Welcome Back to MYP Math 9!

	Assignment Effort Grade (Circle One)	Comments (What was interesting or challenging?)
Monday Date: 3/12 Topic: 9ABCD- Special cases of factoring	0 1 2	
Tuesday Date: 3/13 Topic: 18ABC: Solving Polynomials	0 1 2	
Wednesday Date: 3/14 Topic: Solving - Real and Nonreal Solutions	0 1 2	
Thursday Date: ______ Topic: ____________	0 1 2	
Friday Date: ______ Topic: ____________	0 1 2	

Class Plan:

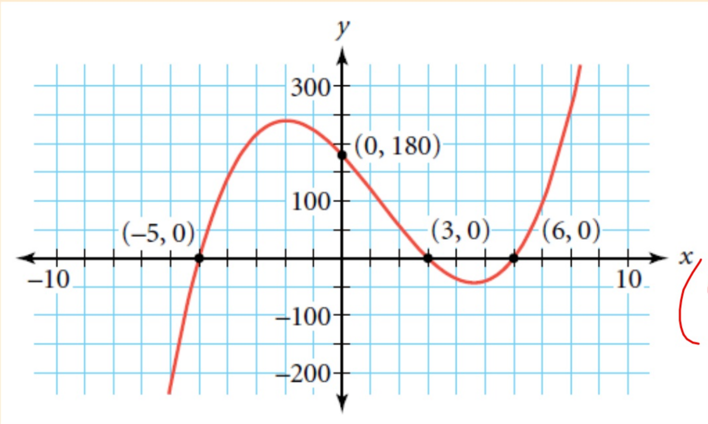
1. Warm-up

2. Graphing Polynomials ⇔ Writing Polyomials from graphs

3. Practice

Warm-up:

Identify the intercepts of the graph.
Where does the graph ***turn***?



x-int(s)

-5, 3, 6

y-int

(0, 180)

Warm-up continued:

2) Write the equation in factored form and use ***additional point*** to solve for the ***a*.**

$$y = a(x - r_1)(x - r_2)(x - r_3)$$

$Y = a(x - -5)(x - 3)(x - 6)$

$y = a(x+5)(x-3)(x-6)$

y-int $(0, 180)$

$180 = a(5)(-3)(-6)$

$\frac{180}{90} = \frac{a(90)}{90}$

$a = 2$

Warm-up continued:

2) Write the equation in factored form and use ***additional point*** to solve for the ***a.*** (0, 180)

$$y = a(x - r_1)(x - r_2)(x - r_3) = \boxed{y = 2(x+5)(x-3)(x-6)}$$

$$y = a(x - -5)(x - 3)(x - 6)$$

$$180 = a(0+5)(0-3)(0-6)$$

$$180 = a(5)(-3)(-6)$$

$$\frac{180}{90} = \frac{90a}{90}$$

$$\boxed{a = 2}$$

Warm-up continued:

3) Expand factored to general form.

$y = 2x^3 - 8x^2 - 54x + 180$ $\rightarrow$ $y = ax^3 + bx^2 + cx + d$

$y = 2(x+5)(x-3)(x-6)$

	x	5
x	x^2	$5x$
-3	$-3x$	-15

$= x^2 + 2x - 15$

	x^2	$2x$	-15
x	x^3	$2x^2$	$-15x$
-6	$-6x^2$	$-12x$	90

$= x^3 - 4x^2 - 27x + 90$

Warm-up continued:

3) Expand factored to general form.

$$\rightarrow y = ax^3 + bx^2 + cx + d$$

$$y = 2(x+5)(x-3)(x-6)$$

$$y = 2(x^2 + 2x - 15)(x-6)$$

$$y = 2(x^3 + 2x^2 - 15x - 6x^2 - 12x + 90)$$

$$y = 2(x^3 - 4x^2 - 27x + 90)$$

$$\boxed{y = 2x^3 - 8x^2 - 54x + 180}$$

Warm-up: Solution

$y = a(x + 5)(x - 3)(x - 6)$

$y = 2(x + 5)(x - 3)(x - 6)$. Substitute the coordinates of the y-intercept, (0, 180), and solve for a.

