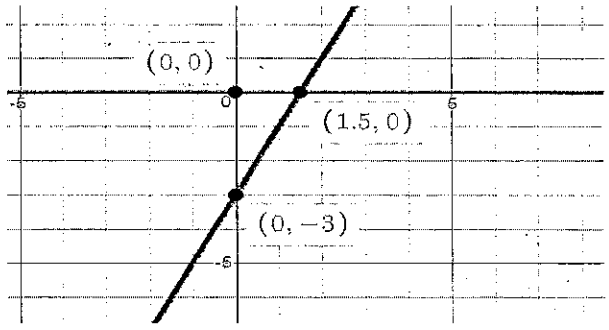
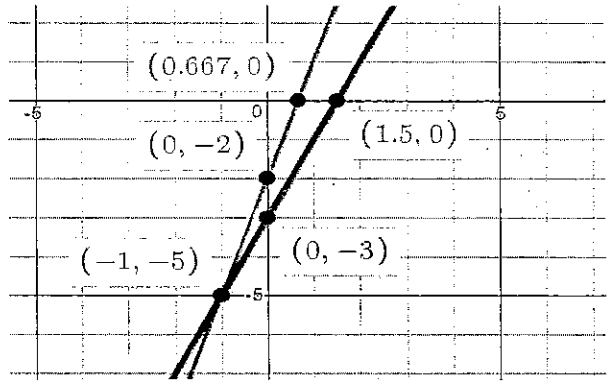
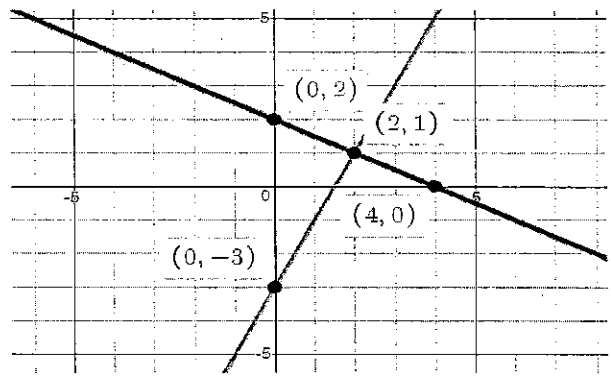
Day 25: Solving Quadratic Equations

Solve each LINEAR equation below. Use the graph to help check your solution(s).

Equations	Graphs:
$2x-3=0$ +3 +3 $\frac{2x}{2}=\frac{3}{2}$ $x=1.5$	
$2x-3=3x-2$ −2x −2x $-3=x-2$ +2 +2 $-1=x$	
$2x-3=\frac{1}{2}x+2$ $-\frac{1}{2}x$ $-\frac{1}{2}x$ $2\frac{1}{2}x-3=2$ +3 +3 $\frac{2\frac{1}{2}x}{2\frac{1}{2}}=\frac{5}{2\frac{1}{2}}$ $x=2$	

