Practice Polar Test

Key

Version B

Name _____ Date _____ Period _____

Trig/Precalculus Chapter Test 6 (polar)

1. Another representation of the polar point (3, 60°) is:
   A) (3, −60°) B) (3, 240°) C) (−3, −60°)
   D) (−3, 120°) E) (3, −300°)

2. The polar point (−1, −2π/3) is equivalent to:
   A) (1, 120°) B) (1, −150°) C) (−1, 240°)
   D) (−1, 60°) E) (−1, 120°)

3. The rectangular point (−3, 1) is the polar point:
   A) (4, −18.4°) B) (3.16, −18.4°) C) (4, 161.6°)
   C) (3.16, 161.6°) E) none of these

4. Convert (8, 93π/6) to rectangular coordinates:
   A) (8, 0) B) (−8, 0) C) (0, 8) D) (0, −8) E) none

5. Convert $\left(-3\sqrt{2}, 3\sqrt{2}\right)$ to polar coordinates:
   A) (6, π/4) B) (−6, π/4) C) (6, 7π/4) D) (6, 3π/4) E) none

6. Which of the polar points is <u>not</u> equivalent to (−4, 5π/3)?
   A) (4, 2π/3) B) (4, −4π/3) C) (−4, 4π/3) D) (−4, −π/3) E) all are equivalent

7. (−5, −3) is equivalent to polar point:
   A) (5.83, 210.96°) B) (5.83, 149.04°) C) (8, 210.96°) D) (8, 30.96°) E) none

8. Convert $x - 2y = 3$ to an equivalent polar equation.
   A) $r = \frac{3}{\cos\theta - 2\sin\theta}$ B) $r = \frac{3}{\cos\theta - 3\sin\theta}$ C) $r = \frac{3}{\cos\theta + 2\sin\theta}$
   D) $r = \frac{3}{2(\cos\theta - \sin\theta)}$ E) $r = \frac{-3}{\cos\theta + 2\sin\theta}$

9. Convert to polar: $y = 1$
   A) $r = \sin\theta$ B) $r = \tan\theta$ C) $r = \csc\theta$ D) $r = \cos\theta$ E) $r = \sec\theta$

10. Convert the polar equation, $r = 6\sec\theta$, to rectangular:
    A) $x = -6$ B) $y = 6$ C) $y = -6$ D) $x = 6$ E) none

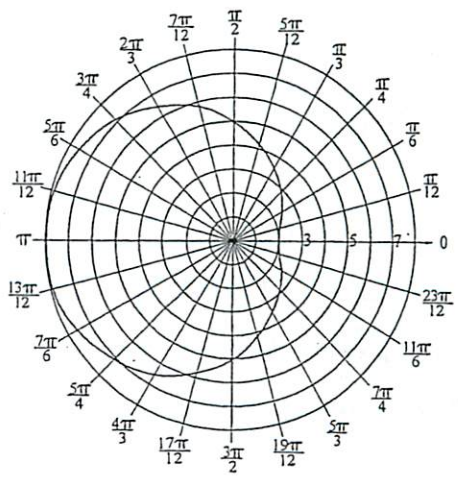
11. The graph of $r = 3 + 5\sin\theta$ is a:
    A) cardioid B) rose C) limaçon with an inner loop
    D) lemniscate E) limaçon without an inner loop

12. The graph of $r = 3\sin 3\theta$ is
    A) a 6-petal rose B) a 3-petal rose C) a limaçon
    D) a lemniscate E) a cardioid

13. The polar graph at the right is the graph of:
    A) $r = 6 - 2\sin\theta$ B) $r = 6 - 2\cos\theta$ C) $r = 3 - 5\cos\theta$
    D) $r = 5 + 3\cos\theta$ E) $r = 5 - 3\cos\theta$

Answers

	A	B	C	D	E
1	○	○	○	○	●
2	○	○	●	○	○
3	○	○	●	○	○
4	○	○	○	●	○
5	○	○	○	●	○
6	○	○	●	○	○
7	●	○	○	○	○
8	●	○	○	○	○
9	○	○	●	○	○
10	○	○	○	●	○
11	○	○	●	○	○
12	○	●	○	○	○
13	○	○	○	○	●

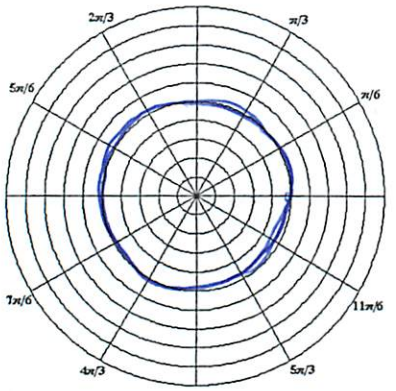


(b)

Graph each and provide important information. Draw dotted lines where r= 0.