$180 = a(0 + 5)(0 - 3)(0 - 6)$

$180 = 90a$

$a = 2$

Art Connection

Andrea Champlin's paintings are often called "cyber" or "digital" landscapes. Can you identify curves that look like polynomials in this painting?

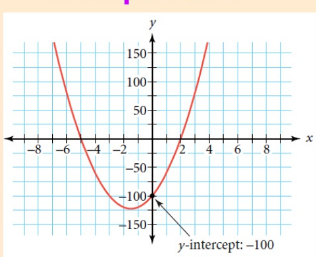
Wandee Love (2001), Andrea Champlin, oil on canvas, 70 in. × 46 in. Courtesy of the artist and Clifford-Smith Gallery, Boston; photo courtesy of the artist.

American painter Inka Essenhigh (b 1969) calls her works "cyborg mutations." She draws and paints images, and then sands them and layers them with enamel-based oil paint. This piece, *Green Wave* (2002), contains polynomial-like waves.

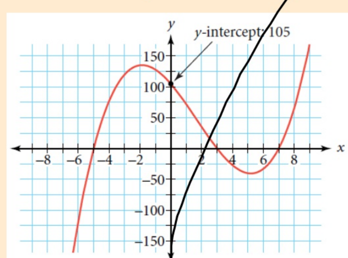
Writing Polynomial Equations
(from graphs)

1. State coordinates of the x and y intercepts.
2. Identify the lowest possible degree of each polynomial.
3. Write the factored form. (4) General form

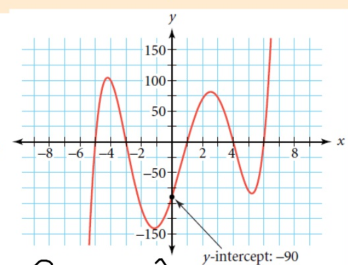
Graph #1



Graph #2



Graph #3



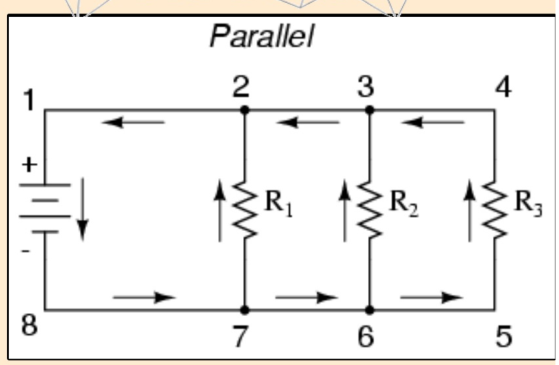
$y = ax^3 + bx^2 + cx + d$

Done?

Work on previous solving exercises.

You need:

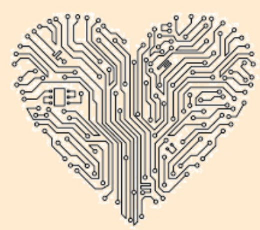
- Notebooks
- Pencils
- Growth Mindset



<u>Do:</u> Start circuit anywhere

- Orange is Challenging
- Blue is More Challenging
- Further challenge: How could we adjust the equations so the solution is ***not real***?

2. Answers on top
   Problems 2nd page

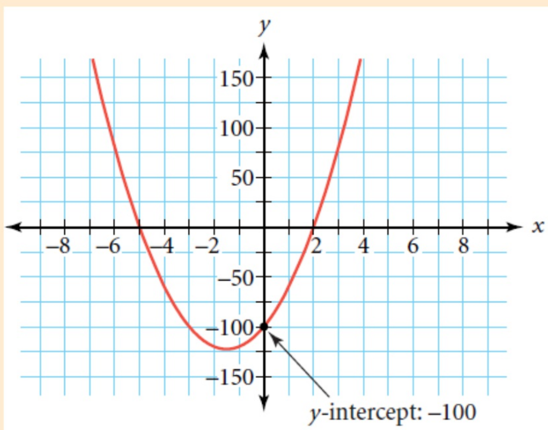


3. **<u>Stuck?</u>** ASK for help.

