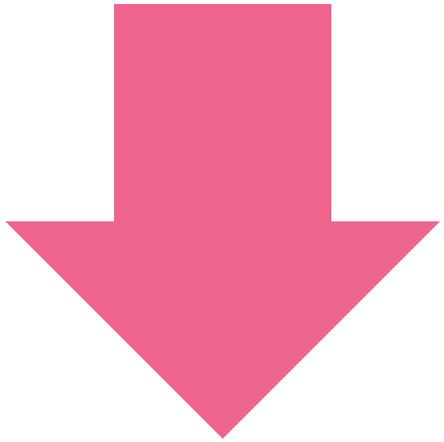
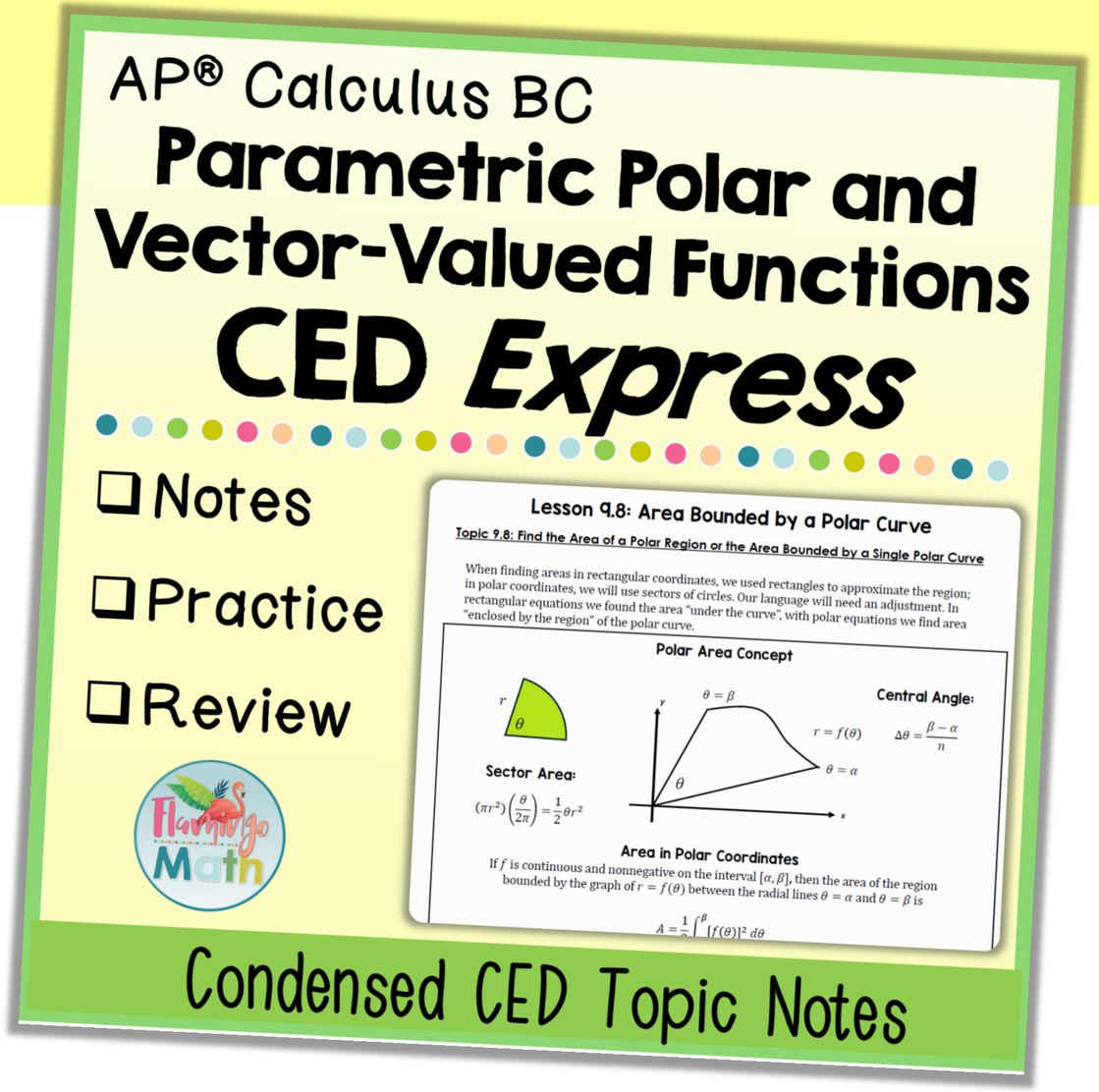
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