LINEAR MODELING

1. Uber rates in Kansas City include a $3 booking fee and $1.10 base fare as well as $0.98 per mile traveled. (a) Write a function for the total fare (F) in terms of the number of miles (x) traveled. (b) What is the total fare for a 14-mile Uber trip?

y = total fare
x = # of miles

$3.00
$1.10
$4.10

$y = mx + b$

$F = 0.98x + 4.10$

How much does it cost to travel from airport to downtown KC (14 miles)?

$F = 0.98(14) + 4.10$
$\$ = 17.82$

How far can you travel for $100?

$100 = 0.98x + 4.10$
-4.10
$\frac{95.90}{0.98} = \frac{0.98x}{0.98}$

$97.9 \text{ mi} = x$

1. A local plumber charges a service fee plus an hourly rate for labor. She charged $103.75 for a job requiring 2.5 hours of labor and $88.70 for a job requiring 1 hour and 48 minutes. (a) Write an equation for total cost (C) in terms of the numbers of hours (x). (b) What is her hourly charge? (c) What is her service fee? (d) What would be the total charges for an 8-hour job?

y x

Cost = y

hours = x

$\frac{48}{60} = 0.8$

$(2.5, 103.75)$ * $(1.8, 88.70)$

$m = \frac{103.75 - 88.70}{2.5 - 1.8} = \frac{15.05}{0.7} = 21.50$

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

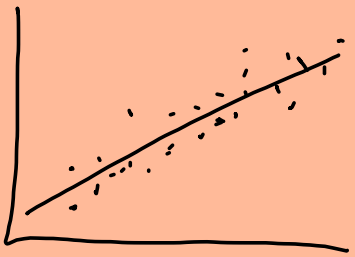
$y - 103.75 = 21.5(x - 2.5)$

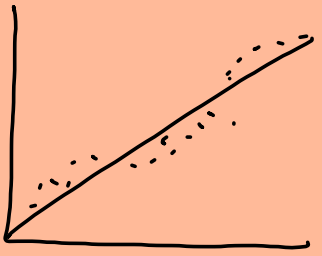
$y - 103.75 = 21.5x - 53.75$

$+103.75 \qquad\qquad +103.75$

$y = 21.5x + 50$

$C = 21.50x + 50$





How good is the model
1) Does line go down middle?
2) r^2 $r^2 \geq 0.75$ good
$0.50 \leq r^2 < 0.75$ fair
$r^2 < 0.5$ poor
3) How does it predict future?

r^2 = coefficient of determination - how well the line fits the data

r = correlation coefficient - how well the data relates to each other

Know x-coord (yds)

$y = 0.0089\ldots x - 129.011\ldots$

yds | tds

25,000

Ctrl-T

Know y-coord (tds)

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