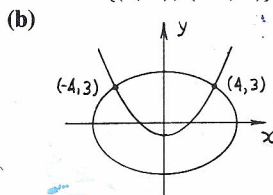
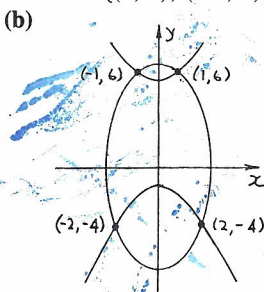


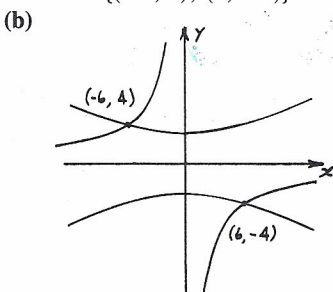
15. (a) $5x^2 + 9y^2 = 161$
 $x^2 - 4y = 4$
 $9y^2 + 20y = 141$
 $(y - 3)(9y + 47) = 0$
 $y = -3, -47/9$
 $x = \pm 4$, no real number
 $S = \{(4, 3), (-4, 3)\}$



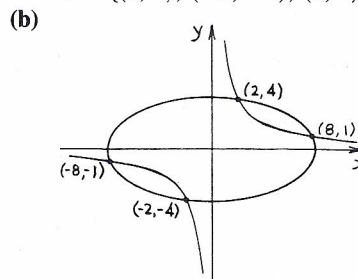
16. (a) $20x^2 - 3y^2 + 12y = -16$
 $20x^2 + 3y^2 = 128$
 $6y^2 - 12y = 144$
 $y^2 - 2y - 24 = 0$
 $y = 6, -4$
 $x = \pm 1, \pm 2$
 $S = \{(1, 6), (-1, 6), (2, -4), (-2, -4)\}$



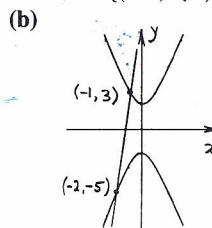
17. (a) $x^2 - 5y^2 = -44$
 $xy = -24 \Rightarrow x = -24/y$
 $576/y^2 - 5y^2 = -44$
 $5y^4 - 44y^2 - 576 = 0$
 $(y^2 - 16)(5y^2 + 36) = 0$
 $y = 4, -4$, no real number
 $x = -6, 6$
 $S = \{(-6, 4), (6, -4)\}$



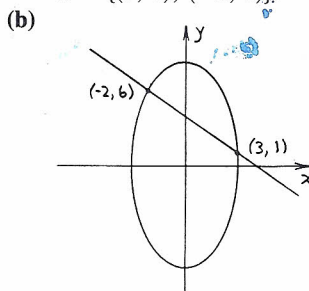
18. (a) $x^2 + 4y^2 = 68$
 $xy = 8 \Rightarrow x = 8/y$
 $64/y^2 + 4y^2 = 68$
 $4y^4 - 68y^2 + 64 = 0$
 $4(y^2 - 16)(y^2 - 1) = 0$
 $y = 4, -4, 1, -1$
 $x = 2, -2, 8, -8$
 $S = \{(2, 4), (-2, -4), (8, 1), (-8, -1)\}$



19. (a) $16x^2 - 3y^2 = -11$
 $8x - y = -11 \Rightarrow y = 8x + 11$
 $-176x^2 - 528x - 352 = 0$
 $x^2 + 3x + 2 = 0$
 $x = -1, -2$
 $y = 3, -5$
 $S = \{(-1, 3), (-2, -5)\}$



20. (a) $7x^2 + y^2 = 64$
 $x + y = 4 \Rightarrow y = 4 - x$
 $7x^2 + 16 - 8x + x^2 = 64$
 $x^2 - x - 6 = 0$
 $x = 3, -2$
 $y = 1, 6$
 $S = \{(3, 1), (-2, 6)\}$



21. (a) $x^2 + 2y^2 = 33$
 $3x + 2y = -11 \Rightarrow x = \frac{1}{3}(-2y - 11)$
 $\frac{1}{9}(4y^2 + 44y + 121) + 2y^2 = 33$
 $y^2 + 2y - 8 = 0$
 $y = 2, -4$
 $x = -5, -1$
 $S = \{(-5, 2), (-1, -4)\}$