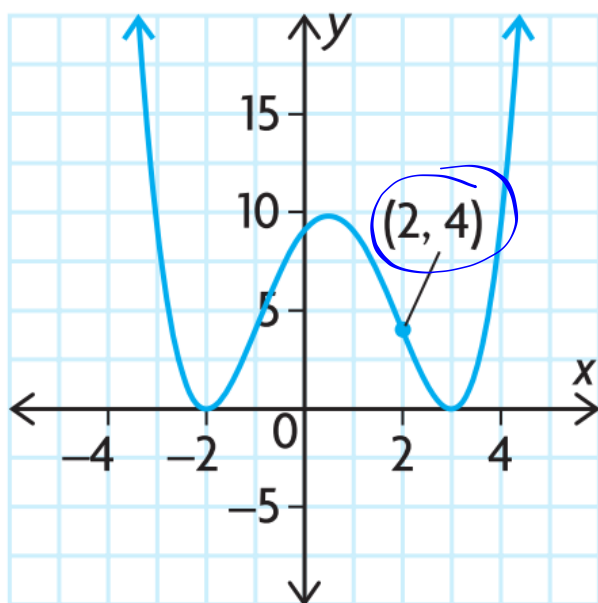
quartic  
positive  
W





## Action!

### Equations from Graphs



Function Equation

$$f(x) = a(x+2)^2(x-3)^2$$

To find  $a$ , sub in  $x=2$ ,  
 $y=4$  and solve.

$$4 = a(2+2)^2(2-3)^2$$

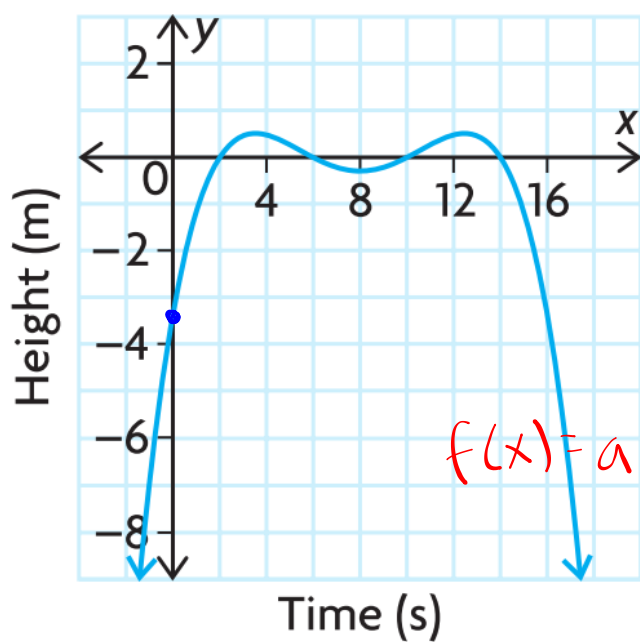
$$4 = a(16)(1)$$

$$a = 0.25$$

$$f(x) = 0.25(x+2)^2(x-3)^2$$

**Action!**

## Equations from Graphs

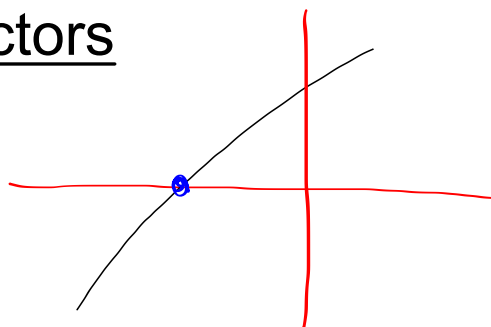


$$f(x) = a(x-2)(x-6)(x-10)(x-14)$$

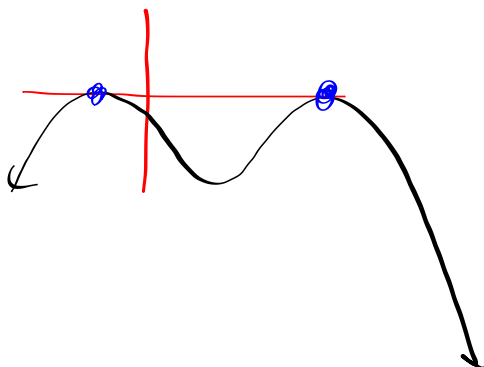
## Consolidation

### The Rules

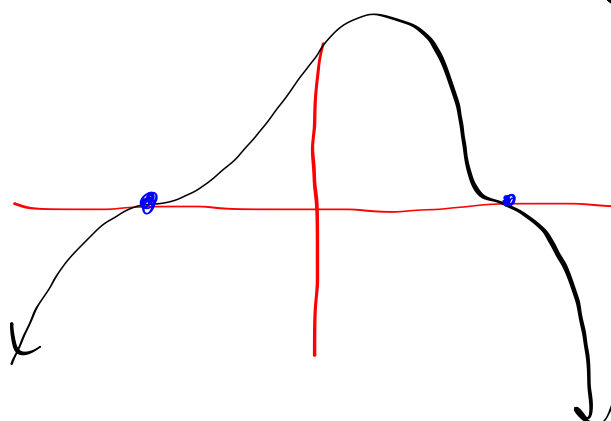
#### Linear Factors



#### Squared Factors



#### Cubed Factors



Pg. 146

1, 2, 4, 9ab, 12