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JOHNS HOPKINS
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Lecture 5e: Practice Problems

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Arm Circumference: Interaction—Height and Sex

1. The following MLR shows the result of a model relating arm circumference (cm) to height (cm) and sex (1 = female, 0 = male) with an interaction term for height and sex (height_sex). This again is based on the random sample of 150 Nepali children < 12 months old.

```
. gen height_sex= height*sex
```

```
. regress armcirc height sex height_sex
```

Source	SS	df	MS	Number of obs	=	150
Model	149.792035	3	49.9306782	F(3, 146)	=	41.34
Residual	176.345897	146	1.20784861	Prob > F	=	0.0000
				R-squared	=	0.4593
				Adj R-squared	=	0.4482
				Root MSE	=	1.099
Total	326.137932	149	2.18884518			

armcirc	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
height	.1675488	.0191759	8.74	0.000	.1296506	.205447
sex	1.260999	1.771483	0.71	0.478	-2.240064	4.762062
height_sex	-.0217193	.0286107	-0.76	0.449	-.0782641	.0348254
_cons	2.141675	1.191448	1.80	0.074	-.2130371	4.496388

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 - a) What does the model estimate for mean difference in arm circumference between groups of male children who differ by one cm in height?
 - b) What does the model estimate for mean difference in arm circumference between groups of female children who differ by one cm in height?
 - c) After accounting for sampling variability, are the slopes of height for male and female children statistically significantly different?

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 - d) Just for fun: Suppose sex is coded as 1 for male children, and 0 for female children. Can you determine the following?
 1. What would the slope estimate for height be in a MLR relating arm circumference and height with an interaction between height and sex?
 2. What would the coefficient estimate for height_sex be in the same model described in part 1?