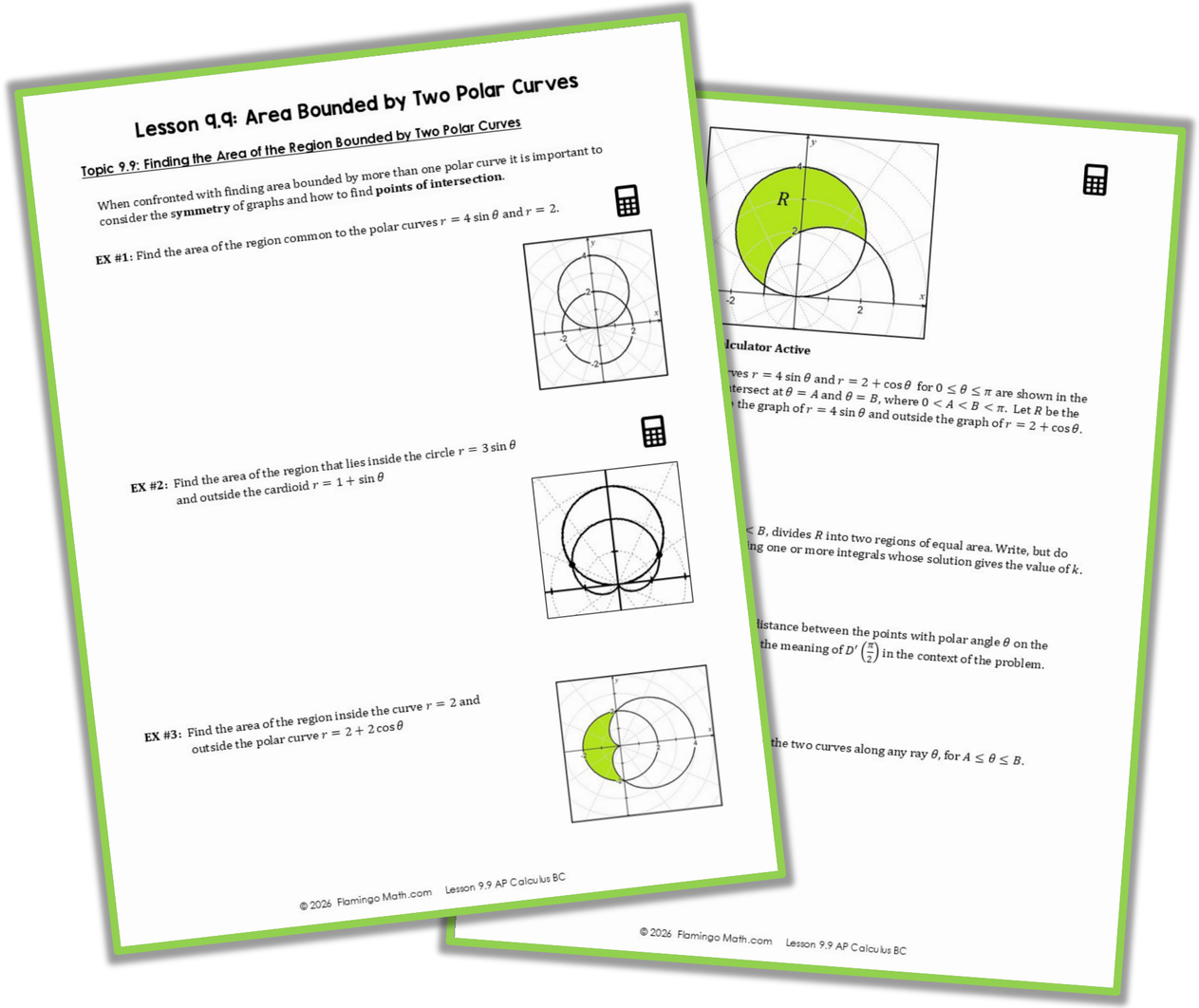
All new condensed notes and practice sets, plus unit reviews to save you time

