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

SCORE: _____ / 4 PTS

$5 + 10\cos\theta = 0$

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

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

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

Test $r = 3 - 5\sin\theta$ for symmetry over the polar axis. **State your final conclusion clearly.** **SCORE: ____ / 6 PTS**

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

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

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

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

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

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

NO CONCLUSION (1)

↳ WRONG TO SAY "NOT SYMMETRIC"

Fill in the blanks.

SCORE: ____ / 6 PTS

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

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

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

$\theta = \tan^{-1}\frac{7}{-7} + \pi$ (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 (3 , $-3\sqrt{3}$). (2)

$(6\cos\frac{5\pi}{3}, 6\sin\frac{5\pi}{3}) = (6\cdot\frac{1}{2}, 6\cdot\frac{-\sqrt{3}}{2})$

Convert the 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)

$2r = 3y + 6$

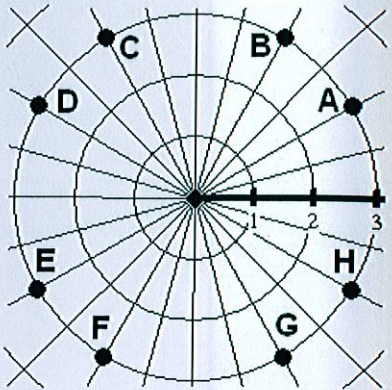
$2\sqrt{x^2+y^2} = 3y + 6$

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

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

SCORE: ____ / 5 PTS

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

$r^2 = \dfrac{8}{\cos\theta\sin\theta}$ (1½)

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

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

$r^2 = 16\csc 2\theta$ (1½)