# PRACTICE TEST, pages 415–418

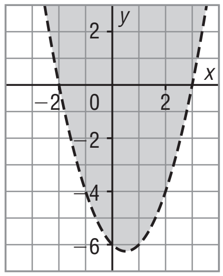
**1. Multiple Choice** Which inequality is not represented by this graph?

A. $y > x^2 - x - 6$

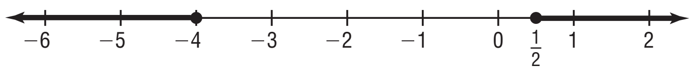
B. $y > \left(x - \frac{1}{2}\right)^2 - \frac{25}{4}$

C. $y > (x + 2)(x - 3)$

(D.) $y > (x + 3)(x - 2)$




**2. Multiple Choice** Which inequality below is represented by this number line?




(A.) $2x^2 + 7x - 4 \geq 0$

B. $2x^2 + 7x - 4 \leq 0$

C. $-2x^2 - 7x + 4 \geq 0$

D. $2x^2 - 7x + 4 \leq 0$

**3.** Graph each inequality. Give 2 possible solutions in each case.

**a)** $2x^2 - 5x < -2$

Solve: $2x^2 - 5x + 2 = 0$

$(2x - 1)(x - 2) = 0$

$x = 0.5$ or $x = 2$

When $x < 0.5$, such as $x = 0$, L.S. = 0; R.S. = −2;

so $x = 0$ does not satisfy the inequality.

When $0.5 < x < 2$, such as $x = 1$, L.S. = −3; R.S. = −2;

so $x = 1$ does satisfy the inequality.

The solution is: $0.5 < x < 2, x \in \mathbb{R}$

Two possible solutions are: $x = 1$ and $x = 1.5$

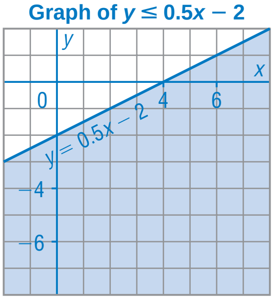
**b)** $-2 \geq -0.5(x - 6)^2$

Solve: $-2 = -0.5(x - 6)^2$
$(x - 6)^2 = 4$
$x - 6 = \pm 2$
$x = 4$ or $x = 8$
When $x \leq 4$, such as $x = 0$, L.S. $= -2$; R.S. $= -18$;
so $x = 0$ does satisfy the inequality.
When $x \geq 8$, such as $x = 10$, L.S. $= -2$; R.S. $= -8$;
so $x = 10$ does satisfy the inequality.
The solution is: $x \leq 4$ or $x \geq 8$, $x \in \mathbb{R}$
Two possible solutions are: $x = 1$ and $x = 20$


**c)** $y \leq 0.5x - 2$

Graph the related functions.
The line has slope 0.5 and
*y*-intercept $-2$.
Draw a solid line. Shade
the region below the line.

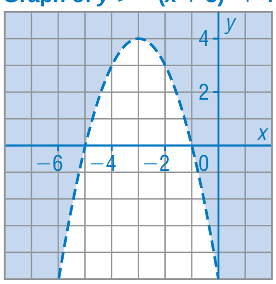
Graph of $y \leq 0.5x - 2$




**d)** $y > -(x + 3)^2 + 4$

The parabola is congruent to
$y = -x^2$ and has vertex $(-3, 4)$.
Draw a broken curve. Shade
the region above the curve.

Graph of $y > -(x + 3)^2 + 4$



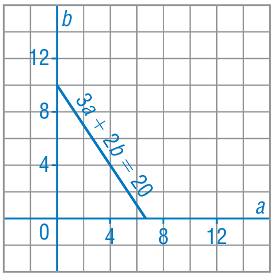
**4.** At a school cafeteria, an apple costs 75¢ and a banana costs 50¢. Ava has up to $5 to spend on fruit for herself and her friends.

**a)** Write an inequality to represent this situation. What are the restrictions on the variables?

**Let *a* represent the number of apples and *b* represent the number of bananas.**
**An inequality is: $75a + 50b \leq 500$, or**
**$3a + 2b \leq 20$**
**Both *a* and *b* are whole numbers.**

**b)** Determine 2 possible ways that Ava can spend up to $5.

**Determine the coordinates of 2 points that satisfy the related function.**
**When $a = 0, b = 10$**
**When $a = 6, b = 1$**
**Join the points with a solid line.**
**The solution is the points, with whole-number coordinates, on and below the line.**
**Two ways are: 4 apples, 2 bananas; 2 apples, 6 bananas**




**5.** Solve each system of equations. Use algebra for one system and graphing technology for the other. How did you decide which strategy to use?

**a)** $y = 2x^2 + x - 1$ ①

$x + y = 12$ ②

**Rearrange equation ②.**
**$y = 12 - x$**
**Substitute $y = 12 - x$ in equation ①.**
**$12 - x = 2x^2 + x - 1$**
**$2x^2 + 2x - 13 = 0$**
**This equation does not factor, so I use graphing technology. I use algebra when the equation does factor.**
**Input the equations. To the nearest tenth, the graphs intersect at these points: (−3.1, 15.1) and (2.1, 9.9)**

**b)** $y = (x - 2)^2$ ①

$y = -x^2 + 4x - 4$ ②

From equation ①, substitute $y = (x - 2)^2$ in equation ②.

$(x - 2)^2 = -x^2 + 4x - 4$

$x^2 - 4x + 4 = -x^2 + 4x - 4$

$2x^2 - 8x + 8 = 0$

$x^2 - 4x + 4 = 0$

$(x - 2)^2 = 0$

So, $x = 2$

Substitute $x = 2$ in equation ①.

$y = (2 - 2)^2$

$y = 0$

The solution is: (2, 0)

**6.** The cross section of a pedestrian tunnel under a road is parabolic and is modelled by the equation $y = -0.3x^2 + 1.8x$, where $y$ metres is the height of the tunnel at a distance of $x$ metres measured horizontally from one edge of the path under the tunnel. In 2010, the tallest living person was about 2.56 m tall. Could he walk through the tunnel without having to bend over? How could you use an inequality to solve this problem?

Determine the values of $x$ for which $y \geq 2.56$.
Solve: $-0.3x^2 + 1.8x \geq 2.56$, or $-0.3x^2 + 1.8x - 2.56 \geq 0$
Use graphing technology. Input: $y = -0.3x^2 + 1.8x - 2.56$
Determine if there are any values of $x$ for which $y \geq 0$; these values are approximately $2.3 \leq x \leq 3.7$.
So, the tallest living person could walk through the tunnel.