Bell Ringer - Simplify the radical.

$$\frac{1}{3}\sqrt{128} \cdot \frac{1}{2}\sqrt{12}$$

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$$\frac{1}{3} \cdot \sqrt{64} \cdot \sqrt{2} \cdot \frac{1}{2} \cdot \sqrt{4} \cdot \sqrt{3}$$

$$\frac{1}{3} \cdot 8 \cdot \sqrt{2} \cdot \frac{1}{2} \cdot 2 \cdot \sqrt{3}$$

$$\frac{16}{6}\sqrt{6} = \frac{8}{3}\sqrt{6}$$

Using the Discriminant to Analyze a Real-life Quadratic

Discriminant: the evaluation of $b^2 - 4ac$ tells how many x-intercepts (real solutions) there are in a quadratic function.

Possibilities

$b^2 - 4ac > 0$	2 solutions to the quadratic function
$b^2 - 4ac = 0$	1 solution to the quadratic function
$b^2 - 4ac < 0$	no solutions to the quadratic function

When analyzing the discriminant of a quadratic function, an outcome of an event is possible if one or two solutions can be reached.

Review

Vertical Motion Models - allow us to determine the amount of time a dropped or thrown object takes to hit the ground.

Model if Object is Dropped $h = -16t^2 + s$

Model if Object is Thrown/Hit $h = -16t^2 + vt + s$

h = height in feet
t = time in seconds; normally what you are solving for
s = initial height from which the object is dropped, thrown, or hit
v = initial velocity (speed) that the object was thrown or hit

Question: what is the height (h) normally in this model and why?

Zero (0) because you want to know when the object hits the ground. Ground is zero height.

Remember the discriminant tells you if solutions are possible.

Example: A basketball is shot from 7 feet high with a velocity of 24 feet/sec. Using the vertical motion model, determine if the ball can reach 16 feet high. If the basketball shot reaches this height, the shooter is considered to have a good "soft shot."

Model if Object is Thrown/Hit $h = -16t^2 + vt + s$

Model if Object is Thrown/Hit $h = -16t^2 + vt + s$

$$h = -16t^2 + vt + s$$

$$16 = -16t^2 + 24t + 7$$

$$0 = -16t^2 + 24t - 9$$

discriminant $b^2 - 4ac$

$$24^2 - 4(-16)(-9)$$

$$576 - 576$$

$$0$$

Since the discriminant shows there is 1 solution, the shot WILL reach a height of 16 feet.