Student Version — Questions only (NO answers). All multiple regre

students should compute (X'X) inverse.

Simple Regression — Q1: Study Hours and Exam Grade

DATA:

Study Hours	Exam Grade
2	55
4	60
6	72
8	80

TASK: Compute beta0 and beta1 using Sxx/Sxy formulas and interpret.

Simple Regression — Q2: Advertising and Sales

DATA:

Advertising (000)	*Sales* (000)
2	25
4	35
6	45
8	55

TASK: Compute beta0 and beta1 using Sxx/Sxy formulas and interpret.

Simple Regression — Q3: Experience and Wage

DATA:

Experience (years)	Wage ($/hr)
1	8
3	10
5	13
7	15

TASK: Compute beta0 and beta1 using Sxx/Sxy formulas and interpret.

Simple Regression — Q4: Price and Quantity Demanded

DATA:

Price	Quantity
10	100
12	90
14	80
16	70

TASK: Compute beta0 and beta1 using Sxx/Sxy formulas and interpret.

Simple Regression — Q5: Age and Medical Expenses

DATA:

Age	Expenses ($)
30	200
40	300
50	400
60	500

TASK: Compute beta0 and beta1 using Sxx/Sxy formulas and interpret.

Simple Regression — Q6: Hours Worked and Weekly Income

DATA:

Hours	Income ($)
20	250
30	300
40	350
50	400

TASK: Compute beta0 and beta1 using Sxx/Sxy formulas and interpret.

Simple Regression — Q7: Years of Schooling and Income

DATA:

Years of Schooling	Monthly Income ($)
8	1200
10	1500
12	1800
14	2100

TASK: Compute beta0 and beta1 using Sxx/Sxy formulas and interpret.

Simple Regression — Q8: Coffee Price and Cups Sold

DATA:

Price ($)	Cups Sold
1	90
2	80
3	70
4	60

TASK: Compute beta0 and beta1 using Sxx/Sxy formulas and interpret.

Simple Regression — Q9: Temperature and Ice Cream Sales

DATA:

Temperature (°C)	Sales ($)
20	150
25	200
30	250
35	300

TASK: Compute beta0 and beta1 using Sxx/Sxy formulas and interpret.

Simple Regression — Q10: Years in Business and Profit

DATA:

Years	Profit (000$)
1	10
3	20
5	30
7	40

TASK: Compute beta0 and beta1 using Sxx/Sxy formulas and interpret.

Multiple Regression — Q1: Wage, Education, and Experience

DATA:

Education	Experience	Wage
8.0	1.001680	9.0
9.0	1.999067	10.0
11.0	3.995834	13.0
13.0	5.999333	16.0

TASK: Compute beta0, beta1, beta2 using (X'X)^-1 X'y. Show X'X and check invertibility.

Then compute SSE, sigma^2 and Var-Cov matrix.

Multiple Regression — Q2: Sales, Advertising, and Price

DATA:

Advertising (000)	*Price*	*Sales* (000)
2.0	10.0	42.0
3.0	9.0	51.0
4.0	8.0	63.0
6.0	7.0	80.0

TASK: Compute beta0, beta1, beta2 using (X'X)^-1 X'y. Show X'X and check invertibility.

Then compute SSE, sigma^2 and Var-Cov matrix.

Multiple Regression — Q3: House Price, Size, and Distance

DATA:

Size (m2)	Distance (km)	Price (000$)
80.0	15.0	200.0
95.0	10.0	250.0
120.0	5.0	300.0
150.0	2.0	360.0

TASK: Compute beta0, beta1, beta2 using (X'X)^-1 X'y. Show X'X and check invertibility.

Then compute SSE, sigma^2 and Var-Cov matrix.

Multiple Regression — Q4: Profit, Employees, and Capital

DATA:

Employees	Capital (000)	*Profit*(000)
5.0	10.0	40.0
12.0	15.0	70.0
18.0	25.0	110.0
25.0	40.0	160.0

TASK: Compute beta0, beta1, beta2 using (X'X)^-1 X'y. Show X'X and check invertibility.

Then compute SSE, sigma^2 and Var-Cov matrix.

Multiple Regression — Q5: Crop Yield, Fertilizer, and Rainfall

DATA:

Fertilizer (kg)	Rainfall (mm)	Yield (tons)
20.0	50.0	12.0
45.0	65.0	18.0
70.0	75.0	24.0
95.0	90.0	30.0

TASK: Compute beta0, beta1, beta2 using (X'X)^-1 X'y. Show X'X and check invertibility.

Then compute SSE, sigma^2 and Var-Cov matrix.

Multiple Regression — Q6: Car Price, Age, and Mileage

DATA:

Age (yrs)	Mileage (000 km)	Price (000$)
1.0	10.0	50.0
2.0	22.0	46.0
3.0	35.0	42.0
5.0	55.0	30.0

TASK: Compute beta0, beta1, beta2 using (X'X)^-1 X'y. Show X'X and check invertibility.

Then compute SSE, sigma^2 and Var-Cov matrix.

Multiple Regression — Q7: Productivity, Training, and Experience

DATA:

Training Hours	Experience	Output (units/hr)
5.0	1.0	11.0
12.0	4.0	18.0
18.0	6.0	24.0
25.0	10.0	36.0

TASK: Compute beta0, beta1, beta2 using (X'X)^-1 X'y. Show X'X and check invertibility.

Then compute SSE, sigma^2 and Var-Cov matrix.

Multiple Regression — Q8: Demand, Income, and Price

DATA:

Income (000$)	Price	Quantity
20.0	5.0	100.0
30.0	4.0	140.0
40.0	3.0	180.0
60.0	2.0	260.0

TASK: Compute beta0, beta1, beta2 using (X'X)^-1 X'y. Show X'X and check invertibility.

Then compute SSE, sigma^2 and Var-Cov matrix.

Multiple Regression — Q9: Energy Use, Temperature, and House Si

DATA:

Temperature (°C)	Size (m2)	Energy Use (kWh)
15.0	80.0	210.0
22.0	105.0	270.0
28.0	125.0	330.0
35.0	160.0	420.0

TASK: Compute beta0, beta1, beta2 using (X'X)^-1 X'y. Show X'X and check invertibility.

Then compute SSE, sigma^2 and Var-Cov matrix.

Multiple Regression — Q10: Life Satisfaction, Income, and Leisure

DATA:

Income (000$)	Leisure Hours	Life Satisfaction
20.0	10.0	5.0
35.0	15.0	6.0
50.0	25.0	8.0
70.0	30.0	10.0

TASK: Compute beta0, beta1, beta2 using (X'X)^-1 X'y. Show X'X and check invertibility.

Then compute SSE, sigma^2 and Var-Cov matrix.