DO NOW

Six times the square of a number decreased by 5 times the number equals 1. Find the negative solution.

let
$$x = number$$

$$6x^{2} - 5x = 1$$

$$6x^{2} - 5x - 1 = 0$$

$$(6x+1)(x-1) = 0$$

$$6x+1 = 0 \text{ or } x-1 = 0$$

$$6x=1 \qquad x=1$$

$$x=\frac{1}{b} \qquad \text{reject}$$

$$positive$$
The negative solution is $-\frac{1}{b}$.

Page 1

1. An object is launched straight up in the air with an initial velocity of 32 feet per second from a roof 48 feet high. Use the function:

$$h(t) = -16t^2 + 32t + 48$$

a. After how many seconds will it reach the maximum height?

$$t = \frac{-b}{20}$$

 $t = \frac{-32}{2(-16)}$
 $t = \frac{-32}{32}$
 $t = \frac{-32}{32}$
 $t = \frac{-32}{32}$

b. What will be the maximum height?

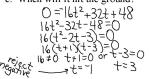
$$h(1) = -16(1)^{2} + 32(1) + 48$$

$$h(1) = -16 + 32 + 48$$

$$h(1) = 16 + 48$$

$$h(1) = 64$$

c. When will it hit the ground?



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height is 64 feet

The maximum

It hit the ground

after 3 seconds

HOMEWORK

Worksheet - HW 8.9

8.9 Modeling with Ouadratic Equations

Word Problems with quadratic equations

* Refer to section 8.3 Word Problems

height problems: Basic form: $h(t) = -16t^2 + vt + h$

1. Asked for when it reaches maximum height Ly find the axis of symmetry

2. Asked for maximum height

1. Find the y-value of the turning point

* Plug above t into equation

3. Asked When it reaches the ground (height=0)

1. Set equation equal to 0.

Page 2

2. A football is kicked upward from ground level with an initial velocity of 32 feet per second. The following function gives the height of the ball in feet after t seconds. $h(t) = -16t^2 + 32t$

a. What is the maximum height reached by the football?

$$t = \frac{-b}{2a} \qquad h(1) = -16(1)^2 + 32(1)$$

$$t = \frac{-32}{2(16)} \qquad h(1) = -16 + 32$$

$$t = \frac{-32}{32} \qquad h(1) = 16$$
The maximum height is 16 feet.

b. After how many seconds does the ball touch the ground?

$$0 = -16t^2 + 32t$$

 $16t^2 - 32t = 0$
 $16t(t-2) = 0$
 $16t = 0$ or $t-2 = 0$
 $t = 0$
Ground after 2 seconds.

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