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| In this activity, students systematically explore the effect of the coefficients on the graphs of sinusoidal functions. Terminology describing the graph—amplitude, period, frequency, phase shift, midline, and vertical offset—is introduced, then reinforced as the student calculates these values directly from the graph using the graphing calculator and the **Transformation Graphing App**. |  |

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| The parameters A, B, C and D will each affect your sinusoidal function in different ways. You will be using the **transformation app** on the handheld, change the value of a parameter by entering the equation for each question into Y1 and/or Y2, and pressing the arrow keys to manipulate each parameter of the function on the graph. At the end of this activity, you will have a much better understanding of the role of each parameter and how they affect a sinusoidal function.  **Problem 1 – A general trigonometric function** |
| |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | To turn on the **Transformation Graphing** app, press **apps**, **Transfrm**, **any key**. Go to **y =** and enter the general sinusoidal function in,  *.*   1. Complete the table.  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | **A** | **B** | **C** | **D** | **zero1** | **zero2** | **min** | **max** | | 1 | 1 | 0 | 0 |  |  |  |  | | 4 | ½ | 3 | 1 |  |  |  |  | | |

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| 1. With a classmate, write down the differences you notice between the graph created by row one and the graph created by row two. |

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| **Problem 2 – The effect of the coefficients A, B, C, and D** |
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| **Problem 3 – A closer look at amplitude, period, and frequency** |
| |  | | --- | | In **Y1**, enter the general cosine function, *.*  **amplitude**: half of the vertical distance from minimum value to maximum value  **period**: horizontal distance from one peak (maximum point) to the next or one minimum point to the next  **frequency:** number of cycles per 2*π* interval   * Write a formula to find the frequency *f* given the period *p*. * Use the formula to complete the table below. | | |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | ***A*** | ***B*** | ***C*** | ***D*** | **max point** | **min point** | **next max point** | **amplitude** | **period** | **frequency** | | 1 | 1 | 0 | 0 | (0, 1) | (3.14, –1) | (6.28, 1) | ½\*(1 – (–1))  2 | 6.28 – 0  6.28  2*π* |  | |  | 1 | 0 | 0 |  |  |  |  |  |  | |  | 1 | 0 | 0 |  |  |  |  |  |  | | 1 |  | 0 | 0 |  |  |  |  |  |  | | 1 |  | 0 | 0 |  |  |  |  |  |  | | 1 | 1 |  | 0 |  |  |  |  |  |  | | 1 | 1 |  | 0 |  |  |  |  |  |  | | 1 | 1 | 0 |  |  |  |  |  |  |  | | 1 | 1 | 0 |  |  |  |  |  |  |  |  |  | | --- | | * Based on the results in the table, discuss with a classmate and record each relationship:   *A* and amplitude *B* and the frequency *B* and the period | | |