Graph # 1

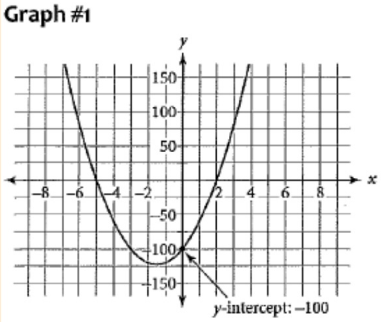
Write the polyomial equation from the graph.

1. State coordinates of the x and y intercepts.
2. Identify the lowest possible degree of each polynomial.
3. Write the factored form.



SOLUTION

Graph #1



x-intercepts: (2,0) + (−5,0)

y-intercept: (0, −100)

Lowest Degree: 2

$y = a(x-2)(x+5)$

$-100 = a(-2)(5)$

$-100 = -10a$

$10 = a$

$\boxed{y = 10(x-2)(x+5)}$

Graph #2

$y = 10(x^2 + 3x - 10)$

$\boxed{y = 10x^2 + 30x - 100}$

SOLUTION

$y = 10(x + 5)(x - 2)$. First use the zeros to start with the factored form $y = a(x + 5)(x - 2)$, and then use the y-intercept, $(0, -100)$, to find a.

$$-100 = a(0 + 5)(0 - 2)$$

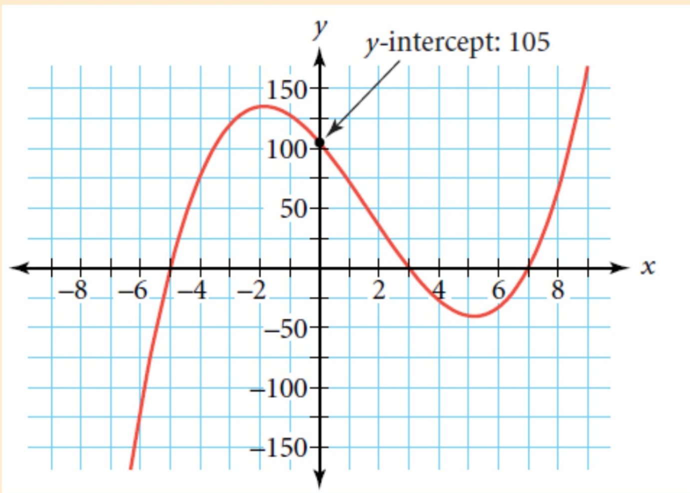
$$-100 = -10a$$

$$a = 10$$

Graph # 2

Write the polyomial equation from the graph.

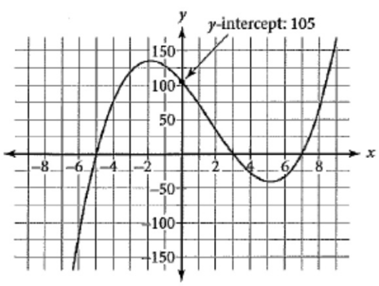
1. State coordinates of the x and y intercepts.
2. Identify the lowest possible degree of each polynomial.
3. Write the factored form.



SOLUTION

$y = 10(x-2)(x+5)$ $\quad 10 = a$

Graph #2



x-ints.: $(-5,0), (3,0), (7,0)$

y-int.: $(0,105)$

Lowest Degree: 3

$y = a(x+5)(x-3)(x-7)$ $\qquad 105 = a(5)(-3)(-7)$

$105 = 105a$

$1 = a$

$\boxed{y = (x+5)(x-3)(x-7)}$

$(x+5)(x-3) = x^2 + 2x - 15$

$(x-7)(x^2+2x-15) = x^3 + 2x^2 - 15x - 7x^2 - 14x + 105$

$\boxed{y = x^3 - 5x^2 - 29x + 105}$

SOLUTION

a. $y = (x + 5)(x - 3)(x - 7)$. First use the zeros to start with the factored form $y = a(x + 5)(x - 3)(x - 7)$, and then use the y-intercept point, $(0, 105)$, to find a.

