Honors Pre-Calculus

Name See work on pg 2

Converting Polar Equations Warm-up

Convert each equation from rectangular to polar form.

1) $(x+1)^2 + y^2 = 1$

$r = -2\cos\theta$

2) $x^2 + (y+3)^2 = 9$

$r = -6\sin\theta$

3) $x^2 + (y+2)^2 = 4$

$r = -4\sin\theta$

Convert each equation from polar to rectangular form.

4) $r = 6\cos\theta$

$(x-3)^2 + y^2 = 9$

5) $r = 6\sin\theta$

$x^2 + (y-3)^2 = 9$

Convert each equation from rectangular to polar form.

6) $(x-1)^2 + (y+1)^2 = 2$

$r = 2\cos\theta - 2\sin\theta$

7) $(x+3)^2 + (y-1)^2 = 10$

$r = -6\cos\theta + 2\sin\theta$

Convert each equation from polar to rectangular form.

8) $r = -4\cos\theta - 2\sin\theta$

$(x+2)^2 + (y+1)^2 = 5$

9) $r = 2\cos\theta + 4\sin\theta$

$(x-1)^2 + (y-2)^2 = 5$

Honors Pre-Calculus

Name Key

Converting Polar Equations Warm-up

Convert each equation from rectangular to polar form.

1) $(x+1)^2+y^2=1$

$x^2+2x+1+y^2=1$

$r^2+2r\cos\theta=0$

Divide by r: $r^2=-2r\cos\theta \rightarrow \boxed{r=-2\cos\theta}$

2) $x^2+(y+3)^2=9$

$x^2+y^2+6y+9=9$

$r^2+6r\sin\theta=0$

$r^2=-6r\sin\theta$

$\boxed{r=-6\sin\theta}$

3) $x^2+(y+2)^2=4$

$x^2+y^2+4y+4=4$

$r^2+4r\sin\theta=0$

$r^2=-4r\sin\theta \rightarrow \boxed{r=-4\sin\theta}$

Convert each equation from polar to rectangular form.

4) $r=6\cos\theta$ multiply by r

$r^2=6r\cos\theta$

$x^2+y^2=6x$

$x^2-6x+\underline{9}+y^2=0+\underline{9}$

$\boxed{(x-3)^2+y^2=9}$

5) $r=6\sin\theta$ $r^2=6r\sin\theta$

$x^2+y^2=6y$

$x^2+y^2-6y+\underline{9}=0+\underline{9}$

$\boxed{x^2+(y-3)^2=9}$

Convert each equation from rectangular to polar form.

6) $(x-1)^2+(y+1)^2=2$

$x^2-2x+1+y^2+2y+1=2$

$x^2+y^2-2x+2y=0$

$\frac{r^2-2r\cos\theta-2r\sin\theta=0}{r}$

$r-2\cos\theta-2\sin\theta=0$

$\boxed{r=2\cos\theta+2\sin\theta}$

7) $(x+3)^2+(y-1)^2=10$

$x^2+6x+9+y^2-2y+1=10$

$x^2+y^2+6x-2y=0$

$r^2+6r\cos\theta-2r\sin\theta=0$

$r+6\cos\theta-2\sin\theta=0$

$\boxed{r=-6\cos\theta+2\sin\theta}$

Convert each equation from polar to rectangular form.

8) $r=-4\cos\theta-2\sin\theta$ multiply by r

$r^2=-4r\cos\theta-2r\sin\theta$

$x^2+y^2=-4x-2y$

$x^2+4x+\underline{4}+y^2+2y+\underline{1}=0+\underline{4}+\underline{1}$

$\boxed{(x+2)^2+(y+1)^2=5}$

9) $r=2\cos\theta+4\sin\theta$ $r^2=2r\cos\theta+4r\sin\theta$

$x^2+y^2=2x+4y$

$x^2-2x+\underline{1}+y^2-4y+\underline{4}=0+\underline{1}+\underline{4}$

$\boxed{(x-1)^2+(y-2)^2=5}$