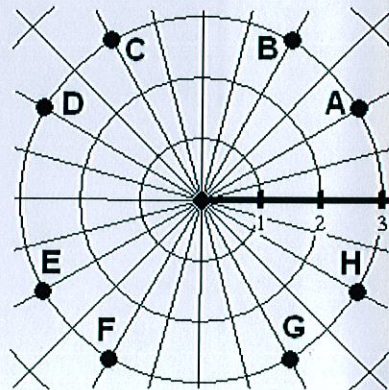


Fill in the blanks. All parts of this question refer to the graph on the right.

SCORE: ____ / 4 PTS

- [a] Point F ^① has polar co-ordinates $(-3, \frac{\pi}{3})$.
- [b] Point D ^① has polar co-ordinates $(3, -\frac{7\pi}{6})$.
- [c] Point G has polar co-ordinates $(3, \frac{5\pi}{3})$ ^①. (Your answer must be positive.)
- [d] Point A has polar co-ordinates $(-3, -\frac{5\pi}{6})$ ^①. (Your answer must be negative.)



Find the zeros of $r = 4 + 8\cos\theta$.

SCORE: ____ / 4 PTS

$$4 + 8\cos\theta = 0$$

$$\cos\theta = -\frac{1}{2} \quad \textcircled{1}$$

$$\theta = \frac{2\pi}{3}, \frac{4\pi}{3}$$

$$\textcircled{\frac{1}{2}}$$

$$\textcircled{\frac{1}{2}}$$

Convert the polar equation $r = \frac{6}{2-3\sin\theta}$ to rectangular form.

SCORE: ____ / 5 PTS

Simplify your answer so that there are no radicals, complex fractions, fractional exponents nor negative exponents.

$$\underline{2r - 3r\sin\theta = 6} \quad (1)$$

$$\underline{2r - 3y = 6} \quad (1)$$

$$2r = 3y + 6$$

$$2\sqrt{x^2 + y^2} = 3y + 6$$

$$\underline{4(x^2 + y^2) = (3y + 6)^2} \quad (2)$$

$$4x^2 + 4y^2 = 9y^2 + 36y + 36$$

$$\underline{4x^2 - 5y^2 - 36y - 36 = 0} \quad (1)$$

Fill in the blanks.

SCORE: ____ / 6 PTS

- [a] The point with rectangular co-ordinates $(-8, 8)$ has polar co-ordinates $(\underline{8\sqrt{2}}, \underline{\frac{3\pi}{4}})$.
(Both parts of your answer must be positive.)

②

$$\begin{aligned} r &= \sqrt{(-8)^2 + 8^2} = 8\sqrt{2} \\ \theta &= \tan^{-1} \frac{8}{-8} + \pi \quad (x < 0) \\ &= \tan^{-1} -1 + \pi \\ &= -\frac{\pi}{4} + \pi = \frac{3\pi}{4} \end{aligned}$$

- [b] The point with rectangular co-ordinates $(0, -7)$ has polar co-ordinates $(\underline{7}, \underline{\frac{3\pi}{2}})$.
(Both parts of your answer must be positive.)



②

- [c] The point with polar co-ordinates $(10, \frac{11\pi}{6})$ has rectangular co-ordinates $(\underline{5\sqrt{3}}, \underline{-5})$.
 $(10 \cos \frac{11\pi}{6}, 10 \sin \frac{11\pi}{6}) = (10 \cdot \frac{\sqrt{3}}{2}, 10 \cdot -\frac{1}{2})$

②

Convert the rectangular equation $xy = 12$ to polar form. Simplify your answer.

SCORE: ____ / 5 PTS

$$(r \cos \theta)(r \sin \theta) = 12 \quad (2)$$

$$r^2 = \frac{12}{\cos \theta \sin \theta} \quad (1\frac{1}{2})$$

$$r^2 = \frac{24}{2 \cos \theta \sin \theta}$$

$$r^2 = \frac{24}{\sin 2\theta}$$

$$r^2 = 24 \csc 2\theta \quad (1\frac{1}{2})$$

Test $r = 3 - 5\cos\theta$ for symmetry over $\theta = \frac{\pi}{2}$. State your final conclusion clearly.

SCORE: ____ / 6 PTS

$$(-r, -\theta): \underline{-r = 3 - 5\cos(-\theta)} \text{ (1)} \text{ (1/2)}$$

$$-r = 3 - 5\cos\theta$$

$$\underline{r = -3 + 5\cos\theta} \text{ (1)}$$

$$(r, \pi - \theta): \underline{r = 3 - 5\cos(\pi - \theta)} \text{ (1)} \text{ (1/2)}$$

$$r = 3 - 5[\cancel{\cos\pi}^{-1}\cos\theta + \cancel{\sin\pi}^0\sin\theta]$$

$$\underline{r = 3 + 5\cos\theta} \text{ (1)}$$

NO CONCLUSION. (1)

↑ WRONG TO SAY "NOT SYMMETRIC"