a) i)

```
. regress  fgpa satv
```

Source	SS	df	MS		
Model	1.09400606	1	1.09400606	Number of obs =	609
Residual	127.691683	607	.210365211	F(1, 607) =	5.20
				Prob > F =	0.0229
				R-squared =	0.0085
				Adj R-squared =	0.0069
Total	128.785689	608	.211818567	Root MSE =	.45866

fgpa	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
satv	.0630859	.0276636	2.28	0.023	.0087578	.1174139
_cons	2.441732	.1550621	15.75	0.000	2.137209	2.746256

```
.
```

- Coefficient of SATV = 0.063
- Standard error of SATV = 0.027
- p-value of SATV = 0.023

ii)

- Confidence interval of SATV = $b + 2\ SE_b$ and $b - 2\ SE_b$
- Therefore b = 0.007 and 0.119

b)

i)

```
. regress  fgpa satv satm fem

      Source |       SS       df       MS              Number of obs =     609
-------------+------------------------------           F(  3,   605) =   18.24
       Model |  10.6846655     3  3.56155518            Prob > F      =  0.0000
    Residual |  118.101023   605  .195208303           R-squared     =  0.0830
-------------+------------------------------           Adj R-squared =  0.0784
       Total |  128.785689   608  .211818567           Root MSE      =  .44182

------------------------------------------------------------------------------
        fgpa |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        satv |   .0141619    .027927     0.51   0.612    -.0406837    .0690075
        satm |   .1727359   .0319267     5.41   0.000     .1100352    .2354365
         fem |   .2002716   .0373809     5.36   0.000     .1268596    .2736836
       _cons |   1.557048   .2160955     7.21   0.000      1.13266    1.981437
------------------------------------------------------------------------------

.
```

- Coefficient of SATV = 0.014
- Standard error of SATV = 0.027
- p-value of SATV = 0.612

ii)

- Confidence interval of SATV = $b + 2\ SE_b$ and $b - 2\ SE_b$
- Therefore b = -0.042 and 0.070

c)

Below is a correlation matrix for all variables in the model. Numbers are Pearson correlation coefficients, go from -1 to 1. Closer to 1 means strong correlation. A negative value indicates an inverse relationship (roughly, when one goes up the other goes down).

```
. pwcorr fgpa satv satm fem
```

	fgpa	satv	satm	fem
fgpa	1.0000			
satv	0.0922	1.0000		
satm	0.1950	0.2878	1.0000	
fem	0.1765	0.0336	-0.1627	1.0000

Although, the coefficient of SATV is statistically significant in the part-A, however, in part B the coefficient of SATV is not statistically significant. This difference can be explained by the correlation matrix :-

The model in part A leaves out variables such as SATM and FEM, which are included in the error term. The error term is correlated with the independent variable SATV…. (SATV-SATM = (0.28) and SATV-FEM = 0.03).

Hence, model A explains the total effect (direct + indirect) of satv on fgpa.

D)

i)

```
. test  satv

 ( 1)  satv = 0

       F(  1,    605) =    0.26
            Prob > F =    0.6123

.
```

The p-value is 0.6123, we do not reject the null. We conclude that SATV does not have any significant effect on FGPA

ii)

$F^2 = t$

- F value from above = 0.26
- T value from part B of SATV = 0.51

Therefore, $0.51^{2 =}$ 0.2601