

ACT - Graphing & Coordinate Geometry

$-5x < x + 12$

$-6x < 12$

$x > -2$

1. Which of the following represents the range of solutions for inequality $-5x - 7 < x + 5$?

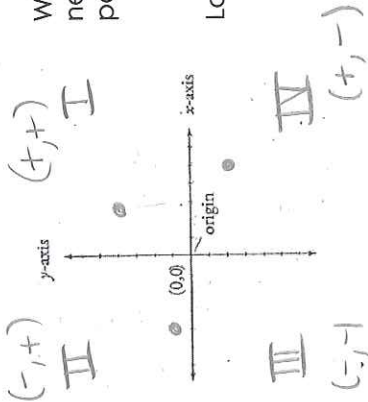
- A.
- B.
- C.
- D.
- E.

What changes if it is $-5x - 7 \leq x + 5$?

Graphing

- The Cartesian Grid: • Graph $(-4, 1)$, $(3, 4)$, $(5, -2)$

Where is x positive and negative? Where is y positive and negative?



Label the quadrants.

By memorizing a few formulas, you will be able to answer virtually all the coordinate geometry questions.

Midpoint Formula:

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

1. Point B (4,3) is the midpoint of line segment AC. If point A has coordinates (0,1), then what are the coordinates of point C?

- A. (-4,-1)
- B. (4,1)
- C. (4,4)
- D. (8,5)
- E. (8,9)



Distance Formula:

1. What is the distance between points A (2,2) and B (5,6)?

- A. 3
- B. 4
- C. 5
- D. 6
- E. 7

$$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$\sqrt{(5-2)^2 + (6-2)^2}$$

$$\sqrt{9+16} = 5$$

How to solve using right triangles and the Pythagorean theorem

More Important Formulas

- Slope-Intercept Form: • The Slope Formula:

$$y = mx + b$$

$$\frac{y_2 - y_1}{x_2 - x_1}$$

What is the slope of the line based on the equation

$$5x - y = 7x + 6?$$

- A. -2
 B. 0
 C. 2
 D. 6
 E. -6

$$-y = 2x + 6$$

$$y = -2x - 6$$

What is the slope of the straight line passing through the points (-2, 5) and (6, 4)

$$\frac{5 - 4}{-2 - 6} = \frac{1}{-8}$$

- A. $-\frac{1}{16}$
 B. $-\frac{1}{8}$
 C. $\frac{1}{5}$
 D. $\frac{2}{9}$
 E. $\frac{4}{9}$

Circles, Ellipses, and Parabolas

- Circles:

$$(x-h)^2 + (y-k)^2 = r^2$$

(h, k) = center

r = radius

- How to draw circles on your calculator

- Ellipses:

$$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$$

(h, k) = center

2a = width

2b = height

- Parabolas:

$$y = x^2$$

1. If the equation $x^2 = 1 - y^2$ were graphed in the standard (x,y) coordinate plane, the graph would represent which of the following geometric figures?

- A. square
 B. straight line
 C. circle
 D. triangle
 E. parabola

$$x^2 + y^2 = 1$$

Summary

- In graphing an inequality, solve for the variable and look for the number-line graph that expresses the equation.
 - Remember to flip inequality when dividing or multiplying by a negative.
- Most coordinate geometry questions can be solved by putting them into $y = mx + b$ form.
- Slope = $\frac{\text{change in } y}{\text{change in } x}$
- You can always find the distance between two points by making a right triangle and using the Pythagorean Theorem.
- Every once in a while, ACT asks a question on the equations of circles, ellipses, and parabolas. It may help to memorize these.