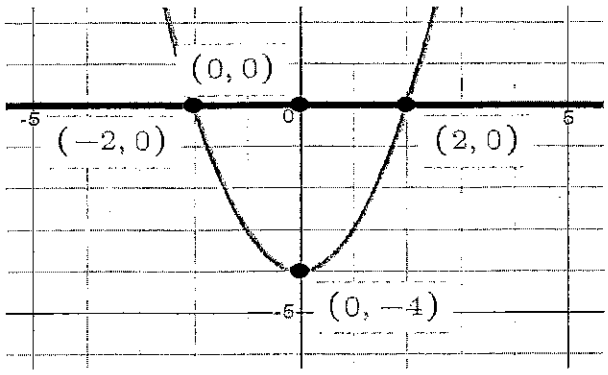
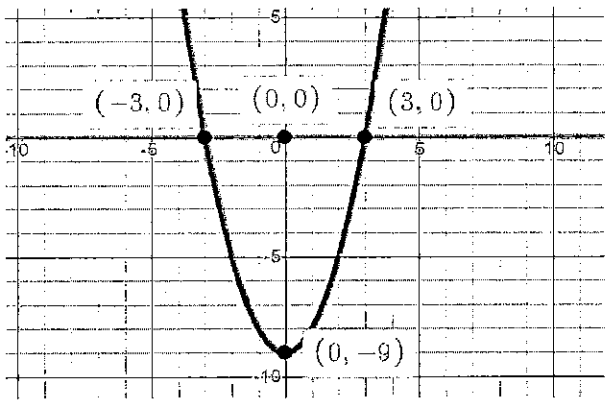
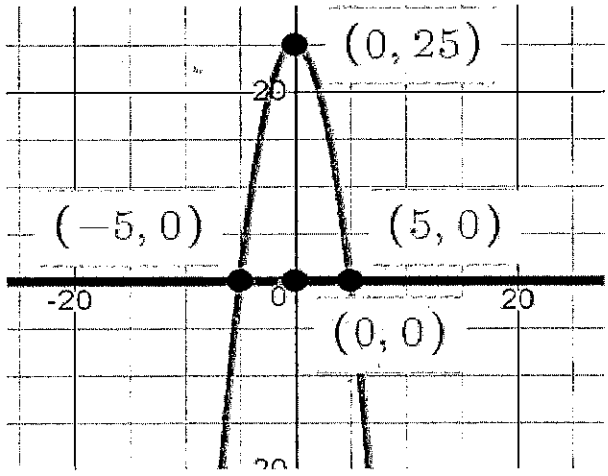
1. **Explain how the solution to your equation relates to the graphs.**

x-coordinate of the point of intersection

2. **Is it possible for linear equations to have no solutions? Draw a picture to support your explanation.**

Yes! Parallel. //

Solve each QUADRATIC equation below. Use the graph to help check your solution(s).

Equations	Graphs:
$x^2 - 4 = 0$ $+4 \quad +4$ $\sqrt{x^2} = \pm\sqrt{4}$ $x = 2 \quad x = -2$	
$x^2 - 9 = 0$ $+9 \quad +9$ $\sqrt{x^2} = \pm\sqrt{9}$ $x = 3 \quad x = -3$	
$-x^2 + 25 = 0$ $+x^2 \quad +x^2$ $\sqrt{25} = \pm\sqrt{x^2}$ $x = 5 \quad x = -5$	

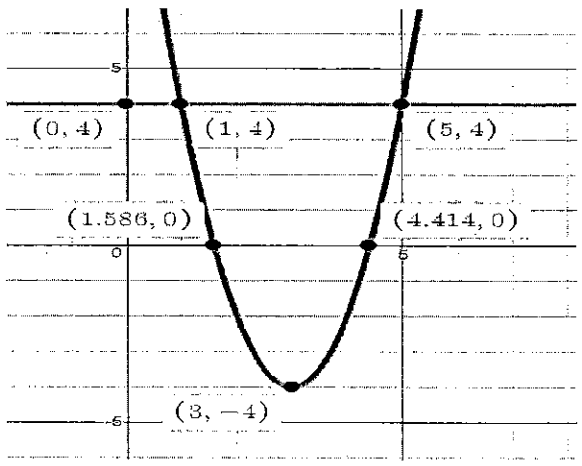
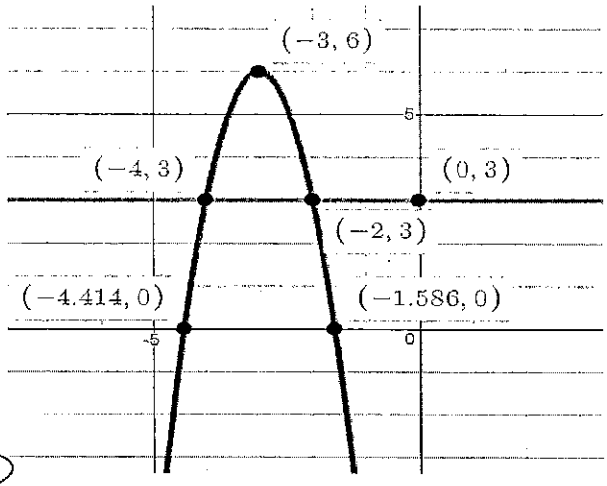
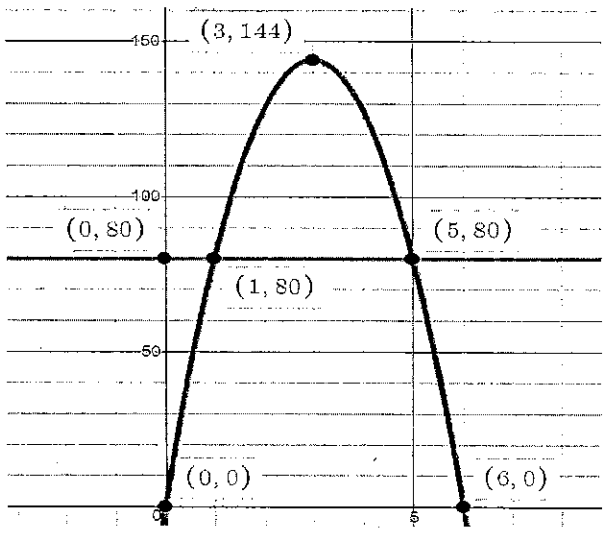
3. Explain how the solutions to your equation relate to the graphs.

