VISUAL SUMMARY

Using Regression Equations to Make Predictions

Before You Begin: Compute $\overline{X}$, $\overline{Y}$, S_X, S_Y, r_{XY}, and cov_{XY}.

```
                    ┌─────────────────┐
                    │     Predict      │
                    │  Y          X    │
                    └─────────────────┘
```

Predict Y	Predict X
$b = \dfrac{\text{cov}_{XY}}{S^2{}_X} = r_{XY} \cdot \dfrac{S_Y}{S_X}$	$b = \dfrac{\text{cov}_{XY}}{S^2{}_Y} = r_{XY} \cdot \dfrac{S_X}{S_Y}$
$a = \overline{Y} - (b \cdot \overline{X})$	$a = \overline{X} - (b \cdot \overline{Y})$
$\hat{Y} = bX + a$	$\hat{X} = bY + a$
$S_{YX} = S_Y \cdot \sqrt{1 - r^2}$	$S_{XY} = S_X \cdot \sqrt{1 - r^2}$
$\text{Prediction} = \hat{Y} + S_{YX}$	$\text{Prediction} = \hat{X} + S_{XY}$