

Linear Interpolation

X	Y
10	47
15	??
20	53

Estimate the missing (??) value.
(C.P.)

How did you do that?

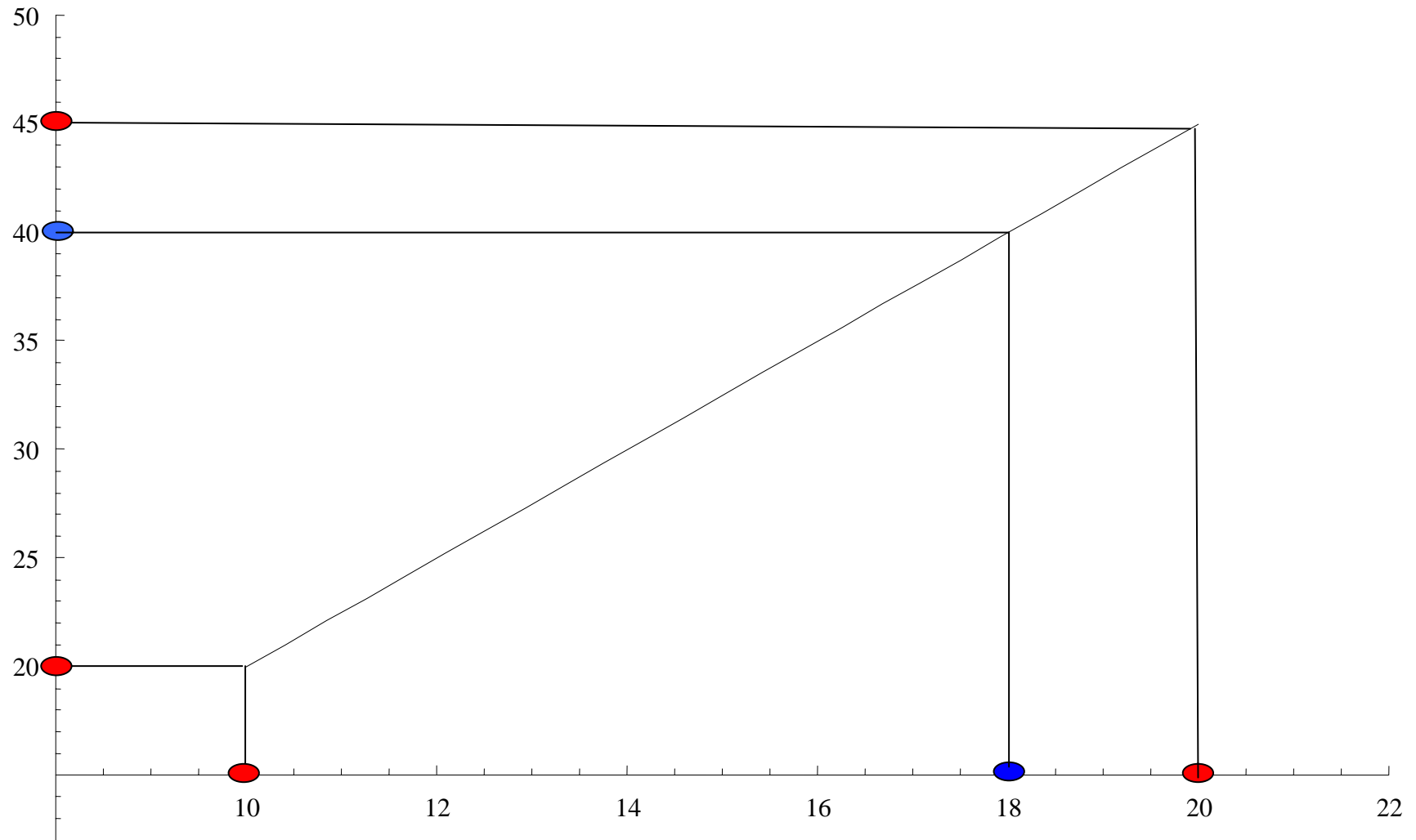
Another Interpolation Problem

X	Y
10	20
18	??
20	45

Estimate the missing (??) value.
(C.P.)

