LESSON MAKER PRO

Intercept Equation Lab

Build each quadratic from its zeros and one point.

HIGH SCHOOL · MA.912.AR.3.5

MA.912.AR.3.5 "Given the x-intercepts and another point on the graph of a quadratic function, write the equation for the function."

NAME _____ DATE _____

BUILD FROM THE ZEROS

If the x-intercepts are r and s, begin with y=a(x-r)(x-s). Substitute the other point to find a, then write the equation.

WORKED EXAMPLE

The x-intercepts are x=-4 and x=6, and the graph passes through (0,-48). Write the equation.

1. Start with y=a(x+4)(x-6).
2. Substitute (0,-48): -48=a(4)(-6).
3. Solve -48=-24a, so a=2.

Answer: y=2(x+4)(x-6)

PRACTICE 6 problems

1 The x-intercepts are x=1 and x=3, and the graph passes through (5,8). Write the equation.

ANSWER _____

2 The x-intercepts are x=-5 and x=-1, and the graph passes through (-3,12). Write the equation.

ANSWER _____

3 The x-intercepts are x=-7 and x=-3, and the graph passes through (-5,20). Write the equation.

ANSWER _____

4 The x-intercepts are x=8 and x=11, and the graph passes through (9,-10). Write the equation.

ANSWER _____

5 The x-intercepts are x=-9 and x=-7, and the graph passes through (-8,-3). Write the equation.

ANSWER _____

6 The x-intercepts are x=13 and x=15, and the graph passes through (14,-7). Write the equation.

ANSWER _____

APPLY IT Show your work

1 A drone's height h(x), in feet, is modeled by a quadratic, where x is the number of seconds after recording begins. The drone is on the ground at x=1 and x=9, and its height is 36 feet at x=3. Write h(x).

WORK SPACE

ANSWER _____

2 A theme-park design team models a roller coaster's height H(x), in feet relative to a platform. The track is level with the platform at x=16 and x=22, and H(18)=-24. Write H(x).

WORK SPACE

ANSWER _____

CHALLENGE One step up

A quadratic has x-intercepts x=-3 and x=8 and passes through (1,28). Write the equation in factored form and standard form. Explain why the value of a must be negative.

WORK SPACE AND ANSWER

ANSWER KEY

Intercept Equation Lab

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	The x-intercepts are x=1 and x=3, and the graph passes through (5,8). Write the equation.	**y=(x-1)(x-3)**
2	The x-intercepts are x=-5 and x=-1, and the graph passes through (-3,12). Write the equation.	**y=-3(x+5)(x+1)**
3	The x-intercepts are x=-7 and x=-3, and the graph passes through (-5,20). Write the equation.	**y=-5(x+7)(x+3)**
4	The x-intercepts are x=8 and x=11, and the graph passes through (9,-10). Write the equation.	**y=5(x-8)(x-11)**
5	The x-intercepts are x=-9 and x=-7, and the graph passes through (-8,-3). Write the equation.	**y=3(x+9)(x+7)**
6	The x-intercepts are x=13 and x=15, and the graph passes through (14,-7). Write the equation.	**y=7(x-13)(x-15)**

PART 2 · APPLY IT

1. **h(x)=-3(x-1)(x-9)** Use h(x)=a(x-1)(x-9). Substituting (3,36) gives 36=a(2)(-6), so a=-3.
2. **H(x)=3(x-16)(x-22)** Use H(x)=a(x-16)(x-22). Substituting (18,-24) gives -24=a(2)(-4), so a=3.

CHALLENGE

y=-(x+3)(x-8)=-x^2+5x+24. At x=1, the factors have opposite signs, so their product is negative. Since the y-value is positive, a must be negative.

Accept equivalent factored or expanded forms. For the challenge, accept any correct explanation that connects the negative factor product at x=1 with the positive y-value.