14) r = 5

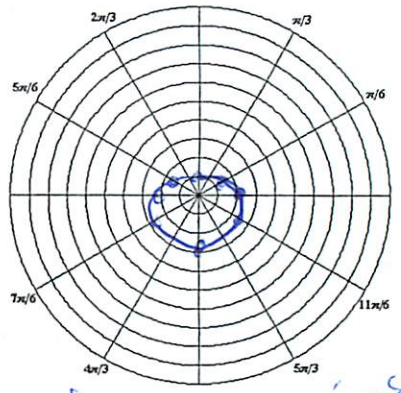
circle w/ radius of 5



15) r = 2 – sin θ

limacon, no loop

r	θ
2	0
1.5	$\frac{\pi}{6}$
1	$\frac{\pi}{2}$
3	$\frac{3\pi}{2}$
2.5	$\frac{11\pi}{6}$

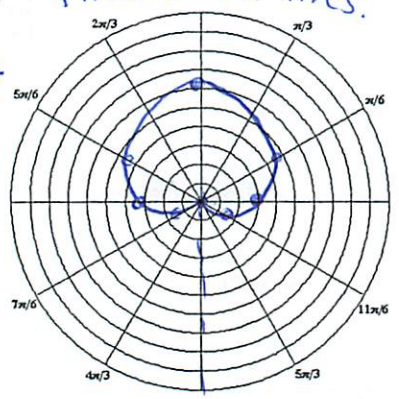


16) r =3 +3sinθ

Find extent lines.

r	θ
3	0
4.5	$\frac{\pi}{6}$
6	$\frac{\pi}{2}$
0	$\frac{3\pi}{2}$
1.5	$\frac{11\pi}{6}$

cardioid



Max at θ = $\frac{\pi}{2}$

Min at θ = $3\pi/2$

r = 0 at = $3\pi/2 + 2\pi K$

$-1 = \sin\theta$

17) r = 7sin3 θ

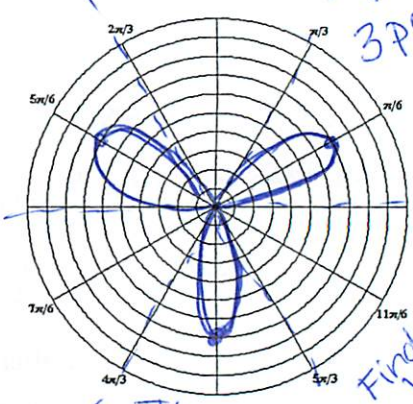
rose w/ 3 petals

$\frac{3\theta}{3} = \frac{\frac{3\pi}{2}}{3}$

$\theta = \frac{\pi}{2}$

$3\theta = 0 + \pi K$

$\theta = \frac{\pi}{3}K$



Find extent lines.

Max at θ = $\pi/6$

Min at θ = $\pi/2$

r = 0 at θ = $0 + \pi/3\, K$

Convert each to rectangular form.

18) r = 5 $\quad x^2+y^2=25$

19) r = 2cos θ $\quad x^2+y^2=2x$

20) r = 4csc θ $\quad y=4$

21) θ = 3π/8 $\quad y=\tan(3\pi/8)\,x$

Convert each to polar form.

22) y = x $\quad \theta=\pi/4$

23) y = 7 $\quad r = 7/\sin\theta$ or r = $7\csc\theta$

24) $x^2 + y^2 = 168$ $\quad r^2=168$, $r=\pm\sqrt{168}$, r = $\pm 2\sqrt{42}$ (4·42, 4·21·2)

25) $x^2 - y^2 = 5$ $\quad r^2\cos^2\theta - r^2\sin^2\theta = 5$, $r^2(\cos^2\theta-\sin^2\theta)=5$, $r^2 = 5/\cos 2\theta$

26) Change 3 – 3i to polar form. Leave in polar form. IV

$r=\sqrt{9+9}=\sqrt{18}=3\sqrt{2}$ $\quad \tan^{-1}(-3/3) = 7\pi/4$

26) $3\sqrt{2}\,\text{cis}\,7\pi/4$

IV

27) Multiply (8cisπ) and (4cis(π/3)).

27) $32\,\text{cis}\,4\pi/3$

Study powers and roots too!! Know DeMoivre's Theorem!!! Solve equations like $x^3=64$ & $x^4=64i$