

November 19/2015  
Computer Engineering  
Math 102 S046

Point (1,0)

$$x^2 + y^2 - 5x - y + 4 = 0$$

$$x^2 - 5x + y^2 - y + 4 = 0$$

$$(x^2 - 5x) + (y^2 - y) = -4$$

$$x^2 - 5x + 2 = (x-a)^2$$

$$x^2 - 5x + 2 = x^2 - ax - ax + a^2$$

$$x^2 - 5x + 2 = x^2 - 2ax + a^2$$

$$-5 = -2a$$

$$a = 5/2$$

$$x^2 - 5x + 25/4$$

$$y^2 - y + 2 = (y-a)^2$$

$$y^2 - y + 2 = y^2 - 2ay + a^2$$

$$-1 = -2a$$

$$a = 1/2$$

$$y^2 - y + 1/4$$

$$x^2 - 5x + 25/4 + y^2 - y + 1/4 = -4 + 25/4 + 1/4$$

$$(x - 5/2)^2 + (y - 1/2)^2 = -4 + 6 1/2$$

$$(x - 5/2)^2 + (y - 1/2)^2 = \sqrt{5/2}$$

$$\frac{y - y_1}{x - x_1} = \frac{0 - 1/2}{1 - 5/2}$$

$$= \frac{-1/2}{-3/2}$$

$$= -1/2 \times 2/3$$

$$= 1/3$$

$$\text{tangent mt} = -3$$

$$y - y_1 = -3(x - x_1)$$

$$y - 0 = -3(x - 1)$$

$$y = -3x + 3$$

... solution of 5% solution

$$2) x^2 + y^2 - 12x - 12y + 47 = 0$$

$$x^2 - 12x + y^2 - 12y = -47$$

$$x^2 - 12x + a = (x-6)^2$$

$$x^2 - 12x + a = x^2 - 26x + 6^2 \quad (1, 0)$$

$$-12 = -26$$

$$b = 6$$

$$a = 36$$

$$x^2 - 12x + 36 + y^2 - 12y + 36 = -47 + 36 + 36$$

$$(x-6)^2 + (y-6)^2 = 25$$

$$(6, 6)$$

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{0 - 6}{1 - 6} = \frac{-6}{-5}$$

$$m = \frac{6}{5}$$

$$y - 0 = \frac{6}{5}(x - 1)$$

$$y = \frac{6}{5}x + \frac{6}{5}$$

$$6y = 6x + 6$$

$$3) x^2 + y^2 - 8x + y^2 + 14y = -40$$

$$x^2 - 8x + y^2 + 14y = -40$$

$$x^2 - 8x + a = x^2 - 2bx + b^2$$

$$-8 = -2b$$

$$b = 4$$

$$a = 16$$

$$y^2 + 14y + a = (y+7)^2$$

$$14 = 2b$$

$$b = 7$$

$$a = 49$$

$$x^2 - 8x + 16 + y^2 + 14y + 49 = -40 + 16 + 49$$

$$(x-4)^2 + (y+7)^2 = 25$$

$$(4, -7)$$

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{0 + 7}{1 - 4} = \frac{7}{-3} = m$$

$$m = -\frac{7}{3}$$

$$y - 0 = -\frac{7}{3}(x - 1)$$

$$y = -\frac{7}{3}(x - 1)$$

$$y = -\frac{7}{3}x + \frac{7}{3}$$

$$7y = 3x - 3$$

$$y = \frac{1}{4}x + \frac{9}{2}$$

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{5 - 1}{-2 - 3} = \frac{4}{-5} = -\frac{4}{5}$$

$$m = -\frac{1}{4}$$

$$y = y_1 = \frac{1}{4}x - \frac{1}{2}$$

$$y = -\frac{1}{4}x - \frac{1}{2} + 5$$

$$y = -\frac{1}{4}x + \frac{9}{2}$$

$$2x + 2y \frac{dy}{dx} - 3 + \frac{14dy}{dx} = 0$$

$$\frac{dy}{dx} (2y + 14) = 3 - 2x$$

$$\frac{dy}{dx} = \frac{3 - 2x}{2y + 14}$$

$$x = 1, y = 0$$

$$m = \frac{3 - 2}{14}$$

$$m = \frac{1}{14}$$

$$m = \frac{3}{7}$$