**NOTES FOR CIRCLES**

A **circle** is the set of all points that are equidistant from a fixed point, called the center.

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|  | Derive a general equation for a circle with its center at the origin and with radius r. |

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|  | Derive a general equation for a circle with its center at (h, k) and with radius r. |

**Write equations for the following circles in standard form (x – h)2 + (y – k)2 = r2**

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**Rewrite the equations of circles in standard form (x – h)2 + (y – k)2 = r2.**

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| x2 + y2 + 2x + 4y = 20 | x2 + y2 - 9y = 0 | 2x2 + 2y2 - 12x + 8y – 24 = 0 |

**Intersections of Circles, Lines, and Parabolas**

Sketch a graph for each pair of equations. Find the exact points of intersection.

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| x2 + y2 = 16  y= 4x | 5x5plan | Solution: |
| y = 4 – x2  x2+ (y – 4)2 = 16 | 5x5plan | Solution: |
| x2 + y2 = 4  (x + 3)2+ y 2 = 9 | 5x5plan | Solution: |

**THE ULTIMATE BONUS PROBLEM (Non-linear systems involving circles)**

A circle passes through the points (-13, -2), (-1, 16), and (4, 15). Write an equation for this circle in standard form.

Here’s another one to practice on….same directions: (-2, 0), (2, -2), and (5, 7)