Math Sheet

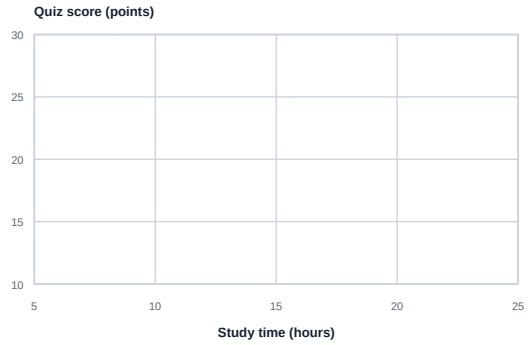
Name _____ Score _____ Teacher _____ Date _____

Scatterplots and Correlation

Use the labeled paired observations. Describe form and direction before calculating Pearson r; round r to the nearest thousandth. Association alone does not establish causation.

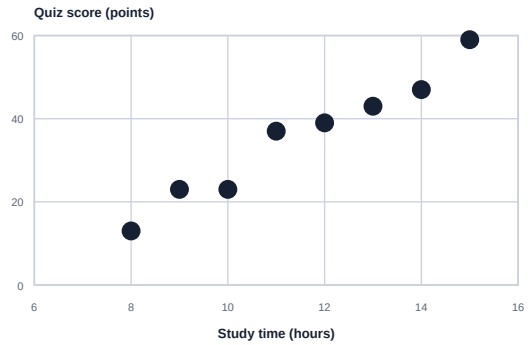
1. **Plot every ordered pair on the blank axes, then describe the direction and form.**

x: Study time (hours)	9	11	13	15	17	19	21	23
y: Quiz score (points)	17	21	23	29	25	19	27	15



2. **Interpret Pearson r = 0.980 in context. State what the data do and do not justify.**

x: Study time (hours)	8	9	10	11	12	13	14	15
y: Quiz score (points)	13	23	23	37	39	43	47	59



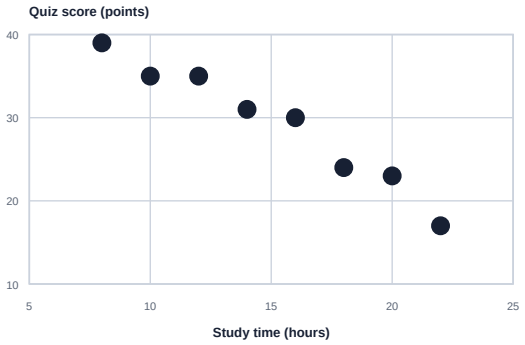
Name _____ Score _____ Teacher _____ Date _____

Scatterplots and Correlation

Use the labeled paired observations. Describe form and direction before calculating Pearson r; round r to the nearest thousandth. Association alone does not establish causation.

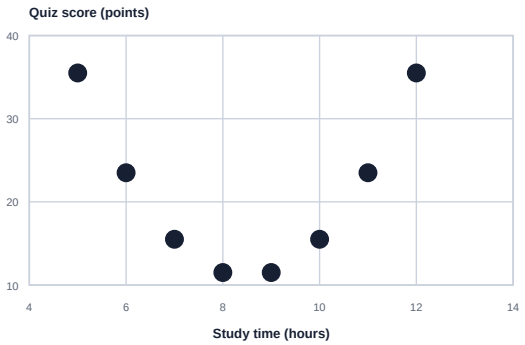
3. **Calculate Pearson's correlation coefficient r from the displayed pairs.**

x: Study time (hours)	8	10	12	14	16	18	20	22
y: Quiz score (points)	39	35	35	31	30	24	23	17



4. **Use the supplied scatterplot to describe its direction and whether its form is linear or nonlinear.**

x: Study time (hours)	5	6	7	8	9	10	11	12
y: Quiz score (points)	35.5	23.5	15.5	11.5	11.5	15.5	23.5	35.5



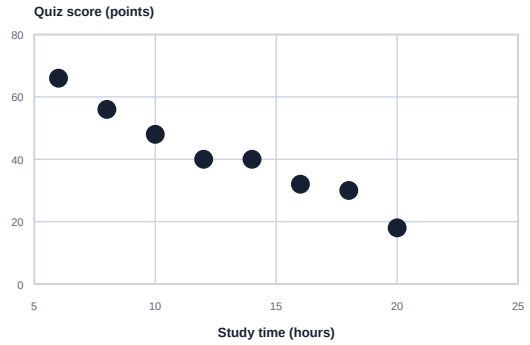
Name _____ Score _____ Teacher _____ Date _____

Scatterplots and Correlation

Use the labeled paired observations. Describe form and direction before calculating Pearson r; round r to the nearest thousandth. Association alone does not establish causation.

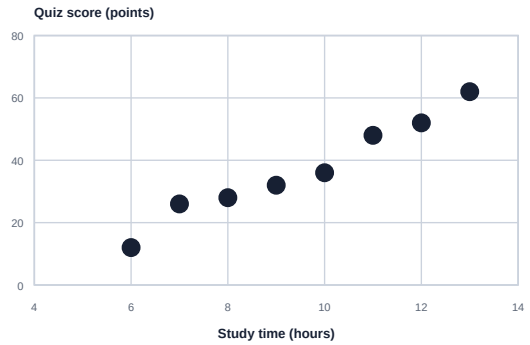
5. **Calculate Pearson's correlation coefficient r from the displayed pairs.**

x: Study time (hours)	6	8	10	12	14	16	18	20
y: Quiz score (points)	66	56	48	40	40	32	30	18



