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* 25, 35-41 odd, 47, 49

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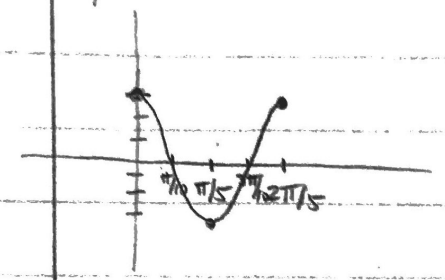
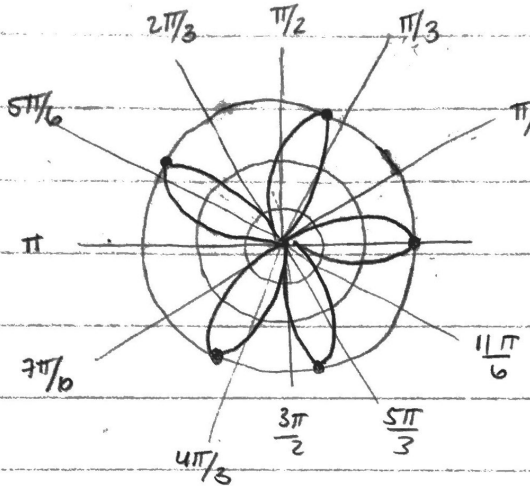
25. a) $r = 3\cos 5\theta \quad 0 \le \theta \le \pi$

$y = 3\cos 5x$

$\max |r| = 3$ when $\theta = 0, \frac{\pi}{5}, \frac{2\pi}{5}, \frac{3\pi}{5}, \frac{4\pi}{5}, \pi$

$r = 0$ when $\theta = \pi/10, 3\pi/10, \pi/2, 7\pi/10, 9\pi/10$



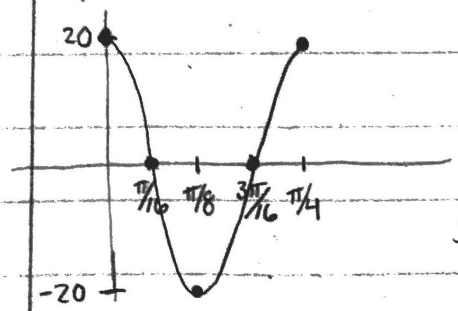


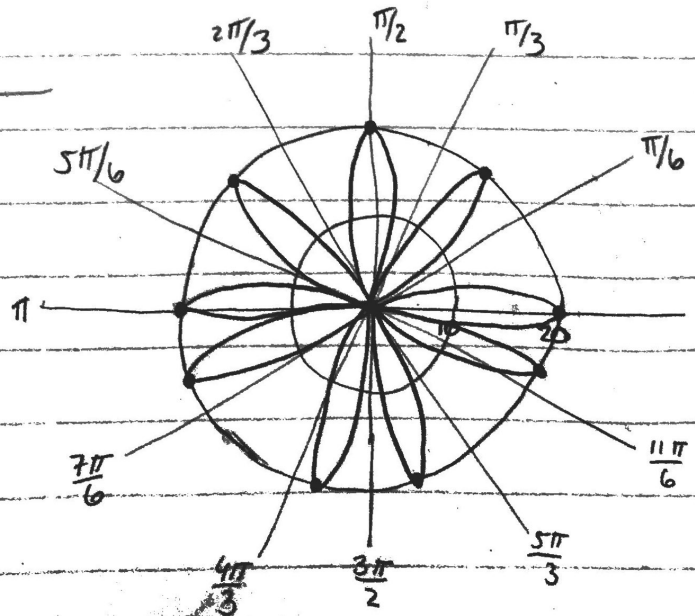
b) $r = 20\cos 8\theta \quad 0 \le \theta \le \pi$

$y = 20\cos 8x$

$\max |r| = 20$ when $\theta = 0, \frac{\pi}{8}, \frac{\pi}{4}, \frac{3\pi}{8}, \frac{\pi}{2}, \frac{5\pi}{8}, \frac{3\pi}{4}, \frac{7\pi}{8}, \pi$

$r = 0$ when $\theta = \frac{\pi}{16}, \frac{3\pi}{16}, \frac{5\pi}{16}, \frac{7\pi}{16}, \frac{9\pi}{16}, \frac{11\pi}{16}, \frac{13\pi}{16}, \frac{15\pi}{16}$





