Recapping what we just did: we took three facts from lecture and combined them to derive, step-by-step, interpretations for all of the regressions involving logarithms. Let's use these interpretations to fill in the worksheet part of **Section Handout 2, part 3**:

We want to see how food consumption (y) measured in \$/year is related to household income (x) measured in \$/year. How would we interpret each of the following regressions?

Name	Functional Form	Interpretation in Words
linear ("constant returns")	$y = \beta_0 + \beta_1 x$	Ceteris paribus, when income increases by _____**z**________, food consumption increases by ______ $\widehat{\boldsymbol{\beta_1}}(\mathbf{z})$ _________.
log ("decreasing returns")	$y = \beta_0 + \beta_1 logx$	Ceteris paribus, when income increases by ____ **z percent** ___, food consumption increases by ______ $\frac{1}{100}\widehat{\boldsymbol{\beta_1}}(\mathbf{z})$ _________.
log-linear ("increasing returns")	$logy = \beta_0 + \beta_1 x$	Ceteris paribus, when income increases by _____**z**______, food consumption increases by ___ $\mathbf{100}\widehat{\boldsymbol{\beta_1}}(\mathbf{z})$ **percent** _____.
log-log ("constant elasticity")	$logy = \beta_0 + \beta_1 logx$	Ceteris paribus, when income increases by ____**z percent**_____, food consumption increases by ______ $\widehat{\boldsymbol{\beta_1}}(\mathbf{z})$ **percent** ______.

Let's do a real example with some numbers. Here I'm going to use different functional forms for regressions relating hourly wage (in \$) with years of education, using Wooldridge's data from example 2.4.

Name	Regression Results	Interpretation in Words
linear ("constant returns")	$\widehat{wage} = -0.90 + 0.54(education)$	Ceteris paribus, when education increases by **1 year**, wage changes by **0.54(1) = \$0.54**.
log ("decreasing returns")	$\widehat{wage} = -7.46 + 5.33 log(education)$	Ceteris paribus, when education increases by **10%**, wage increases by $\frac{\mathbf{1}}{\mathbf{100}}\mathbf{5.33(10)}$ = **\$0.533**.
log-linear ("increasing returns")	$\log\widehat{(wage)} = 0.58 + 0.08(education)$	Ceteris paribus, when education increases by **1 year**, wage increases by $\mathbf{100(0.08)(1)\%}$ = **8%**.
log-log ("constant elasticity")	$\log\widehat{(wage)} = -0.44 + 0.83 log(education)$	Ceteris paribus, when education increases by **10%**, wage increases by $\mathbf{0.83(10)\%}$ = **8.3%**.