$$105 = a(0 + 5)(0 - 3)(0 - 7)$$

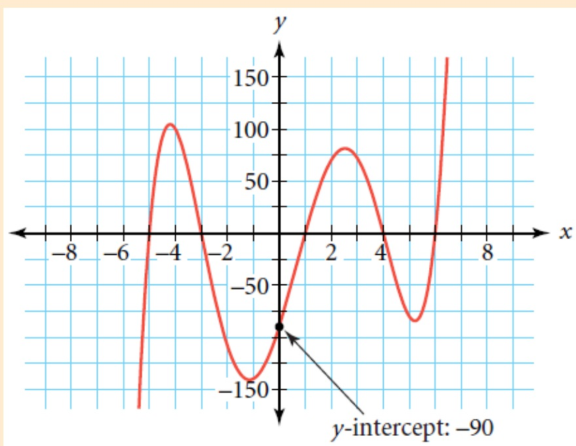
$$105 = 105a$$

$$a = 1$$

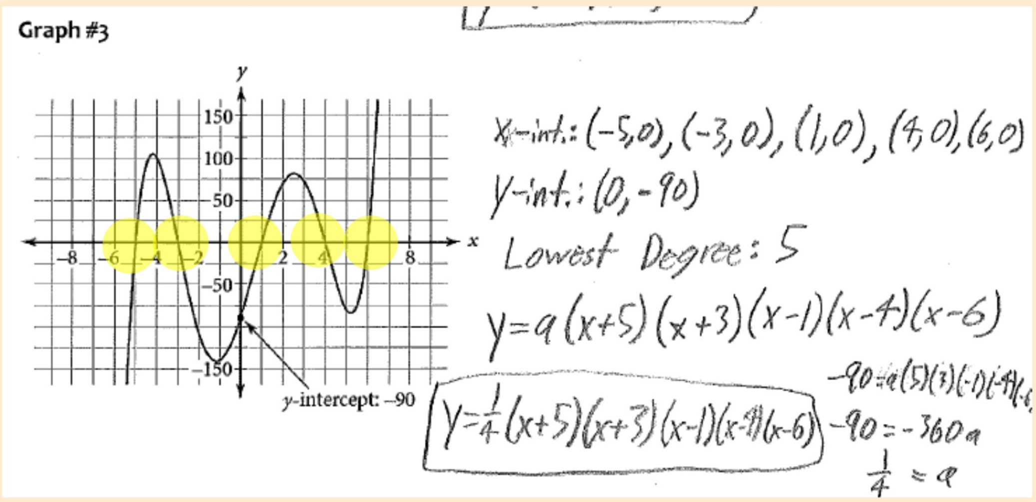
Graph # 3

Write the polyomial equation from the graph.

1. State coordinates of the x and y intercepts.
2. Identify the lowest possible degree of each polynomial.
3. Write the factored form.



SOLUTION


Graph #3
y
x
150
100
50
-50
-150
-8
-6
-4
-2
2
4
8
y-intercept: -90
x-int.: (-5,0), (-3,0), (1,0), (4,0), (6,0)
y-int.: (0, -90)
Lowest Degree: 5
y=a(x+5)(x+3)(x-1)(x-4)(x-6)
-90=a(5)(3)(-1)(-4)(-6)
-90=-360a
1/4 = a
y=1/4(x+5)(x+3)(x-1)(x-4)(x-6)

SOLUTION

$y = 0.25(x + 5)(x + 3)(x - 1)(x - 4)(x - 6)$.
First use the zeros to start with the factored form $y = a(x + 5)(x + 3)(x - 1)(x - 4)(x - 6)$, and then use the y-intercept, $(0, -90)$, to find a.

$$-90 = a(0 + 5)(0 + 3)(0 - 1)(0 - 4)(0 - 6)$$

$$-90 = -360a$$

$$a = 0.25$$