

Convert each pair

3)  $(-2\sqrt{3}, \pi)$   
Polar/Rectangular Equations

Convert the rectangular equation into polar form.

1)  $x^2 + y^2 - 121 = 0$

$$r^2 = 121$$

$$r = 11$$

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Date \_\_\_\_\_ Period \_\_\_\_\_

~~2)  $x^2 + y^2 - 49 = 0$~~

$$r = 49$$

$$-r = 7$$

~~4)  $x^2 + y^2 - 28x + 22y = 0$~~

~~4)  $x^2 + y^2 - 22x + 30y = 0$~~

5)  $x^2 + y^2 - 22x + 10y = 0$

$$r^2 - 22r\cos\theta + 10r\sin\theta = 0$$

$$r = 22\cos\theta - 10\sin\theta$$

6)  $(x-3)^2 + (y-4)^2 = 25$

$$x^2 - 6x + 9 + y^2 - 8y + 16 = 25$$

$$r = 6\cos\theta + 8\sin\theta$$

7)  $(x+2)^2 + (y+6)^2 = 40$

$$x^2 + 4x + 4 + y^2 + 12y + 36 = 40$$

$$r = -4\cos\theta - 12\sin\theta$$

8)  $(x-11)^2 + (y-2)^2 = 125$

$$x^2 - 22x + 121 + y^2 - 4y + 4 = 125$$

$$r^2 - 22r\cos\theta - 4r\sin\theta = 0$$

$$r(r - 22\cos\theta - 4\sin\theta) = 0$$

$$r = 22\cos\theta + 4\sin\theta$$

9)  $x = 16$

$$r = 16 / \cos \theta$$

11)  $y = \frac{\sqrt{3}}{3}x$

$$\frac{y}{x} = \frac{\sqrt{3}}{3}$$

$$\tan \theta = \sqrt{3}/3$$

$$\theta = \pi/6$$

13)  $y = 0$

$$r \sin \theta = 0$$

$$r = 0$$

10)  $y = x$

$$\frac{y}{x} = 1$$

$$\tan \theta = 1$$

$$\theta = 45^\circ$$

12)  $4x + 5y = -40$

$$r(4 \cos \theta + 5 \sin \theta) = -40$$

$$r = \frac{-40}{4 \cos \theta + 5 \sin \theta}$$

14)  $y = 6x + 5$

~~$$r \cos \theta = 6r \sin \theta + 5$$~~

$$r \sin \theta = 6r \cos \theta + 5$$

$$r(\sin \theta - 6 \cos \theta) = 5$$

$$r = \frac{5}{\sin \theta - 6 \cos \theta}$$

Convert the polar equation into rectangular form.

15)  $\theta = \frac{5\pi}{6}$

$$\tan \theta = 5\pi/6$$

$$\frac{x}{y} = -\frac{\sqrt{3}}{3} \quad y = -\frac{\sqrt{3}}{3}x$$

17)  $r^2 = 4^2$

$$r^2 = 16$$

$$x^2 + y^2 = 16$$

16)  $\theta = -\frac{\pi}{6}$

$$\tan \theta = -\pi/6$$

$$\frac{x}{y} = -\frac{\sqrt{3}}{3} \quad y = -\frac{\sqrt{3}}{3}x$$

18)  $r^2 = 2$

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

20)  $r = -2 \sin \theta$

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

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

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

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

19)  $r = 4 \sin \theta$

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

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

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

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

(-3, 135°)  
where

$$\cos \theta = 3$$
$$x = 3$$

$$22) r = 8$$
$$r^2 = 64$$
$$x^2 + y^2 = 64$$

$$23) r = 5 \cos \theta - 8 \sin \theta$$

$$r^2 = 5r \cos \theta - 8r \sin \theta$$
$$r(r - 5 \cos \theta + 8 \sin \theta) = 0$$
$$r = 5 \cos \theta$$
$$x^2 + y^2 = 5x - 8y$$
$$x^2 - 5x + \frac{25}{4} + y^2 + 8y + \frac{16}{1} = 0 + \frac{25}{4} - \frac{16}{1}$$
$$(x - 5/2)^2 + (y + 4)^2 = 22.25$$

$$24) r = -8 \cos \theta + 10 \sin \theta$$

$$x^2 + y^2 = -8x + 10y$$
$$x^2 + 8x + \frac{16}{1} + y^2 - 10y + \frac{25}{1} = 0 + \frac{16}{1} - \frac{25}{1}$$
$$(x + 4)^2 + (y - 5)^2 = 41$$

$$25) r = -\frac{11}{\sin \theta}$$

$$y = -11$$

$$26) r = 4 \csc \theta$$

$$y = 4$$

$$27) r = 9 \sec \theta$$

$$r = \frac{9}{\cos \theta}$$
$$r \cos \theta = 9$$
$$x = 9$$

$$28) \theta = 315^\circ$$

$$\tan \theta = \frac{y}{x}$$
$$\tan 315 = \frac{y}{x}$$
$$-1 = \frac{y}{x}$$
$$y = -x$$