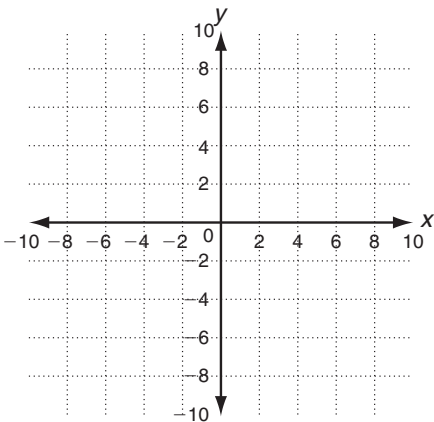Name _____ Date _____ Class _____

Practice A
Solving Quadratic Inequalities

Graph each inequality and shade the solution region. Use a test point to verify the solution region.
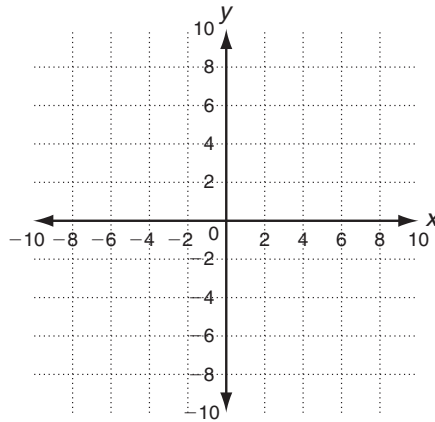
1. $y < x^2 - 2x + 3$

    a. y-intercept is 3.

    b. Vertex is $(1, 2)$.

    c. Test point _____

_____

2. $y \geq -x^2 + 4x - 5$

    a. y-intercept is _____

    b. Vertex is _____

    c. Test point _____

_____

Solve each inequality by using algebra.

3. $x^2 + x - 8 \leq -6$

    a. Write the related equation.   _____

    b. Solve for x to find the critical values.   _____

    c. Test an x-value in each interval.   _____

    d. Write the solution.   _____

4. $x^2 + 10x + 25 > 9$ **5.** $x^2 - x < 12$ **6.** $x^2 + 2x - 10 \geq 14$

_____   _____   _____

Solve.

7. The annual profit, $p(x)$, in dollars of a small company varies with the number of employees, x, as $p(x) = -40x^2 + 4400x$. What is the range of the number of employees for which the company's annual profit will be at least \$112,000?
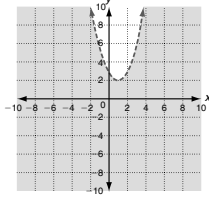
_____

Holt Algebra 2

Practice A
Solving Quadratic Inequalities

Graph each inequality and shade the solution region. Use a test point to verify the solution region.
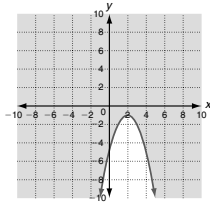
1. $y < x^2 - 2x + 3$

  a. y-intercept is 3.

  b. Vertex is $(1, 2)$.

  c. Test point   __(0, 0)__

      __$0 < 3$ ✓__

2. $y \geq -x^2 + 4x - 5$

  a. y-intercept is __-5__

  b. Vertex is __$(2, -1)$__

  c. Test point   __(0, 0)__

      __$0 \geq -5$ ✓__

Solve each inequality by using algebra.

3. $x^2 + x - 8 \leq -6$

  a. Write the related equation.   __$x^2 + x - 8 = -6$__

  b. Solve for x to find the critical values.   __$x = -2, 1$__

  c. Test an x-value in each interval.   __$x = -3, -2 \leq -6$ X; $x = 0, -8$__
                                 __≤ -6 ✓; $x = 2, -2 \leq -6$ X__

  d. Write the solution.   __$-2 \leq x \leq 1$__

4. $x^2 + 10x + 25 > 9$ **5.** $x^2 - x < 12$ **6.** $x^2 + 2x - 10 \geq 14$

__$x < -8$ or $x > -2$__   __$-3 < x < 4$__   __$x \leq -6$ or $x \geq 4$__

Solve.

7. The annual profit, $p(x)$, in dollars of a small company varies with the number of employees, x, as $p(x) = -40x^2 + 4400x$. What is the range of the number of employees for which the company's annual profit will be at least $112,000?

Between 40 and 70 employees

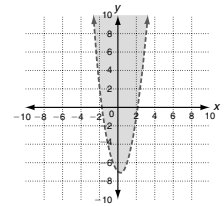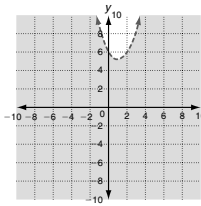   **51**   **Holt Algebra 2**

Practice B
Solving Quadratic Inequalities

Graph each inequality.

