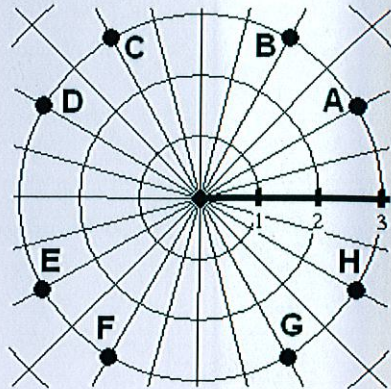


Fill in the blanks. All parts of this question refer to the graph on the right.

SCORE: ____ / 4 PTS

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



Find the zeros of $r = 5 + 10\cos\theta$.

SCORE: ____ / 4 PTS

$$5 + 10\cos\theta = 0$$

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

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

$(1\frac{1}{2}) \quad (1\frac{1}{2})$

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.

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

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

$$2r = 3y + 6$$

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

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

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

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

Fill in the blanks.

SCORE: ____ / 6 PTS

- [a] The point with rectangular co-ordinates $(0, -8)$ has polar co-ordinates $(\underline{8}, \underline{\frac{3\pi}{2}})$.
(Both parts of your answer must be positive.)



- [b] The point with rectangular co-ordinates $(-7, 7)$ has polar co-ordinates $(\underline{7\sqrt{2}}, \underline{\frac{3\pi}{4}})$.
(Both parts of your answer must be positive.)

$$r = \sqrt{(-7)^2 + 7^2} = 7\sqrt{2}$$

$$\theta = \tan^{-1} \frac{7}{-7} + \pi \quad (x < 0)$$

$$= \tan^{-1} -1 + \pi$$

$$= -\frac{\pi}{4} + \pi = \frac{3\pi}{4}$$

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

Convert the rectangular equation $xy = 8$ to polar form. Simplify your answer.

SCORE: ____ / 5 PTS

$$(r \cos \theta)(r \sin \theta) = 8 \quad (2)$$

$$r^2 = \frac{8}{\cos \theta \sin \theta} \quad (1\frac{1}{2})$$

$$r^2 = \frac{16}{2 \cos \theta \sin \theta}$$

$$r^2 = \frac{16}{\sin 2\theta}$$

$$r^2 = 16 \csc 2\theta \quad (1\frac{1}{2})$$

Test $r = 3 - 5 \sin \theta$ for symmetry over the polar axis. State your final conclusion clearly.

SCORE: ____ / 6 PTS

$$(r, -\theta): \underline{r = 3 - 5 \sin(-\theta)} \quad \textcircled{\frac{1}{2}}$$

$$\underline{r = 3 + 5 \sin \theta} \quad \textcircled{1}$$

$$(-r, \pi - \theta): \underline{-r = 3 - 5 \sin(\pi - \theta)} \quad \textcircled{\frac{1}{2}}$$

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

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

$$\underline{r = -3 + 5 \sin \theta} \quad \textcircled{1}$$

NO CONCLUSION $\textcircled{1}$

↑ WRONG TO SAY "NOT SYMMETRIC"