Cardioid Pattern Student Worksheet   *(Teacher Solutions)*

1) On screen 1.2, what was the equation? _____$r = 2 + 2\cos\theta$ _____

    a) What were the intercepts along the polar axis (x-axis)? _____4, 0_____

    b) What were the intercepts along the line $\theta = \dfrac{\pi}{2}$ (y-axis)? ____2, -2_____

    c) Did the graph go through the pole? _____yes_____

    d) Briefly describe the shape of the graph and its location with respect to the pole.
        Graph is heart shaped with the majority of the graph to the right of the pole.

2) On screen 1.3, what was the equation? _____$r = 4 + 4\cos\theta$ _____

    a) What were the intercepts along the polar axis (x-axis)? _____0, 8_____

    b) What were the intercepts along the line $\theta = \dfrac{\pi}{2}$ (y-axis)? _____4, -4_____

    c) Did the graph go through the pole? _____yes_____

    d) Briefly describe the shape of the graph and its location with respect to the pole.
        Graph is heart shaped with the majority of the graph to the right of the pole.

3) On screen 1.4, what was the equation? _____ $r = 2 - 2\cos\theta$ _____

    a) What were the intercepts along the polar axis (x-axis)? _____-4, 0_____

    b) What were the intercepts along the line $\theta = \dfrac{\pi}{2}$ (y-axis)? _____2, -2_____

    c) Did the graph go through the pole? _____yes_____

    d) Briefly describe the shape of the graph and its location with respect to the pole.
        Graph is heart shaped with the majority of the graph to the left of the pole.

4) On screen 1.5, what was the equation? _____ $r = 3 - 3\cos\theta$ _____

    a) What were the intercepts along the polar axis (x-axis)? _____-6, 0_____

    b) What were the intercepts along the line $\theta = \dfrac{\pi}{2}$ (y-axis)? _____-3, 3_____

    c) Did the graph go through the pole? _____

    d) Briefly describe the shape of the graph and its location with respect to the pole.
        Graph is heart shaped with the majority of the graph to the left of the pole.

5) What can you conclude from these graphs concerning a basic graph of $r = a + a\cos\theta$ and
$r = a - a\cos\theta$? *The y-intercepts (line $\theta = \dfrac{\pi}{2}$) will be at $\pm a$ and the polar axis intercepts will
be at 2a and 0 with the majority of the graph to the right of the pole for the graph of
$r = a + a\cos\theta$. The y-intercepts (line $\theta = \dfrac{\pi}{2}$) will be at $\pm a$ and the polar axis intercepts will
be at -2a and 0 with the majority of the graph being to the left of the pole for $r = a - a\cos\theta$.*

6) On screen 1.7, what was the equation? _____ $r = 2 + 2\sin\theta$ _____

    a) What were the intercepts along the polar axis (x-axis)? _____-2, 2_____

    b) What were the intercepts along the line $\theta = \dfrac{\pi}{2}$ (y-axis)? _____0, 4_____

    c) Did the graph go through the pole? _____yes_____

    d) Briefly describe the shape of the graph and its location with respect to the pole.
        Graph is heart shaped with the majority of the graph is above the pole.

7) On screen 1.8, what was the equation? _____ $r = 4 + 4\sin\theta$ _____

    a) What were the intercepts along the polar axis (x-axis)? _____-4, 4_____

    b) What were the intercepts along the line $\theta = \dfrac{\pi}{2}$ (y-axis)? _____0, 8_____

    c) Did the graph go through the pole? _____yes_____

    d) Briefly describe the shape of the graph and its location with respect to the pole.
        Graph is heart shaped with the majority of the graph is above the pole.

8) On screen 1.9, what was the equation? _____ $r = 2 - 2\sin\theta$ _____

    a) What were the intercepts along the polar axis (x-axis)? _____-2, 2_____

    b) What were the intercepts along the line $\theta = \dfrac{\pi}{2}$ (y-axis)? _____0, 4_____

    c) Did the graph go through the pole? _____yes_____

    d) Briefly describe the shape of the graph and its location with respect to the pole.
        Graph is heart shaped with the majority of the graph is below the pole.

9) On screen 1.10, what was the equation? _____ $r = 3 - 3\sin\theta$ _____

    a) What were the intercepts along the polar axis (x-axis)? _____-3, 3_____

    b) What were the intercepts along the line $\theta = \dfrac{\pi}{2}$ (y-axis)? _____0, 6_____

    c) Did the graph go through the pole? _____yes_____

    d) Briefly describe the shape of the graph and its location with respect to the pole.
        Graph is heart shaped with the majority of the graph is below the pole.

10) What can you conclude from these graphs concerning a basic graph of $r = a + a\sin\theta$ and
$r = a - a\sin\theta$? *The y-intercepts (line $\theta = \dfrac{\pi}{2}$) will be at 2a and 0 and the polar axis intercepts*
will be at ± a with the majority of the graph above the pole for the graph of $r = a + a\cos\theta$.
The y-intercepts (line $\theta = \dfrac{\pi}{2}$) will be at -2a and 0 and the polar axis intercepts will be at ± a
with the majority of the graph being below the pole for $r = a - a\sin\theta$.