Circles and parabolas

Review. Solve the equation.

1. $\sqrt{x+2}+\sqrt{x-1}=3$

2. A rocket is thrown upward from a height of 40 ft at time $t = 0$. Its height at time t (in seconds) is given by the equation

$$y(t) = -16t^2 + 150t + 40.$$

Find the maximum height reached by the rocket. At what time does the rocket reach this maximum value? How long is the rocket airborne?

3. A stone is thrown upward from the bottom of a deep pit that is 100 m below ground level. It is thrown at time $t = 0$. The height of the stone at time t (in seconds) is given by the equation

$$y(t) = -10t^2 + 20t - 100.$$

Find the maximum height reached by the stone and find the time it reaches this maximum height. Will the stone ever be visible to someone outside the pit?

Graph the parabola. Make sure to check and see if it opens vertically or horizontally.

4. $y^2 + 6y - x + 16 = 0$

5. $x^2 - 4x - 2y = 0$

6. $x = y^2 + 6y + 10$

7. $y^2 + y - x - 4 = 0$

8. Challenge: A farmer has 120 ft of fence that are used to enclose a rectangular pasture. The pasture sits next to a barn, so one side of the enclosure is part of the wall of the barn. The other three sides are fenced. What is the maximum possible area of the pasture?