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

SCORE: _____ / 4 PTS

$4 + 8\cos\theta = 0$

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

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

(1 1/2) (1 1/2)

Test $r = 3 - 5\cos\theta$ for symmetry over $\theta = \frac{\pi}{2}$. **State your final conclusion clearly.** **SCORE: ____ / 6 PTS**

$(-r, -\theta)$: $-r = 3 - 5\cos(-\theta)$ (1½)

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

$r = -3 + 5\cos\theta$ (1)

$(r, \pi - \theta)$: $r = 3 - 5\cos(\pi - \theta)$ (1½)

$r = 3 - 5[\cos\pi\cos\theta + \sin\pi\sin\theta]$ ($\cos\pi = -1$, $\sin\pi = 0$)

$r = 3 + 5\cos\theta$ (1)

NO CONCLUSION. (1)

↑ WRONG TO SAY "NOT SYMMETRIC"

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)

$r = \sqrt{(-8)^2 + 8^2} = 8\sqrt{2}$

$\theta = \tan^{-1}\frac{8}{-8} + \pi \quad (x<0)$

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

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

[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 $(\underline{5\sqrt{3}}, \underline{-5})$. (2)

$(10\cos\frac{11\pi}{6}, 10\sin\frac{7\pi}{6}) = (10\cdot\frac{\sqrt{3}}{2}, 10\cdot-\frac{1}{2})$

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

SCORE: _____ / 5 PTS

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

$2r - 3r\sin\theta = 6$ (1)

$2r - 3y = 6$ (1)

$2r = 3y + 6$

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

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

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

$4x^2 - 5y^2 - 36y - 36 = 0$ (1)

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

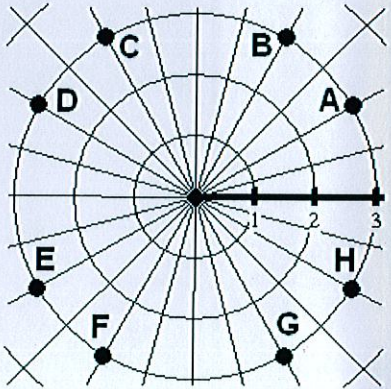
SCORE: _____ / 4 PTS

[a] Point ___F___ has polar co-ordinates $(-3, \frac{\pi}{3})$.

[b] Point ___D___ has polar co-ordinates $(3, -\frac{7\pi}{6})$.

[c] Point G has polar co-ordinates $(3, \underline{\frac{5\pi}{3}})$. (Your answer must be **positive**.)

[d] Point A has polar co-ordinates $(-3, \underline{-\frac{5\pi}{6}})$. (Your answer must be **negative**.)



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

SCORE: ____ / 5 PTS

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

$r^2 = \dfrac{12}{\cos\theta \sin\theta}$ (1½)

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

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

$r^2 = 24\csc 2\theta$ (1½)