**STUDY SHEET: UNIT 4- SYSTEMS AND PARABOLAS**

**TOPIC #1: SYSTEMS OF EQUATIONS (2 VARIABLES)**

|  |  |  |
| --- | --- | --- |
| **METHOD 1: ELIMINATION** | **METHOD 2: SUBSTITUTION** | **METHOD 3: SET Y’S =** |
| Image result for elimination method | Image result for SUBSTITUTION METHOD | Image result for SUBSTITUTION METHOD |

**TOPIC #2: SYSTEMS OF EQUATIONS (3 VARIABLES)**



**TOPIC #3: CIRCLE AND LINE SYSTEMS**

|  |  |
| --- | --- |
| **EQUATION OF A CIRCLE BASICS** | **STEPS: SOLVING LINEAR AND CIRCLE SYSTEMS ALGEBRAICALLY** |
| Image result for equation of a circle* Flip both signs for *h* and *k* when finding the center
* Always take the square root to find the radius!
* When the equation of a circle is in standard form- use **completing the square** to convert to center-radius form!

Image result for equation of a circle completing the square | * Systems of linear equations and circles can have *3 possible outcomes*:

Image result for circle and linear system of equations* 1. Convert linear equation to slope-intercept form: $y=mx+b$
	2. Substitute y in the equation of a circle
	3. **DOUBLE DISTRIBUTE** and combine like terms
	4. *Set equal to zero* and factor to solve for x.
	5. Substitute x-values back into equation to find corresponding y-values.
	6. Write your final answer as *2 coordinates*
	7. Check your answers graphically.
 |

**TOPIC #4: PARABOLA AND LINE SYSTEMS**

* System of linear equations and parabolas can have *3 possible outcomes*:



* To solve a linear and parabola system of equations **ALGEBRAICALLY**:
	1. Convert linear equation to slope-intercept form: $y=mx+b$
	2. Set equations equal to each other
	3. *Set equal to zero* and factor to solve for x
	4. Substitute x-values back into equation to find corresponding y-values.
	5. Write your final answer as *2 coordinates*
	6. Check your answers graphically.

**TOPIC #5: PARABOLAS- FOCUS AND DIRECTRIX**

 

|  |  |
| --- | --- |
| **WORD** | **DEFINITION** |
| Focus | Point **INSIDE** the parabola  |
| Directrix | Line **ABOVE** or **BELOW** the parabolaIf directrix is **ABOVE** the parabola, ‘p’ is **NEGATIVE**If directrix is **BELOW** the parabola, ‘p’ is **POSITIVE** |
| Vertex | Turning point of parabola**Midpoint** of focus and directrix |
| Axis of Symmetry | Line that divides the parabola directly in half.The focus and vertex will fall on this line. |

**\* MEMORIZE THIS FORMULA! \***

$$y-k=\frac{1}{2p}\left(x-h\right)^{2}$$

$$\left(h, k\right)=Vertex$$

$$p=Distance between Focus and Directrix$$

**\* When identifying the vertex, only flip the *x*-coordinate! \***