a) i) coefficient of SATV = 0.063
standard error of coefficient = 0.028
p value = 0.023

ii) 95% confidence interval is 0.007 … 0.119

Regression Statistics	
Multiple R	0.092167121
R Square	0.008494778
Adjusted R Square	0.006861326
Standard Error	0.458655877
Observations	609

ANOVA

	df	SS	MS	F	Significance F
Regression	1	1.094005881	1.094005881	5.200507538	0.022926106
Residual	607	127.6916849	0.210365214		
Total	608	128.7856908			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lo
Intercept	2.441732463	0.155062068	15.74680708	4.25735E-47	2.137209194	2.746255732	2.1
X Variable 1	0.063085845	0.027663623	2.280462133	0.022926106	0.008757813	0.117413878	0.0

b)

i) coefficient of SATM = 0.173   **coefficient of SATV = 0.014**   coefficient of Gender = 0.200

SE of coef of SATM =   0.032   **SE of coef of SATV = 0.028**   SE of coef of Gender = 0.037

P value (SATM) = 0.000   **P value (SATV) = 0.612**   P value (Gender) = 0.000

ii) 95 % confidence interval with 1 point increase in SATV = -0.041…0.069

Regression Statistics	
Multiple R	0.288035928
R Square	0.082964696
Adjusted R Square	0.078417414
Standard Error	0.44182384
Observations	609

ANOVA

	df	SS	MS	F	Significance F
Regression	3	10.68466569	3.56155523	18.24489595	2.4115E-11
Residual	605	118.1010251	0.195208306		
Total	608	128.7856908			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lo
Intercept	1.557048213	0.216095514	7.20537036	1.72986E-12	1.132659785	1.981436641	1.1
X Variable 1	0.172735887	0.031926713	5.410387396	9.07148E-08	0.110035244	0.23543653	0.1
X Variable 2	0.014161897	0.027926969	0.507104667	0.612266162	-0.040683678	0.069007471	0.0
X Variable 3	0.200271605	0.037380851	5.357598893	1.20027E-07	0.126859621	0.273683589	0.1

c)

Correlation	FGPA	SATM	SATV	FEM
FGPA	1.000000	0.195040	0.092167	0.176491
SATM	0.195040	1.000000	0.287801	-0.162680
SATV	0.092167	0.287801	1.000000	0.033577
FEM	0.176491	-0.162680	0.033577	1.000000

The difference between (a) and (b) is that (a) indicated a stronger correlation between FGPA and SATV than (b)

Explanation: (a)'s result did not take SATM and FEM into consideration. Therefore, the correlation of SATV and FGPA is affected by SATM and FEM, because SATV, SATM and FEM are correlated according to the table above. And this false correlation is corrected in (b) when the regression takes all three variables into account.

d) i)

for regression in (b): $R_1^2 = 0.082965$

when SATV has no effect on FGPA, we get regression based on the following charts. And $R_0^2 = 0.082575$

Perform an F test: $g = 1$, $n = 609$, $k = 4$, $F = 0.257297$

Because the critical value is 3.9, $0.257297 < 3.9$, so null hypothesis can't be rejected.

Therefore, on the 5 % significant level, SATV has no effect on FGPA.

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.287359
R Square	0.082575
Adjusted R Square	0.079547
Standard Error	0.441553
Observations	609

ANOVA

	df	SS	MS	F	Significance F
Regression	2	10.63447	5.317233	27.2722	4.56E-12
Residual	606	118.1512	0.194969		
Total	608	128.7857			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	1.605147	0.194048	8.271921	8.39E-16	1.22406	1.986235	1.22406	1.986235
X Variable 1	0.177551	0.030464	5.828303	9.1E-09	0.117724	0.237378	0.117724	0.237378
X Variable 2	0.201884	0.037222	5.423724	8.44E-08	0.128784	0.274985	0.128784	0.274985

ii)

F = 0.257

$t^2 = 0.507105^2 = 0.257$

therefore $F = t^2$