Name _____ Date _____

LESSON 9.4

Challenge Practice

For use with the lesson "Use Square Roots to Solve Quadratic Equations"

In Exercises 1–5, solve the equation by writing the left side of the equation as a perfect square, then use square roots to solve the problem.

1. $x^2 + 6x + 9 = 81$
2. $4x^2 + 20x + 25 = 16$
3. $\frac{1}{4}x^2 + 2x + 4 = 0$
4. $36x^2 + 12x + 1 = 4$
5. $49x^2 + 112x + 64 = 25$

In Exercises 6–8, use the following information.

A NASA mission plans to send a probe to a moon of a distant planet in our solar system. The probe will orbit the moon at a height of 100 kilometers above the moon's surface, then fall out of orbit to the surface of the moon. Once the probe begins to fall to the surface of the moon, its height is modeled by the equation $h = -\frac{1}{4}t^2 + 100$, where t is the time in minutes and h is the height in kilometers.

6. Once the probe begins to fall, how many minutes pass until the probe hits the surface of the moon?
7. A NASA scientist needs to know how many minutes pass between the time the probe falls out of orbit until the probe is 64 kilometers above the surface of the moon. Find the number of minutes to answer the scientist's question.
8. Suppose that once the probe reaches a height of 64 kilometers above the surface of the moon it fires a rocket to temporarily stop the descent and then releases a parachute. Once the parachute is released, the height of the probe is modeled by the equation $h = -\frac{1}{16}t^2 + 64$. Find the number of minutes between the release of the parachute and the probe striking the surface of the moon.