Take a look inside!





WHAT IS INCLUDED?



Lesson 9.9: Area Bounded by Two Polar Curves

Topic 9.9: Finding the Area of the Region Bounded by Two Polar Curves

When confronted with finding area bounded by more than one polar curve it is important to consider the **symmetry** of graphs and how to find **points of intersection**.

EX #1: Find the area of the region common to the polar curves $r = 4\sin\theta$ and $r = 2$.

EX #2: Find the area of the region that lies inside the circle $r = 3\sin\theta$ and outside the cardioid $r = 1 + \sin\theta$

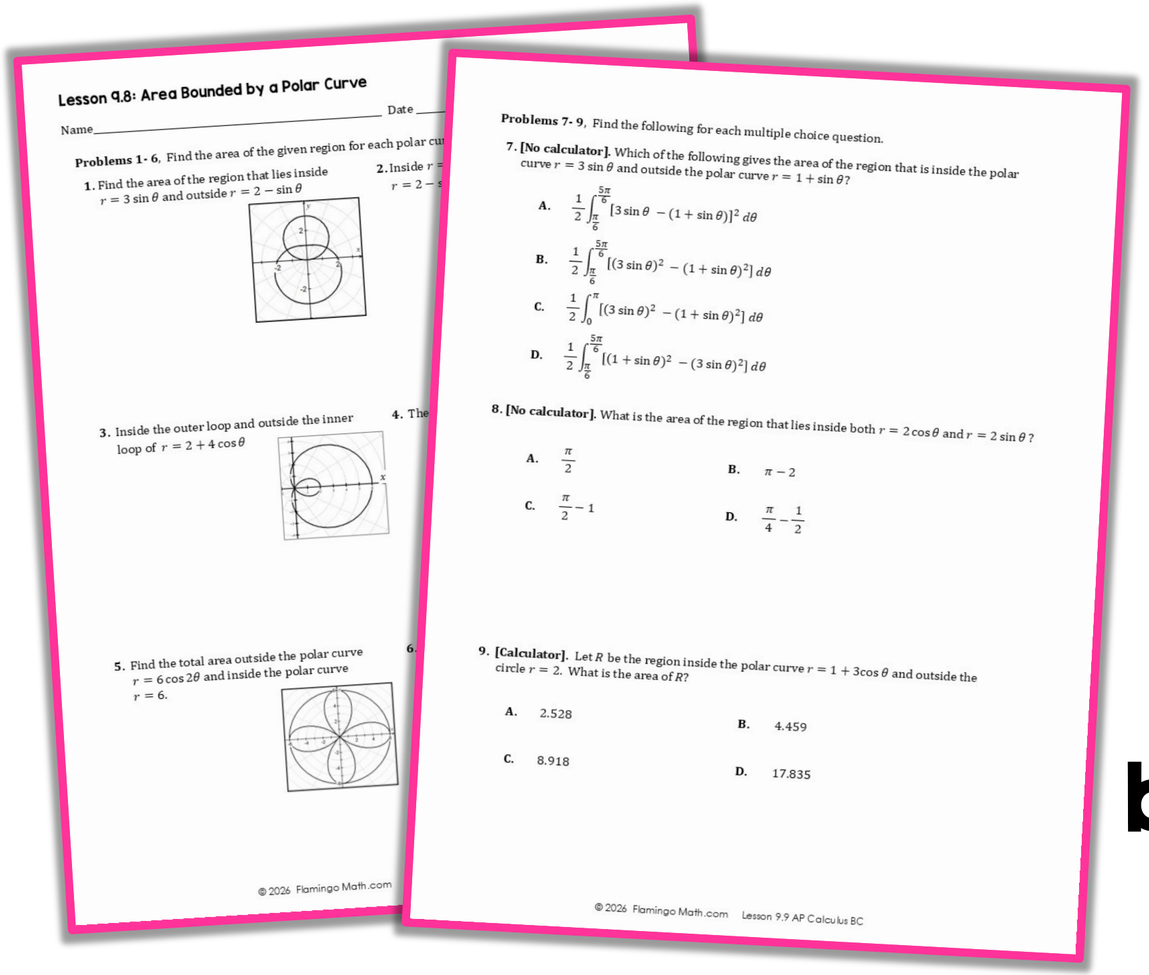
EX #3: Find the area of the region inside the curve $r = 2$ and outside the polar curve $r = 2 + 2\cos\theta$

