

1.(1 pt) Find the area of the region inside: $r = 8 \sin \theta$ but outside: $r = 4$

2.(1 pt) Find the area of the region bounded by the given curve: $r = 7e^\theta$ on the interval $\frac{6}{7}\pi \leq \theta \leq 2\pi$.

3.(1 pt) Find the exact length of the polar curve described by:
 $r = 5e^{-\theta}$
 on the interval $\frac{9}{2}\pi \leq \theta \leq 7\pi$.

4.(1 pt) Find the area of the region bounded by: $r = 10 - 2 \sin \theta$

5.(1 pt) A curve with polar equation

$$r = \frac{17}{4 \sin \theta + 9 \cos \theta}$$
 represents a line. This line has a Cartesian equation of the form $y = mx + b$, where m and b are constants. Give the formula for y in terms of x . For example, if the line had equation $y = 2x + 3$ then the answer would be $2 * x + 3$.

6.(1 pt) Match each polar equation below to the best description. Possible answers are C,E,F,H,L,P,and S.
 DESCRIPTIONS
 C. Circle, E. Ellipse, F. Figure eight, H. Hyperbola, L. Line, P. Parabola, S. Spiral
 POLAR EQUATIONS

- 1. $r = \frac{1}{2+11 \cos \theta}$
- 2. $r = \frac{1}{2 \sin \theta + 11 \cos \theta}$
- 3. $r = 2 \sin \theta + 11 \cos \theta$
- 4. $r = \frac{1}{11+2 \cos \theta}$
- 5. $r = \frac{1}{2+2 \cos \theta}$

7.(1 pt) Match each polar equation below to the best description. Each answer should be C,E,F,H,L,O,P,R,S,T,or W.
 DESCRIPTIONS
 C. Cardioid, E. Ellipse, F. Figure eight, H. Hyperbola, L. Line, O. Oval, P. Parabola, R. Rose with four petals, S. Spiral, T. Three-petaled rose, W. A pair of wings
 POLAR EQUATIONS

- 1. $r^2 = 12 \sin \theta$
- 2. $r = 3 - 3 \sin \theta$
- 3. $r^2 = \csc 2\theta$
- 4. $1 = \tan \theta$
- 5. $r = \sin 3\theta$

8.(1 pt) A circle C has center at the origin and radius 6. Another circle K has a diameter with one end at the origin and the other end at the point (0, 19). The circles C and K intersect in two points. Let P be the point of intersection of C and K which lies in the first quadrant. Let (r, θ) be the polar coordinates of P, chosen so that r is positive and $0 \leq \theta \leq 2$. Find r and θ .

$r =$ _____
 $\theta =$ _____

9.(1 pt) Find the area of the region bounded by: $r = 6 - 3 \sin \theta$

10.(1 pt) Find the exact length of the polar curve described by:

$r = 7e^{0.6\theta}$
 on the interval $0 \leq \theta \leq \frac{1}{4}$.

11.(1 pt) Find the area enclosed by the polar curve
 $r = 9e^{0.3\theta}$
 on the interval $0 \leq \theta \leq \frac{1}{8}$.
 and the straight line segment between its ends.

12.(1 pt) Find the area of the region inside $r = 10 \sin \theta$ but outside $r = 3$.

13.(1 pt) Find the length of the entire perimeter of the region inside $r = 19 \sin \theta$ but outside $r = 1$.

14.(1 pt) Find the area enclosed by the closed curve obtained by joining the ends of the spiral
 $r = 3\theta, 0 \leq \theta \leq 3.9$
 by a straight line segment.

15.(1 pt) Find the area of the region bounded by: $r = 9 \cos 6\theta$

16.(1 pt) Find the area of the region bounded by: $r^2 = 50 \cos 2\theta$

17.(1 pt) Find the area inside the loop of the following limaçon: $r = 9 - 18 \sin \theta$

18.(1 pt)
 Find the arc length of the polar curve described by: $r = 5 + 5 \cos \theta$

19.(1 pt) Find the area of the region outside $r = 5 + 5 \sin \theta$, but inside $r = 15 \sin \theta$.