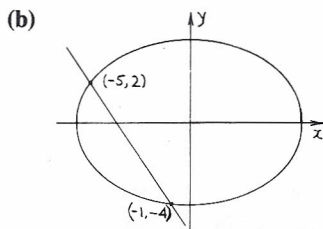
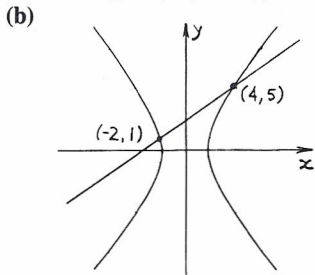


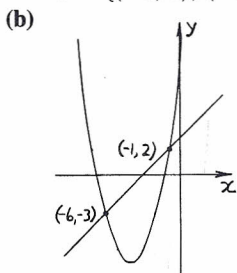
### Exercise 12-4



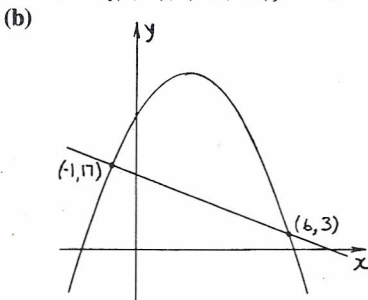
22. (a)  $2x^2 - y^2 = 7$   
 $2x - 3y = -7 \Rightarrow y = \frac{1}{3}(2x + 7)$   
 $2x^2 - \frac{1}{9}(4x^2 + 28x + 49) = 7$   
 $x^2 - 2x - 8 = 0$   
 $x = 4, -2$   
 $y = 5, 1$   
 $S = \{(4, 5), (-2, 1)\}$



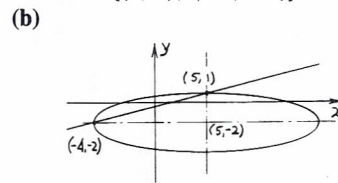
23. (a)  $y = x^2 + 8x + 9$   
 $x - y = -3 \Rightarrow y = x + 3$   
 $x + 3 = x^2 + 8x + 9$   
 $x^2 + 7x + 6 = 0$   
 $x = -1, -6$   
 $y = 2, -3$   
 $S = \{(-1, 2), (-6, -3)\}$



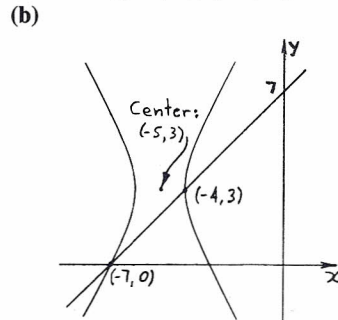
24. (a)  $y = -2x^2 + 8x + 27$   
 $2x + y = 15 \Rightarrow y = 15 - 2x$   
 $15 - 2x = -2x^2 + 8x + 27$   
 $x^2 - 5x - 6 = 0$   
 $x = 6, -1$   
 $y = 3, 17$   
 $S = \{(6, 3), (-1, 17)\}$



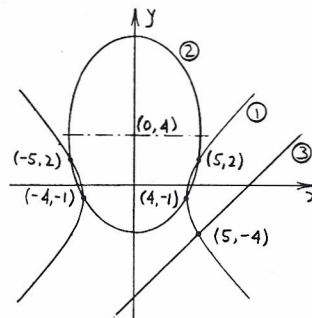
25. (a)  $x^2 + 9y^2 - 10x + 36y = 20$   
 $x - 3y = 2 \Rightarrow x = 3y + 2$   
 $(3y + 2)^2 + 9y^2 - 10(3y + 2) + 36y = 20$   
 $18y^2 + 18y - 36 = 0$   
 $18(y - 1)(y + 2) = 0$   
 $y = 1, -2$   
 $x = 5, -4$   
 $S = \{(5, 1), (-4, -2)\}$



26. (a)  $3x^2 - y^2 + 30x + 6y = -63$   
 $x - y = -7 \Rightarrow y = x + 7$   
 $3x^2 - (x + 7)^2 + 30x + 6(x + 7) = -63$   
 $2x^2 + 22x + 56 = 0$   
 $2(x + 4)(x + 7) = 0$   
 $x = -4, -7$   
 $y = 3, 0$   
 $S = \{(-4, 3), (-7, 0)\}$



27. (a)  $S = \{(5, 2), (-5, 2), (4, -1), (-4, -1)\}$   
 (b)  $S = \{(5, -4)\}$   
 (c)  $S = \emptyset$   
 (d)  $S = \emptyset$



28. (a)  $S = \{(1, 6), (-1, 6), (2, 2), (-2, 2)\}$   
 (b)  $S = \{(2, 2), (8, 18)\}$   
 (c)  $S = \{(2, 2), (-1, -6)\}$