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- Condensed Student Notes
- Practice sets
- Unit Reviews
- Solution sets
- Scope and Sequence
- Pacing Guide/Calendar

Condensed lessons and practice sets designed for 50-minute class sessions and aligned to CED course standards is here.



Lesson 9.8: Area Bounded by a Polar Curve

Name _____ Date _____

Problems 1- 6. Find the area of the given region for each polar cu

1. Find the area of the region that lies inside $r = 3\sin\theta$ and outside $r = 2 - \sin\theta$

2. Inside $r =$ $r = 2 -$

3. Inside the outer loop and outside the inner loop of $r = 2 + 4\cos\theta$

4. The

5. Find the total area outside the polar curve $r = 6\cos 2\theta$ and inside the polar curve $r = 6$.

6.

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Problems 7- 9, Find the following for each multiple choice question.

7. [No calculator]. Which of the following gives the area of the region that is inside the polar curve $r = 3\sin\theta$ and outside the polar curve $r = 1 + \sin\theta$?

A. $\frac{1}{2}\int_{\frac{\pi}{6}}^{\frac{5\pi}{6}} [3\sin\theta - (1+\sin\theta)]^2\, d\theta$

B. $\frac{1}{2}\int_{\frac{\pi}{6}}^{\frac{5\pi}{6}} [(3\sin\theta)^2 - (1+\sin\theta)^2]\, d\theta$

C. $\frac{1}{2}\int_{0}^{\pi} [(3\sin\theta)^2 - (1+\sin\theta)^2]\, d\theta$

D. $\frac{1}{2}\int_{\frac{\pi}{6}}^{\frac{5\pi}{6}} [(1+\sin\theta)^2 - (3\sin\theta)^2]\, d\theta$

8. [No calculator]. What is the area of the region that lies inside both $r = 2\cos\theta$ and $r = 2\sin\theta$?

A. $\frac{\pi}{2}$ **B.** $\pi - 2$

C. $\frac{\pi}{2} - 1$ **D.** $\frac{\pi}{4} - \frac{1}{2}$

9. [Calculator]. Let R be the region inside the polar curve $r = 1 + 3\cos\theta$ and outside the circle $r = 2$. What is the area of R?

A. 2.528 **B.** 4.459

C. 8.918 **D.** 17.835

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- Where do you find extra time to write AP-Style notes and practice sets?
- Is your class instruction aligned to the CED learning objectives and topics?
- You need resources that will challenge your students to the AP® rigor for success.

