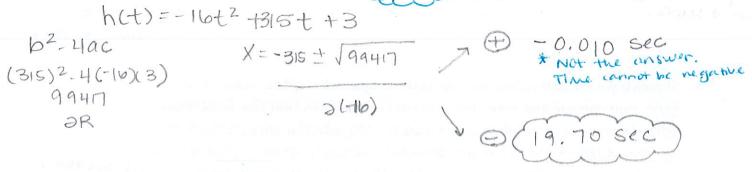
Quadratic Applications Practice Worksheet

Name	Date

1. Suppose you launch a model rocket with an upward starting velocity of v ft/s. You can use the equation $h = -16t^2 + vt + h_0$ to find the rocket's altitude, h represents height in feet, t seconds after launch and h_0 represents initial height. Suppose the upward starting velocity is 315 ft/s and the initial height is 3 ft. When will the rocket hit the ground? \rightarrow find \times intercepts



- 2. The height of a projectile can be described by the Vertical motion model: $h = -16t^2 + vt + s$, where t is the time (in seconds) the object has been in the air, v is the initial vertical velocity (in feet per second), and s is the initial height (in feet). To catch a frisbee, a dog leaps into the air with an initial vertical velocity of 28 feet per second.
- tancy word to equation h(+) = -16t2 + 28t

:

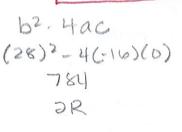
b. After how many seconds does the dog land on the ground? find the X in tercepts

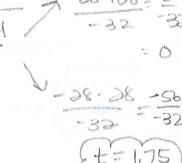
[FACTOR]

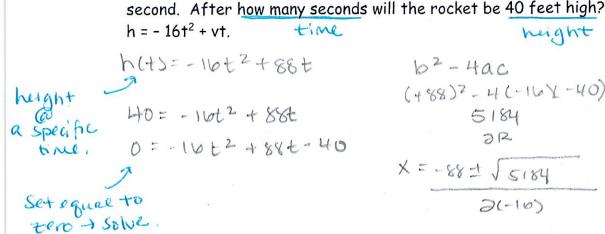
[Quad. Formula]

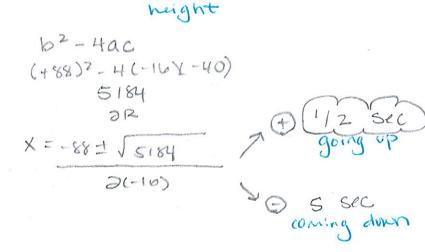
0 = 16t^2 + 28t | 62.4ac | X = -28 + 5784

 $0 = -16t^{2} + 38t$ 0 = -4t(4t-7) t = 0 $t = \frac{7}{4}$ $t \approx 1.75 \text{ sc}$









4. Suppose you launch a firecracker with an upward starting velocity of v ft/s. You can use the equation $h = -16t^2 + vt + h_0$ to find the firecracker's altitude h feet t seconds after launch. Suppose the upward starting velocity is 185 ft/s and the initial height is 2 feet. At what time will the firecracker be at its maximum height? What is the maximum height? find vertex.

3. Henry launched a model rocket with an initial speed of 88 feet per

5. Each of the "golden arches" at a McDonald's is in the shape of a parabola. Each arch is modeled by: $h(x) = -x^2 + 6x$, where h(x) is the height of the arch(in feet) at a distance x (in feet) from one side.

a. Find the equation of the axis of symmetry.
$$X = -\frac{b}{ba} = -\frac$$

x value of vertex: X = -b

b. How high is the arch at the axis of symmetry?

finding the maximum height aka y value of the vertex

$$h(3) = -(3)^{2} + b(3)$$

$$= 9 + 18$$

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6. The tallest building in the USA is in Chicago, Illinois. It is 1450ft. tall. How long would it take a penny to drop from the top of the building to the ground? Use the formula h= -16t² + ho.

Solve for X interept.

+ missing a middle term silve long SQRT or avad. Form

SQ RT

Quad. Formula

 $0 = -16t^2 + 1450$ $-1450 = -16t^2$ $90.625 = t^2$ 62-4ac (0)2-4(-16)(1450) 92800 2R

- 7. A study of air quality in a particular city by an environmental group suggest that t years from now the level of carbon monoxide, in parts per million, in the air will be $A = 0.2t^2 + .01t + 5.1$.
 - a. What is the level, in part per million, now?) original year > time term y interept

 5. | part per million
 - b. How many years from now will the level of carbon monoxide be at 8 parts per million? Round to the nearest tenth.

$$8 = 0.3t^{2} + .01t + 5.1$$
 $0 = 0.3t^{2} + .01t - 3.9$
 $b^{2} - 4ac$
 $(.01)^{2} - 4(0.3)(-3.9)$
 $-.01 \pm \sqrt{.3321}$
 $3(.3)$
 $3(.3)$
 $-1.3 years$

find the Vertex use x=-b 8. A rocket is shot upward with an initial velocity of 125 feet per second from a platform 3 feet above the ground. Use the model $h = -16t^2 + v_0t + h_0$ to find the maximum height of the rocket.

9. If an object is thrown vertically upward, its height h, above the ground in feet after t seconds is given by $h = h_0 + v_0 t - 16t^2$, where h_0 is the initial height from which the object is thrown and v_0 is the initial velocity of the object. Using this formula solve the problem.

A ball thrown vertically into the air has the equation of motion $h=48+32t-16t^2$

- a. How high is the ball at t = 0? yint 48 + 4
- b. How high is the ball at t = 1?

 h(1) = -16(1) 2 +32(1) +48

 64 +4
 - c. When does the ball hit the ground again? Solve for x intercept