35. $r = 3\sin\theta$

37. rose (8 petals) $\rightarrow r = a\cos n\theta$

$2n = 8$

$n = 4$ $\qquad r = 3\cos 4\theta$

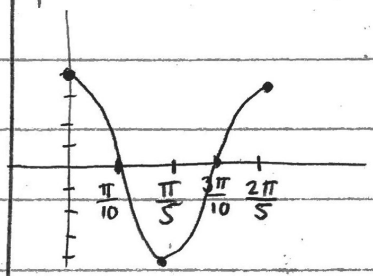
39. $r = -2\cos\theta$

41. $n = 5$, $r = 4$

a) $r = 4\cos 5\theta$, $r = 4\sin 5\theta$

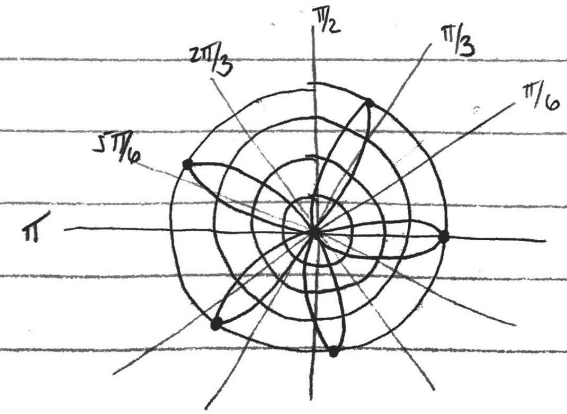
b) $r = 4\cos 5\theta$

$y = 4\cos 5x$



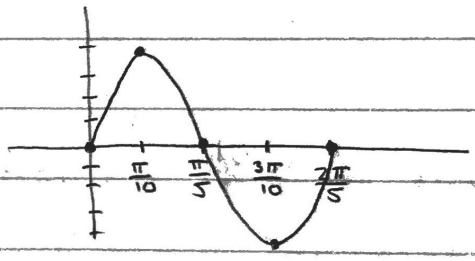
$\max |r| = 4$ @ $\theta = 0, \frac{\pi}{5}, \frac{2\pi}{5}, \frac{3\pi}{5}, \frac{4\pi}{5}, \pi$

$r = 0$ @ $\theta = \frac{\pi}{10}, \frac{3\pi}{10}, \frac{\pi}{2}, \frac{7\pi}{10}, \frac{9\pi}{10}$



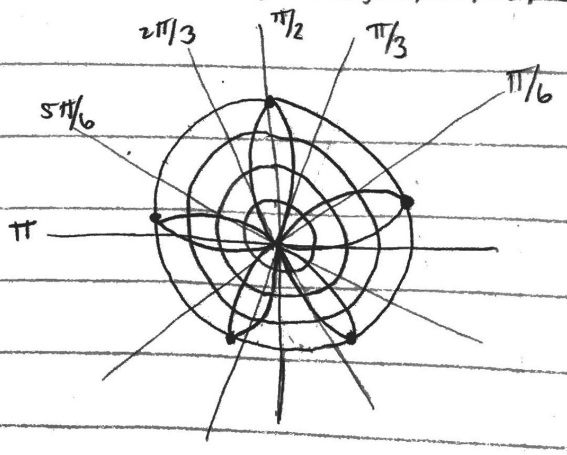
$r = 4\sin 5\theta$

$y = 4\sin 5x$



$\max |r| = 4$ @ $\theta = \frac{\pi}{10}, \frac{3\pi}{10}, \frac{\pi}{2}, \frac{7\pi}{10}, \frac{9\pi}{10}$

$r = 0$ @ $\theta = 0, \frac{\pi}{5}, \frac{2\pi}{5}, \frac{3\pi}{5}, \frac{4\pi}{5}, \pi$



47. a) $n=5$, $r=2$ $r=2\sin 5\theta$

b) $2n=4$, $r=7$ $r=7\sin 2\theta$

$n=2$

c) $2n=8$, $r=6$ $r=6\sin 4\theta$

$n=4$

49. limaçon → looks like ◯ ($r=a+b\cos\theta$) rotated 90° → $r=a+b\sin\theta$

$2a=4$ $a=b=2$

$r=2+2\sin\theta$