June 13, 2017

Lines

① Standard Form
$Ax + By = C$
* A, B, & C are coefficients & not fractions

*② Slope-Intercept
$y = mx + b$
slope, y-intercept $(0, b)$

*③ Point-Slope
$y - y_1 = m(x - x_1)$

④ Slope Formula
$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\text{Chg of } y}{\text{Chg of } x} = \frac{\Delta y}{\Delta x}$

Jun 13-7:58 AM

$(\overset{x_1}{-5}, \overset{y_1}{4})$ & $m = \frac{2}{3}$

Pt.-slope: $y - y_1 = m(x - x_1)$

$y - 4 = \frac{2}{3}(x - (-5))$

$y - 4 = \frac{2}{3}(x + 5)$

$3\left(y - 4 = \frac{2}{3}x + \frac{10}{3}\right)$

$3y - 12 = 2x + 10$

$-2x + 12 \quad -2x + 12$

$\begin{cases} \frac{-2x}{-1} + \frac{3y}{-1} = \frac{22}{-1} \\ 2x - 3y = -22 \end{cases}$

Jun 13-8:13 AM

$(6, -2)$ & $(-7, 11)$

① Find eq. $y = mx + b$

② Find eq. parallel to ① going through $(-2, 4)$ in $y = mx + b$

③ Find the eq. of the circle for ①.

$\left(x + \frac{1}{2}\right)^2 + \left(y - \frac{9}{2}\right)^2 = 84.46$

Jun 13-8:23 AM

$(1, 8)$ & $(5, -6)$

mid pt.: $\frac{1+5}{2}, \frac{8-6}{2}$

$(x-3)^2 + (y-1)^2 = 53$ $\quad 3, 1$

$r^2 = (3-1)^2 + (1-8)^2$

$= 4 + 49$

$r^2 = 53$

Jun 13-9:20 AM

$r^2 = d^2 = \left(-\frac{1}{2} - 6\right)^2 + \left(\frac{9}{2} + (-2)\right)^2$

$= \left(\frac{-1-12}{2}\right)^2 + \left(\frac{9-4}{2}\right)^2$

$r^2 = \left(\frac{-13}{2}\right)^2 + \left(\frac{5}{2}\right)^2$

$= \frac{169}{4} + \frac{25}{4}$

$= \frac{194}{4}$

$r^2 = 48.5$

Jun 13-9:24 AM

$P(-7, 11)$ & $Q(6, -2)$

mid pt. $\frac{-7+6}{2}, \frac{11-2}{2} = -\frac{1}{2}, \frac{9}{2}$

$r = \sqrt{\left(-\frac{1}{2} - 6\right)^2 + \left(\frac{9}{2} - (-2)\right)^2}$

$= \sqrt{\left(\frac{-1-12}{2}\right)^2 + \left(\frac{9+4}{2}\right)^2}$

$= \sqrt{\left(\frac{-13}{2}\right)^2 + \left(\frac{13}{2}\right)^2}$

$= \sqrt{\frac{169}{4} + \frac{169}{4}}$

$= \sqrt{\frac{338}{4}}$

$r = 9.19$

$r^2 = (9.19)^2$

$= 84.45$

Jun 13-9:39 AM

$18x^3 - 2x^2 + 27x - 3$

* Degree: 3 polynomial
* 3 solutions

$2x^2(9x-1) + 3(9x-1)$

$(9x-1)(2x^2+3)$

Jun 13-9:58 AM

$x^3 + x^2 - 9x - 9 = 0$

$x^2(x+1) - 9(x+1) = 0$

$(x+1)(x^2-9) = 0$

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

① $x+1=0$, $x=-1$

② $x+3=0$, $x=-3$

③ $x-3=0$, $x=3$

Jun 13-10:04 AM

$x^4 + 7x^3 - 8x - 56 = 0$

$x^3(x+7) - 8(x+7) = 0$

$(x+7)(x^3-8) = 0$

* Difference of 2 Cubes

$(x+7)(x-2)(x^2+2x+4) = 0$

① $x+7=0$, $x=-7$

② $x-2=0$, $x=2$ **2 Real

$x^2+2x+4=0$

Discriminate: b^2-4ac

$(2)^2-4(1)(4)$

$4-4(4)$

$4-16$

-12

Jun 13-10:07 AM

$2x^4 - 26x^2 + 72 = 0$

let $u = x^2$

$2(u)^2 - 26(u) + 72 = 0$

$(2u-8)(u-9) = 0$

$-18u, -8u \rightarrow -26u$

① $2u-8=0$

$2u = 8$

$u = 4$

$x^2 = 4$

$x = \pm 2$

② $u-9=0$

$u = 9$

$x^2 = 9$

$x = \pm 3$

Jun 13-10:17 AM

$\left|\frac{2}{3}x - 7\right| = 1$ $\quad |x| = \begin{cases} x, \text{ if } x \geq 0 \\ -x, \text{ if } x < 0 \end{cases}$

① $\frac{2}{3}x - 7 = 1$

$2x - 21 = 3$

$2x = 24$

$x = 12$

Ch

$\frac{2}{3}(12) - 7 = 1$

$\frac{24}{3} - 7 = 1$

$8 - 7 = 1$ ✓

② $\frac{2}{3}x - 7 = -1$

$2x - 21 = -3$

$2x = 18$

$x = 9$

$\frac{2}{3}(9) - 7 = -1$

$\frac{18}{3} - 7 = -1$

$6 - 7 = -1$ ✓

Jun 13-10:26 AM

$y = \frac{5}{2}x + 1$ (m_1)

90°

(2, 4)

$y = -\frac{2}{5}x + \frac{24}{5}$

$m_2 = -\frac{2}{5}$

Perpendicular lines

$\frac{m_1}{1} \cdots \frac{1}{m_2} = -1$

$4 = -\frac{2}{5}(2) + b$

$4 = -\frac{4}{5} + b$

$\frac{4}{1} + \frac{4}{5} = b$

$\frac{20+4}{5}$

$\frac{24}{5} = b$

Jun 13-10:31 AM