# Lesson 7-5 → Falling Objects from Any Height

## Review

Last unit we learned objects fell pursuant to this function:

$$f(x) = -16x^2 + \text{Initial Height}$$

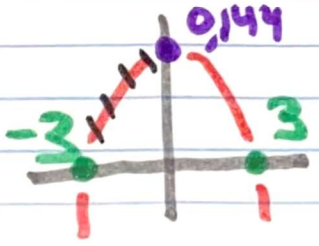
f(x) is height  x is seconds

a helicopter drops a package from 144 ft.

$$f(x) = -16x^2 + 144$$

$$f(x) = -16(x^2 - 9)$$

$$f(x) = -16(x-3)(x+3)$$




$$0 = -16(x-3)(x+3)$$

Roots 3, -3

3 second fall

What about 149 feet (NOT 144)?

What are the roots of $-16x^2+149$

How about $a=-16$ $b=0$ $c=149$

roots are $\frac{-b \pm \sqrt{b^2-4ac}}{2a}$

| Expression 1 | Expression 2 |
| --- | --- |
| $\frac{-0+\sqrt{0^2-4(-16)(149)}}{2(-16)}$ | $\frac{-0-\sqrt{0^2-4(-16)(149)}}{2(-16)}$ |

with a little help from Desmos

$-3.0516\ldots$

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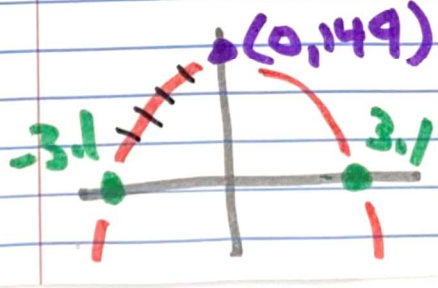


3.1 second fall