How did you do that?

Linear Interpolation



Linear Interpolation

X	Y
10	20
18	??
20	45

$$\frac{8}{10} = \frac{C}{25}$$

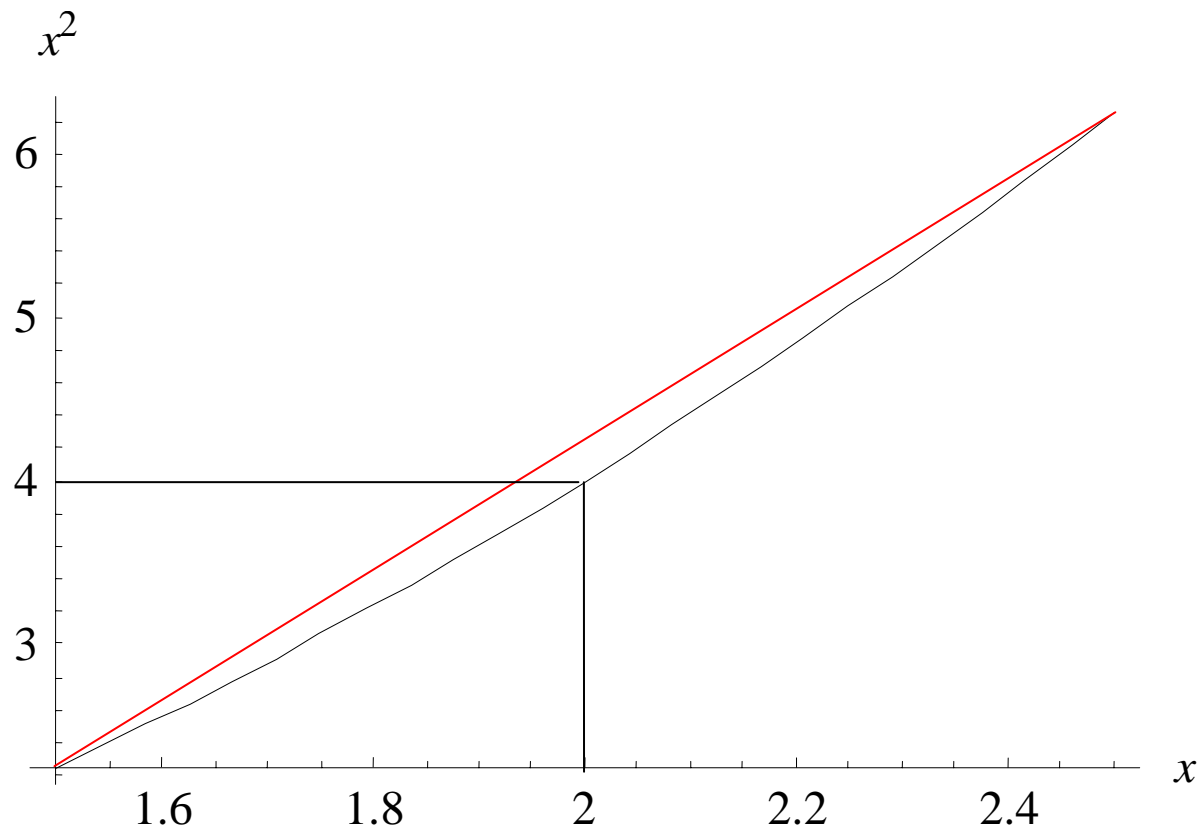
$$C = \frac{(8)(25)}{10} = 20 \quad ?? = 20 + C = 40$$

“Local Linearity”

Linear interpolation assumes function is at least well-approximated by a straight line “over the missing region.”

If it is not, there will be an estimation error.

Example. Suppose the function is $Y = X^2$. Over a short region, this function is well approximated by a straight line. Over a wider region, the approximation will fail.



X	Y
1.5	2.25
2.0	??
2.5	6.25

Oops!!

With some functions, linear interpolation can produce horrendous errors, if applied in the wrong place.