1. $y < x^2 - 2x + 6$

2. $y > 2x^2 - x - 7$

Solve each inequality by using tables or graphs.

3. $x^2 + 3x - 14 \leq 14$ **4.** $x^2 - 9x > -18$

__$-7 \leq x \leq 4$__   __$x < 3$ or $x > 6$__

Solve each inequality by using algebra.

5. $x^2 - x - 3 > x$ **6.** $x^2 + 6x + 3 < -2$

__$x < -1$ or $x > 3$__   __$-5 < x < -1$__

7. $3 \leq x^2 - 8x + 15$ **8.** $3x^2 + x + 8 \leq 12$

__$x < 2$ or $x > 6$__   __$-\dfrac{4}{3} < x < 1$__

Solve.

9. An online music service that sells song downloads models its profit using the function $P(d) = -5d^2 + 450d - 1000$, where d is the number of downloads sold and P is the profit. How many downloads does it need to sell to make a profit of more than $8000?

More than 30 but fewer than 60
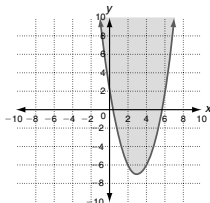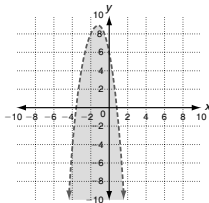
   52   **Holt Algebra 2**

Practice C
Solving Quadratic Inequalities

Graph each inequality.

1. $y < -2x^2 - 5x + 6$

2. $y \geq x^2 - 6x + 2$

Solve each inequality.

3. $x^2 - 10x + 17 \geq -4$ **4.** $2x^2 - 7x - 2 < 2$

__$x \leq 3$ or $x \geq 7$__   __$-\dfrac{1}{2} < x < 4$__

5. $3x^2 + 5 \leq 53$ **6.** $x^2 - 6x - 36 > 36$

__$-4 \leq x \leq 4$__   __$x < -6$ or $x > 12$__

Solve.

7. Use the Quadratic Formula to find the critical values for the inequality $x^2 - 3x + 8 \geq -2$.   __$x = \dfrac{3 \pm i\sqrt{31}}{2}$__

8. The distance, d, in car lengths, that a drag racer travels during the course of a race is given by $d = 0.8t^2 - 3.5t$, where t is time in seconds.

  a. How long does it take for a racer to travel at least 100 car lengths?   **13.6 s**

  b. During what time period will the racer be more than 50 car lengths but less than 100 car lengths into the race?   **More than 10.4 s but less than 13.6 s into the race**

  c. During what time period will the racer be less than 50 car lengths from the start?   **Less than 10.4 s into the race**

   53   **Holt Algebra 2**

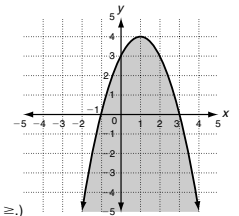### Reteach
Solving Quadratic Inequalities

Graphing quadratic inequalities is similar to graphing linear inequalities.

Graph $y \leq -x^2 + 2x + 3$.

Step 1 Draw the graph of $y = -x^2 + 2x + 3$.

  • $a = -1$, so the parabola opens downward.

  • vertex at $(1, 4)$

    $-\dfrac{b}{2a} = -\dfrac{2}{2(-1)} = 1$, and $f(1) = 4$

  • y-intercept is 3, so the curve also passes through $(2, 3)$

    Draw a solid boundary line for $\leq$ or $\geq$.

    (Draw a dashed boundary line for $<$ or $>$.)

Step 2 Shade below the boundary of the parabola for $<$ or $\leq$. (Shade above the boundary for $>$ or $\geq$.)

Step 3 Check using a test point in the shaded region. Use $(0, 0)$.

  $y \leq -x^2 + 2x + 3$

  ?: $0 \leq -(0)^2 + 2(0) + 3$

  ✓: $0 \leq 3$

Graph each inequality.

1. $y \geq x^2 - 4x + 3$

  Vertex: __$(2, -1)$__

  y-intercept: __3__

  Boundary: __solid boundary__

  Test point: $(1, 1)$

    __$1 \geq 0$__

2. $y < -x^2 - 4x - 1$

  Vertex: __$(-2, 3)$__

  y-intercept: __-1__

  Boundary: __dashed boundary__

  Test point: $(-1, 0)$

    __$0 < 2$__

   54   **Holt Algebra 2**