**Activity Title:**

**Polar Coordinates Exploration with DESMOS and PADLET**

**Instructions:**

Students need to use DESMOS to graph polar equations and answer related questions given in this sheet. After discussing with group members, students are required to share their feedback in PADLET.

**Expected outcome**:

Students should be able to recognize the shape of polar equations. They should also be able to determine the behavior of the graphs when a certain parameter/term is changed.

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| **Exploration** | **Observation/Finding** |
| **Exploration 1:**  Graph the followings:  a) *r* = 2 cos *x*  b) *r* = 6 sin *x* | If *r* = 2*a* cos *x*, how does the graph change when *a* is changing?   * *a* determines \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * 2*a* determines \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Exploration 2:**  Sketch the graph of the followings:  a) *r* = 1 + 2 cos x  b) *r* = 2 + 4 sin x | If *r* = *a* + *b* cos x or *r* = *a* + *b* sin x, then   * sin and cos determine\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * *a* determines\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * *a* + *b* determines\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * *a* = *b* determines\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Exploration 3:**  Sketch:  a) *r* = 9 sin 2 x | Explore *r* = *a* cos 2x   * *a* determines \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * the number of petals is determined by\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Exploration 4:**  Sketch the followings:  a) *r* = 2 cos 5x                             b) *r* = 3 sin 3x  c) *r* = 3 cos 4 x                            d) *r* = 5 sin 6x | * Explore *r* = *a* cos *n* *x*, what happen if: * *n* is even? * *n* is odd? * *a* determines\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * When *n* is odd there are \_\_\_\_ petals and when *n* is even there are \_\_\_\_\_ petals. |
| **Exploration 5:**  What else can you explore? Share your thoughts and findings. |  |