

Math 45 3.5 Point-Slope Form of a Line

Example from class notes (complete):

The % of total income y
that an individual spends
on healthcare increases
linearly with age x

A 35-year-old spends 4%
on healthcare.

A 65-year-old spends 11.2%
on healthcare.

← y values are %
← x values are age
← "increases" means
slope is positive
← "linearly" means
linear equation, or
line.

When $x=35$, $y=4$
point $(35, 4)$

When $x=65$, $y=11.2$
point $(65, 11.2)$

a) Find slope

b) Find equation of line in slope-int. form.

c) Use equation to predict %
that a 50-year-old spends.

a) slope formula: $m = \frac{y_2 - y_1}{x_2 - x_1}$

plug in $(35, 4)$ and $(65, 11.2)$
 (x_1, y_1) (x_2, y_2)

$$m = \frac{4 - 11.2}{65 - 35} = \frac{-7.2}{30} = \boxed{-0.24 = m}$$

b) point-slope form of eqn of a line: $y - y_1 = m(x - x_1)$

plug in $m = -0.24$, $x_1 = 35$, $y_1 = 4$: $y - 4 = -0.24(x - 35)$

dist : $y - 4 = -0.24x + 8.4$

add 4 : $\boxed{y = -0.24x + 12.4}$

c) Predict 50-year-old. age = x so $x = 50$.

Plug in $x = 50$, solve for y :

$$y = -0.24(50) + 12.4$$

$y = \boxed{7.6\% \text{ of income spent on healthcare}}$