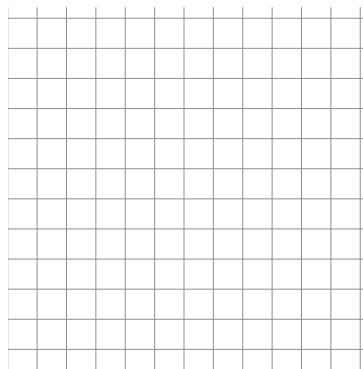


Intro to Calculus

Homework 3

- What is the exact length of the segment connecting the points $(-5,1)$ and $(-2,4)$?
- The grid at the right has lines which are one unit apart. Using this grid, draw segments to exactly represent the following lengths.
 - 3
 - $\sqrt{5}$
 - $\sqrt{13}$
 - $\sqrt{37}$
 - $2\sqrt{2}$



- Find all of the points having an x -coordinate of 2 whose distance from the point $(-2,-1)$ is 5. Justify graphically and algebraically.
- Find all of the points having a y -coordinate of -3 whose distance from the point $(1,2)$ is 13. Justify graphically and algebraically.
- Find all of the points whose y -coordinate is the opposite of its x -coordinate whose distance from $(-2, 1)$ is $\sqrt{145}$. Justify graphically and algebraically. Approximate to the nearest tenth.
- Find the center and radius of the circle whose equation is given. Give answers as exact values, simplified.
 - $12x^2 + 12y^2 = 9$
 - $x^2 + y^2 + 8x - 6y + 16 = 0$
 - $x^2 + y^2 + 6x - 4y - 15 = 0$
 - $x^2 + y^2 - 10x + 7y - 12 = 0$
 - $x^2 + y^2 - 8x + 6y + 47 = 0$

Goals

I can...

determine the length of a segment connecting two points in the cartesian plane.

draw segments to represent specified irrational lengths (such as the square root of 5).

draw and find the equation of a circle when given the locations where the circle intersects axes, a point through which the circle passes, or the end-points of a diameter of the circle.

determine where a circle intersects an axis when given the equation of a circle, completing the square where necessary.

determine the equation of a line tangent to a circle given the equation of the circle in various forms and the point of tangency.

Name _____

Date _____

Class # _____

Block _____

6. Create a graph for each of the following, then find the equation of the circle that meets the following conditions.
- Center $(-1, -3)$; passes through $(-4, -2)$.
 - Center $(1, 2)$; intersects the x -axis at -1 and 3 .
 - Center at $(-5, 4)$; tangent to the x -axis.
 - Center at $(2, -6)$; tangent to the y -axis.
 - Endpoints of the diameter of the circle are $(3, 3)$ and $(1, -2)$.
7. Determine where the following circles intersect the x -axis.
- $12x^2 + 12y^2 = 9$
 - $x^2 + y^2 + 8x - 6y + 16 = 0$
8. If P is a point on a circle with center C , then the tangent line to the circle at P is the straight line through P that is perpendicular to the radius of CP . Find the equation of the tangent line to the circle at the given point. Include a graph for each.
- $x^2 + y^2 = 25$ at $(3, 4)$
 - $(x - 1)^2 + (y - 3)^2 = 5$ at $(2, 5)$
 - $x^2 + y^2 + 6x - 8y + 15 = 0$ at $(-2, 1)$
9. Line k is tangent to the circle whose center is at $(3, 4)$ with radius of $\sqrt{17}$ at the point(s) where the circle crosses the x -axes. What could be the equation of line k (slope-intercept form is fine)?
10. Circle C has a radius of 5 and center at $(2, 1)$. Two tangent lines are drawn to the circle. Line a is tangent to the circle at the point $(5, 5)$ while line b is tangent to the circle at point $(-2, 4)$. What is the point of intersection of the two tangent lines? Justify with both a graph and algebra.
11. a. Pick any multiple of 3 . What do you have to add to this number to get to the next multiple of 3 ?
- b. Write an expression for "The sum of any four multiples of 3 " where you let a represent the first multiple of 3 .
- c. Write an expression for "The sum of any five multiples of 3 " where you let a represent the first multiple of 3 .
- d. Write an expression for "The sum of any number, n , multiples of 3 " and you let a represent the first multiple of 3 .