LESSON MAKER PRO

Polynomial Pathways

Factor, solve, and read polynomial graphs.

HIGH SCHOOL · MA.912.AR.6

MA.912.AR.6 "Solve and graph polynomial equations and functions in one and two variables."

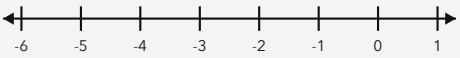
NAME _____ DATE _____

ZEROS AND GRAPHS

Factor a polynomial equation when possible, then set each factor equal to 0 to find its zeros. On a graph, zeros are the x-values where the curve crosses or touches the x-axis.

WORKED EXAMPLE

Solve $x^2 + 7x + 10 = 0$. Mark both solutions on the number line.



1. Factor: $x^2 + 7x + 10 = (x + 5)(x + 2)$.
2. Set each factor equal to 0: $x + 5 = 0$ or $x + 2 = 0$.
3. Solve: $x = -5$ or $x = -2$. Mark -5 and -2 on the number line.

Answer: x = -5, -2

PRACTICE 6 problems

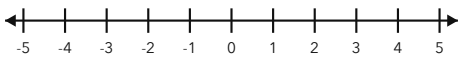
1 Solve $x^2 - 11x + 24 = 0$.

ANSWER _____

2 Solve $(x + 1)(x - 3)(x - 6) = 0$.

ANSWER _____

3 Solve $x^2 + x - 12 = 0$. Plot both solutions on the number line.



ANSWER _____

4 Solve $3x^2 - 27 = 0$.

ANSWER _____

5 Find the x-intercepts of $y = (x + 3)(x - 8)$. Write each intercept as an ordered pair.

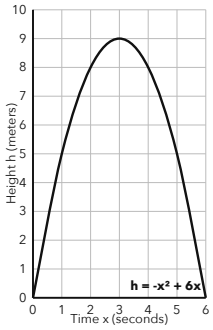
ANSWER _____

6 Does the point (4, 0) lie on $y = x^3 - 4x^2$? Show the value you get when $x = 4$.

ANSWER _____

APPLY IT Show your work

1 A student records the height h, in meters, of a foam rocket x seconds after launch. The graph shows its path. At what times is the rocket on the ground? What is its greatest height?



ANSWER _____

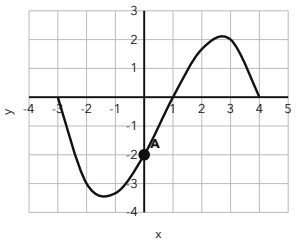
2 A game designer models the height of a virtual jump path with y = (x + 4)(x - 9). The ground level is y = 0. Find the two x-values where the path meets the ground.

WORK SPACE

ANSWER _____

CHALLENGE One step up

The grid shows a cubic function. Write its equation in factored form. Explain how the x-intercepts and point A help you find the leading coefficient.



WORK SPACE AND ANSWER

ANSWER KEY # Polynomial Pathways

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Solve $x^2 - 11x + 24 = 0$.	**x = 3, 8**
2	Solve $(x + 1)(x - 3)(x - 6) = 0$.	**x = -1, 3, 6**
3	Solve $x^2 + x - 12 = 0$. Plot both solutions on the number line.	**x = -4, 3**
4	Solve $3x^2 - 27 = 0$.	**x = -3, 3**
5	Find the x-intercepts of $y = (x + 3)(x - 8)$. Write each intercept as an ordered pair.	**(-3, 0) and (8, 0)**
6	Does the point (4, 0) lie on $y = x^3 - 4x^2$? Show the value you get when x = 4.	**Yes; $y = 4^3 - 4(4^2) = 64 - 64 = 0$.**

PART 2 · APPLY IT

1. **The rocket is on the ground at 0 seconds and 6 seconds. Its greatest height is 9 meters.** Read the x-intercepts, (0, 0) and (6, 0), for the ground times. The vertex is (3, 9), so the greatest height is 9 meters.
2. **x = -4 and x = 9** Set y equal to 0. By the zero-product property, x + 4 = 0 or x - 9 = 0.

CHALLENGE

$y = -1/6(x + 3)(x - 1)(x - 4)$. The x-intercepts give factors (x + 3), (x - 1), and (x - 4). Using A, $-2 = a(3)(-1)(-4) = 12a$, so $a = -1/6$.

Accept zeros in any order and equivalent factored forms. For graphing items, accept clearly plotted solution points at the correct x-values.