

HONORS PRE-CALCULUS

Problem Set 10.4: # 41-45, 49-53 odd

(41)  $-x^2 + y^2 + 4x - 6y + 4 = 0$        $y = 4$        $x^2 + 4^2 - 4x - 6(4) + 12 = 0$   
 $x^2 + y^2 - 4x - 6y + 12 = 0$        $x^2 - 4x + 4 = 0$

$2y^2 - 12y + 16 = 0$

$(x-2)(x-2) = 0$

$2(y^2 - 6y + 8) = 0$

$x = 2$        $(2, 4)$

$2(y-4)(y-2) = 0$

$y = 2$        $x^2 + 2^2 - 4x - 6(2) + 12 = 0$

$y = 4$        $y = 2$

$x^2 - 4x + 4 = 0$        $(2, 2)$

$(x-2)(x-2) = 0$

$x = 2$

(43)  $-4x^2 - y^2 - 16x + 24y - 16 = 0$        $x = -8$        $4(-8)^2 + y^2 + 40(-8) - 24y + 208 = 0$   
 $4x^2 + y^2 + 40x - 24y + 208 = 0$        $256 + y^2 - 320 - 24y + 208 = 0$

$24x + 192 = 0$

$y^2 - 24y + 144 = 0$

$24x = -192$

$(y-12)(y-12) = 0$

$x = -8$

$y = 12$        $(-8, 12)$

(45)  $x^2 - y^2 - 12x + 16y - 64 = 0$        $x = 0$        $0^2 - y^2 - 12(0) + 16y - 64 = 0$   
 $x^2 + y^2 - 12x - 16y + 64 = 0$        $-y^2 + 16y - 64 = 0$

$2x^2 - 24x = 0$

$y^2 - 16y + 64 = 0$        $(0, 8)$

$2x(x-12) = 0$

$(y-8)(y-8) = 0$

$x = 0, x = 12$

$y = 8$

$x = 12$        $12^2 - y^2 - 12(12) + 16y - 64 = 0$

$-y^2 + 16y - 64 = 0$

$y^2 - 16y + 64 = 0$        $(12, 8)$

$(y-8)(y-8) = 0$

$y = 8$

$x^2 + y^2 - 4 = 0$        $x^2 + 3x - 4 = 0$        $x = -4$        $3(-4) - y^2 = 0$        $-12 - y^2 = 0$        $y^2 = -12$   
 $3x - y^2 = 0$        $(x+4)(x-1) = 0$        $x = 1$        $3(1) - y^2 = 0$        $3 = y^2$   
 $3x = y^2$        $x = -4, x = 1$        $y = \pm\sqrt{3}$

$(1, \sqrt{3})(1, -\sqrt{3})$

$x^2 + 2y^2 - 4x + 6y - 5 = 0$        $x^2 + 2(x+4)^2 - 4x + 6(x+4) - 5 = 0$   
 $-x + y - 4 = 0$        $x^2 + 2x^2 + 16x + 32 - 4x + 6x + 24 - 5 = 0$   
 $y = x + 4$        $3x^2 + 18x + 51 = 0$   
 $3(x^2 + 6x + 17) = 0$       NO SOLUTION

$xy + x - 2y + 3 = 0$        $xy - 2y = -3 - x$        $y(x-2) = -3-x$   
 $x^2 + 4y^2 - 9 = 0$        $y = \frac{-3-x}{x-2}$

$(-3-x)(-3-x)$   
 $9 + 6x + x^2$

$x^2 + 4\left(\frac{-3-x}{x-2}\right)^2 - 9 = 0$

$x^2 + 4\left(\frac{9 + 6x + x^2}{x^2 - 4x + 4}\right) - 9 = 0$

$x^2 + \frac{36 + 24x + 4x^2}{x^2 - 4x + 4} - 9 = 0$

$x = 0$        $y = \frac{-3-0}{0-2} = \frac{3}{2}$

$y = \frac{-3-3}{-3-2} = \frac{6}{-5}$

$(0, \frac{3}{2})$

$x^4 - 4x^3 + 4x^2 + 36 + 24x + 4x^2 - 9x^2 + 36x - 36 = 0$

$x^4 - 4x^3 - x^2 + 60x = 0$

$x(x^3 - 4x^2 - x + 60) = 0$

$x = 0$        $x = -3$        $y = 0$

$(-3, 0)$