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| **Topic 3.14 Polar Function Graphs** | **Rose Curves** |
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| **Practice Problem 1**graphThe figure shows the graph of a polar function$r=f\left(θ\right),$ for $0 \leq θ \leq π.$ Which of the following could be an expression for $f\left(θ\right)?$ |
| A. $f\left(θ\right)=4sin\left(3ϑ\right)$ |
| B. $f\left(θ\right)=4sin\left(6ϑ\right)$ |
| C. $f\left(θ\right)=4cos\left(3ϑ\right)$ |
| D. $f\left(θ\right)=4cos\left(6ϑ\right)$ |

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| **Practice Problem 2**graphA portion of the graph of the polar function $r=f\left(θ\right),$ where $f\left(θ\right)=4sin\left(2θ\right),$ is shown in the polar coordinate system for $a \leq θ \leq b.$ If $0 \leq a<b \leq 2π,$ which of the following could be the values of $a$ and $b?$ |
| A. $a=\frac{π}{2}$ and $b=π$ |
| B. $a=\frac{π}{4}$ and $b=\frac{3π}{4}$ |
| C. $a=\frac{π}{2}$ and $b=\frac{3π}{2}$ |
| D. $a=π$ and $b=\frac{3π}{2}$ |

**Solutions:**

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| **Practice Problem 1 Solution:**1. $f\left(θ\right)=4sin\left(3ϑ\right)$

 This is the graph of a polar rose in the form of $f\left(θ\right)=asin\left(nϑ\right)$. The length from the pole to the tip of a petal is 4 units so $a=4.$ There are an odd number of petals so $n$ represents the number of petals and $n=3$. |
| **Practice Problem 2 Solution:**D. $a=π$ and $b=\frac{3π}{2}$

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| The graph of the sinusoidal function $f\left(θx\right)=4sin\left(2x\right)$ shown to the right is positive on the interval $\left[π, \frac{3π}{2}\right]$. On the interval $\left[π, \frac{3π}{2}\right]$ the polar rose has values of $r$ which are positive so the points of the polar rose would be graphed in quadrant 3. | graph |

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| This is the graph corresponding to choice A.  | This is the graph corresponding to choice B.  | This is the graph corresponding to choice C.  |
| graph | graph | graph |

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