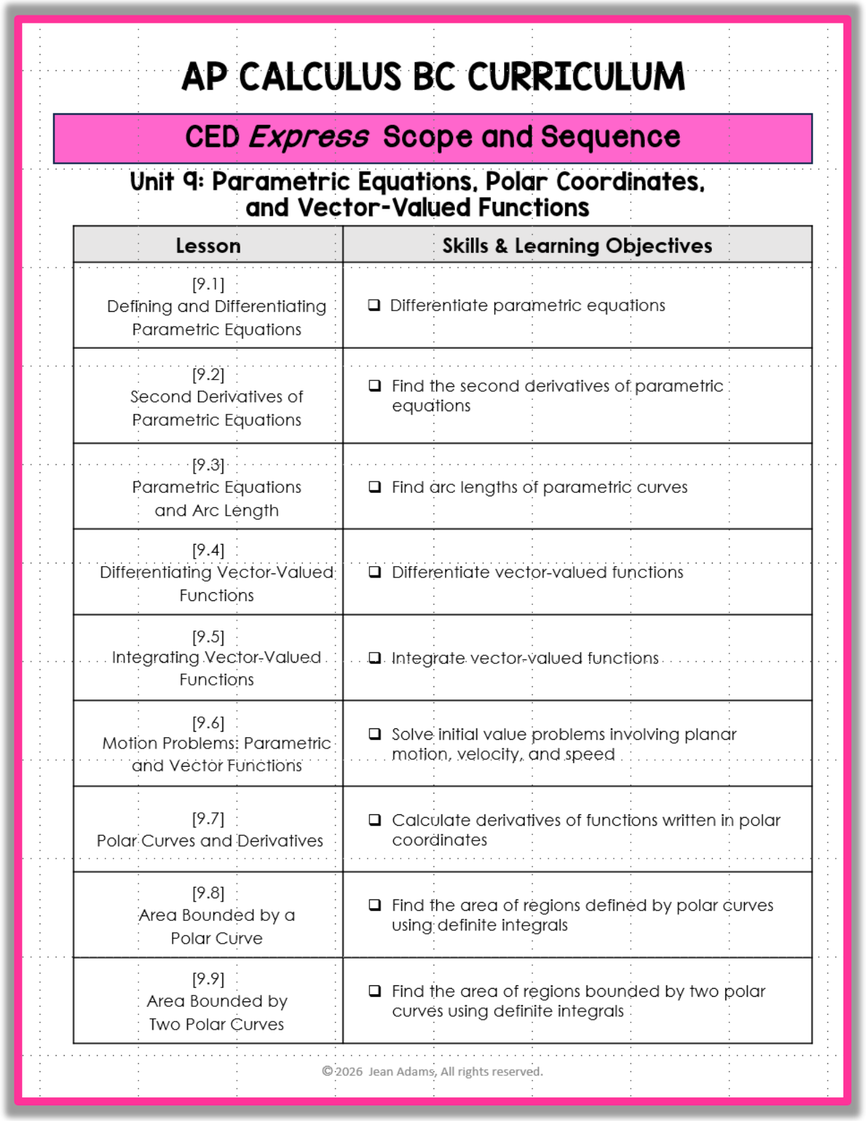
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AP CALCULUS BC CURRICULUM

CED *Express* Scope and Sequence

Unit 9: Parametric Equations, Polar Coordinates, and Vector-Valued Functions

Lesson	Skills & Learning Objectives
[9.1] Defining and Differentiating Parametric Equations	❑ Differentiate parametric equations
[9.2] Second Derivatives of Parametric Equations	❑ Find the second derivatives of parametric equations
[9.3] Parametric Equations and Arc Length	❑ Find arc lengths of parametric curves
[9.4] Differentiating Vector-Valued Functions	❑ Differentiate vector-valued functions
[9.5] Integrating Vector-Valued Functions	❑ Integrate vector-valued functions
[9.6] Motion Problems: Parametric and Vector Functions	❑ Solve initial value problems involving planar motion, velocity, and speed
[9.7] Polar Curves and Derivatives	❑ Calculate derivatives of functions written in polar coordinates
[9.8] Area Bounded by a Polar Curve	❑ Find the area of regions defined by polar curves using definite integrals
[9.9] Area Bounded by Two Polar Curves	❑ Find the area of regions bounded by two polar curves using definite integrals

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> “Excellent resource to prepare for the AP calc test. Just finished an AP workshop and am really impressed how aligned this bundle is for getting the Calculus taught. Thank you for all the hard work put into it. It’s a fabulous resource. *Linda A.*”