x-coordinate of the points of intersection

4. Is it possible for quadratic equations to have no solutions? Draw a picture to support your explanation.

Yes! ∩ or ∪

Solve each equation below. Use the graph to help check your solution(s).

Equations	Graphs:
$2(x-3)^2-4=4$ $+4\ \ +4$ $\frac{2(x-3)^2}{2}=\frac{8}{2}$ $\sqrt{(x-3)^2}=\sqrt{4}$ $x-3=2$ $\quad$ $x-3=-2$ $x=5$ $\quad$ $x=1$	
$-3(x+3)^2+6=3$ $-6\ \ -6$ $\frac{-3(x+3)^2}{-3}=\frac{-3}{-3}$ $\sqrt{(x+3)^2}=\sqrt{1}$ $x+3=1$ $\quad$ $x+3=-1$ $x=-2$ $\quad$ $x=-4$	
$-16(x-3)^2+144=80$ $-144\ \ -144$ $\frac{-16(x-3)^2}{-16}=\frac{-64}{-16}$ $\sqrt{(x-3)^2}=\sqrt{4}$ $x-3=2$ $\quad$ $x-3=-2$ $x=5$ $\quad$ $x=1$	

5. Explain how the numbers in your equation relate to the graphs. In particular, can you use the equation to find the VERTEX (highest/lowest point)? What about the horizontal line?

For $y=a(x-h)^2+k$, vertex is (h,k).

Horizontal line is $y=c$.

Is it possible for quadratic equations to have only one solution? Draw a picture to support your explanation.

Yes!  or

Mixed Practice: Some of these equations have 2 solutions, some have 1 solution, and some have 0 solutions. Remember that you can always use a graphing calculator to check your answers (AND you can always plug your solutions in to check algebraically).

1. $x^2 = 100$ $x = 10, -10$

2. $(x-1)^2 = 25$ $x = 6, -4$

3. $(x+1)^2 = 1$ $x = 0, -2$

4. $(x-3)^2 = 0$ $x = 3$

5. $x^2 = -49$ No Solution

6. $(x-4)^2 + 3 = 19$ $(x-4)^2 = 16 \rightarrow x = 8$, $x = 0$

7. $(x+5)^2 - 17 = 32$ $(x+5)^2 = 49 \rightarrow x = 2$, $x = -12$

8. $2(x-3)^2 + 24 = 96$
$2(x-3)^2 = 72 \rightarrow (x-3)^2 = 36 \rightarrow x = 9$, $x = -3$

9. $-16(x-4)^2 + 256 = 0$
$-16(x-4)^2 = -256$
$(x-4)^2 = 16 \rightarrow x = 0, x = 8$