Real Numbers

- Representing real numbers
- Order and interval notation

Cartesian Coordinate System

- Distance Formulas
- Midpoint Formulas
- Equations of Circles

Sections P1 & P2:

HW: Math XL P1 & P2...due Tues. 8/29 at midnight

Aug 20-7:12 AM

Interval Notation

Inequality	Interval Notation	Graph on Number Line	Description
$x > a$	(a, ∞)		x is greater than a
$x < a$	$(-\infty, a)$		x is less than a
$x \geq a$	$[a, \infty)$		x is greater than or equal to a
$x \leq a$	$(-\infty, a]$		x is less than or equal to a
$a < x < b$	(a, b)		x is strictly between a and b
$a \leq x < b$	$[a, b)$		x is between a and b, to include a
$a < x \leq b$	$(a, b]$		x is between a and b, to include b
$a \leq x \leq b$	$[a, b]$		x is between a and b, to include a and b

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Interval Notation	Graph on Number Line	Bounded Type
(a, ∞)		Unbounded Open
$(-\infty, a)$		Unbounded Open
$[a, \infty)$		Unbounded Closed
$(-\infty, a]$		Unbounded Closed
(a, b)		Bounded Open
$[a, b)$		Bounded Half-open
$(a, b]$		Bounded Half-open
$[a, b]$		Bounded Closed

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Converting Between Intervals and Inequalities

Convert interval notation to inequality notation or vice versa. Find the endpoints and state whether the interval is bounded, its type and then graph it.

$[-6, 3)$

$(-\infty, -1)$

$-2 \leq x \leq 3$

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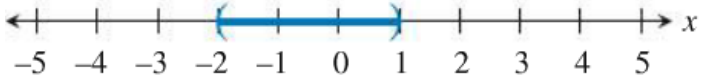
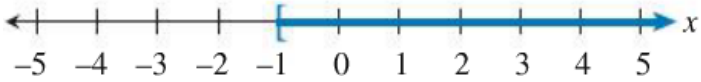
Writing Using Interval Notation

Use interval notation to describe the interval of real numbers

$x > -3$

$-7 < x \leq 2$





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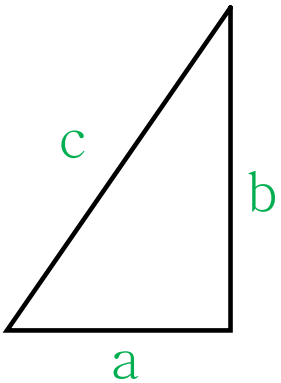
DISTANCE FORMULA

THE DISTANCE FORMULA

Given the two points (x_1, y_1) and (x_2, y_2), the distance between these points is given by the formula:

$$\sqrt{(X_1 - X_2)^2 + (Y_1 - Y_2)^2}$$

Recall: You pick which point is first, then second.



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Finding the Distance Between Two Points

Find the distance d between the points (1, 5) and (6, 2)

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Midpoint Formula

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

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Finding the Midpoint of a Line Segment

Find the midpoint of the line segment with endpoints (−5, 2) and (3, 7)

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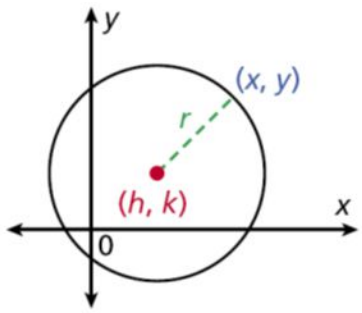
The equation of a circle is based on the Distance Formula and the fact that all points on a circle are equidistance from the center.



$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$ Distance Formula

$$r = \sqrt{(x - h)^2 + (y - k)^2}$$ Substitute the given values.

$$r^2 = (x - h)^2 + (y - k)^2$$ Square both sides.

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Finding the Standard Form Equations of Circles

Find the standard form equation of the circle with...

Center (-4, 1), radius 8

Center (0, 0), radius 5

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