Economics 312 — Spring 2020
Daily Problem #8 — February 10

Consider the following multiple regression with dependent variable of grade in Econ 201. The regressors are high-school GPA, verbal and math SAT scores (divided by 100 for scaling), and the inverted reader rating (5 is best).

```
. reg gpoints hsgpa satv100 satm100 female

      Source |       SS           df       MS      Number of obs   =       405
-------------+----------------------------------   F(4, 400)       =     11.63
       Model |  31.5318792         4  7.88296979   Prob > F        =    0.0000
    Residual |  271.017899       400  .677544747   R-squared       =    0.1042
-------------+----------------------------------   Adj R-squared   =    0.0953
       Total |  302.549778       404  .748885589   Root MSE        =    .82313

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     gpoints |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       hsgpa |   .5723204   .1116918     5.12   0.000      .3527441    .7918967
     satv100 |   .0924651   .0614782     1.50   0.133     -.0283956    .2133258
     satm100 |    .15441   .0683045     2.26   0.024      .0201293    .2886907
      female |   .0192882   .0910424     0.21   0.832     -.1596932    .1982697
       _cons |  -.9125915   .5730471    -1.59   0.112     -2.039152    .2139689
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1. Interpret the effects of the variables taking into account that students with higher SAT scores may often have higher high-school GPAs as well.

2. Is this regression a good fit? Explain.

If we add the reader rating to the regression we get this result:

```
. reg gpoints hsgpa satv100 satm100 irdr female

      Source |       SS           df       MS      Number of obs   =       405
-------------+----------------------------------   F(5, 399)       =     10.55
       Model |  35.3228503         5  7.06457005   Prob > F        =    0.0000
    Residual |  267.226928       399  .669741673   R-squared       =    0.1168
-------------+----------------------------------   Adj R-squared   =    0.1057
       Total |  302.549778       404  .748885589   Root MSE        =    .81838

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     gpoints |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       hsgpa |   .4191427   .1283612     3.27   0.001      .1667938    .6714916
     satv100 |   .0582289   .0627942     0.93   0.354       -.06522    .1816778
     satm100 |   .1201843    .069417     1.73   0.084     -.0162845    .2566532
        irdr |   .2432813   .1022556     2.38   0.018      .0422542    .4443085
      female |  -.0027906   .0909911    -0.03   0.976     -.1816725    .1760913
       _cons |  -.6836788   .5778051    -1.18   0.237     -1.819601     .452244
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3. Reader rating is based partially on SAT scores and high-school GPA, since those are important components of the admission file (along with letters of recommendation, reputation of high school, interviews, etc.). Given this, what does the coefficient on reader rating mean? (What kind of change(s) would raise the expected Econ 201 grade by the estimated 0.24 points?)

4. What does the coefficient on high-school GPA mean? (What kind of change(s) would raise the expected Econ 201 grade by the estimated 0.42 points?)