Slope-intercept $y = mx + b$

point-slope $y - y_1 = m(x - x_1)$

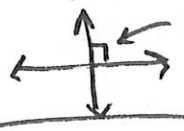
Standard Form $Ax + By = C$

slope $= m = \frac{y_2 - y_1}{x_2 - x_1}$

If $m = \frac{1}{2}$

$m_{parallel} = \frac{1}{2}$

$m_{perpendicular} = \frac{-2}{1}$




opposite reciprocal

$x = 4$ vertical ↕ slope is undefined

$y = 4$ horizontal ↔ slope $= \phi$

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**Ex 6** Write an equation in slope-intercept and standard form that passes through $(3, 5)$ ($x_1, y_1$)

and ...

(a) is parallel to $2x + 5y = 4$

What is the slope?

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

$-2x$ $\qquad$ $-2x$

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

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

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

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

Plug into point - slope

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

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

$$5y - 25 = -2(x - 3)$$

$$5y - 25 = -2x + 6$$

$+2x \quad +25 \quad +2x \quad +25$

$$\boxed{2x + 5y = 31}$$

Change to standard form

x and y same side

---

Convert to slope - intercept $y = mx + b$

get y alone

$$2x + 5y = 31$$

$-2x \qquad -2x$

$$\frac{5y}{5} = -\frac{2x}{5} + \frac{31}{5}$$

$$\boxed{y = -\frac{2}{5}x + \frac{31}{5}}$$ ← slope - intercept form

Ex 6 b Find equation of line through point $(3,5)$ and perpendicular to $2x+5y=4$ in slope-intercept and standard form.

$m_{\parallel} = -\frac{2}{5}$ $\quad$ $m_{\perp} = +\frac{5}{2}$

$Ax+By=C$

Standard Form → plug into point-slope

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

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

$2y - 10 = 5(x-3)$

$2y - 10 = 5x - 15$ → Get x and y on same side

$-5x \quad +10 \quad -5x \quad +10$

$-5x + 2y = -5$ Standard Form!

$5x - 2y = 5$

---

Slope-intercept $y = mx+b$ get y alone

$-5x + 2y = -5$

$+5x \qquad +5x$

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

$y = \frac{5}{2}x - \frac{5}{2}$ Slope-intercept

**Ex 7**

| x | Year | Cost ($) |
|---|---|---|
| 0 | 2009 | 6312 |
| 1 | 2010 | 6695 |
| 2 | 2011 | 7136 |
| 3 | 2012 | 7703 |
| 4 | 2013 | 8070 |

x = 0 represents 2009

a) Find equation

(0, 6312) and (4, 8070)

$$m = \frac{8070 - 6312}{4 - 0} = \frac{1758}{4} = 439.5 = m$$

Slope indicates cost of tuition and fees increased by about $440 each year from 2009 to 2013.

$$y = 439.5x + 6312$$

b) Estimate cost in 2015

$$x = \begin{array}{r} 2015 \\ -2009 \\ \hline \end{array} = 6$$

$$y = 439.5(6) + 6312 = \$8949$$

↑ tuition in 2015