6. **Interpret Pearson r = 0.983 in context. State what the data do and do not justify.**

x: Study time (hours)	6	7	8	9	10	11	12	13
y: Quiz score (points)	12	26	28	32	36	48	52	62



Math Sheet

Name _____ Score _____ Teacher _____ Date _____

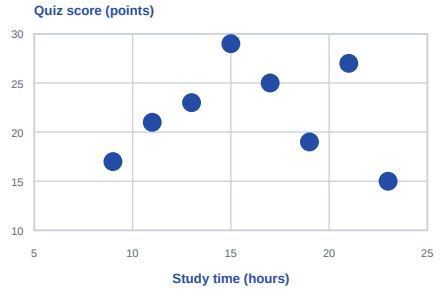
Scatterplots and Correlation

Worked Answer Key

Use the labeled paired observations. Describe form and direction before calculating Pearson r; round r to the nearest thousandth. Association alone does not establish causation.

1. **Plot every ordered pair on the blank axes, then describe the direction and form.**

x: Study time (hours)	9	11	13	15	17	19	21	23
y: Quiz score (points)	17	21	23	29	25	19	27	15

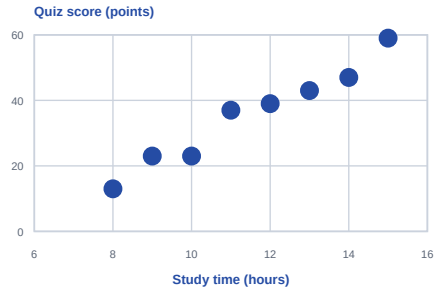


Answer: Completed plot; little or no linear association (r = 0.000).

1. Use each table row as one ordered pair (x, y); label both axes with variables and units.
2. The completed plot shows little or no linear association (r = 0.000).
3. Classroom convention: |r| < 0.20 little or no, 0.20-0.39 weak, 0.40-0.69 moderate, and 0.70-1.00 strong linear association.

2. **Interpret Pearson r = 0.980 in context. State what the data do and do not justify.**

x: Study time (hours)	8	9	10	11	12	13	14	15
y: Quiz score (points)	13	23	23	37	39	43	47	59



Answer: strong positive linear association (r = 0.980). This is association, not evidence that study time causes the scores.

1. Classroom convention: |r| < 0.20 little or no, 0.20-0.39 weak, 0.40-0.69 moderate, and 0.70-1.00 strong linear association. By that convention these data show strong positive linear association (r = 0.980).
2. Correlation does not establish causation; lurking variables and study design still matter.
3. An r near 0 means little linear association, not independence; nonlinear dependence may remain.

Name _____ Score _____ Teacher _____ Date _____

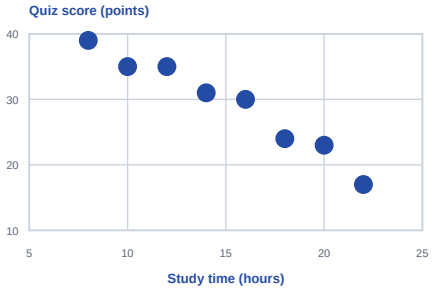
Scatterplots and Correlation

Worked Answer Key

Use the labeled paired observations. Describe form and direction before calculating Pearson r; round r to the nearest thousandth. Association alone does not establish causation.

3. **Calculate Pearson's correlation coefficient r from the displayed pairs.**

x: Study time (hours)	8	10	12	14	16	18	20	22
y: Quiz score (points)	39	35	35	31	30	24	23	17

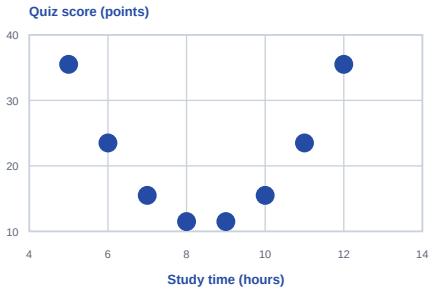


Answer: r = -0.980

1. x-bar = 15.000, y-bar = 29.250; Sxx = 168.000, Syy = 381.500, and Sxy = -248.000.
2. r = Sxy / sqrt(Sxx x Syy) = -0.980 (rounded only here at the final answer).
3. Pearson r measures the direction and strength of linear association.

4. **Use the supplied scatterplot to describe its direction and whether its form is linear or nonlinear.**

x: Study time (hours)	5	6	7	8	9	10	11	12
y: Quiz score (points)	35.5	23.5	15.5	11.5	11.5	15.5	23.5	35.5



Answer: a clear U-shaped nonlinear association (r = 0.000)

1. The points fall and then rise, so a straight-line direction alone misses the U-shaped form.
2. Classroom convention: |r| < 0.20 little or no, 0.20-0.39 weak, 0.40-0.69 moderate, and 0.70-1.00 strong linear association.
3. A visual description concerns association in these observations; it does not establish a cause.

Math Sheet

Name _____ Score _____ Teacher _____ Date _____

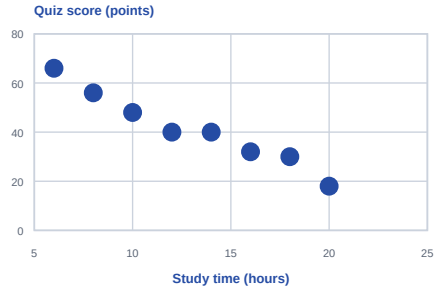
Scatterplots and Correlation

Worked Answer Key

Use the labeled paired observations. Describe form and direction before calculating Pearson r; round r to the nearest thousandth. Association alone does not establish causation.

5. **Calculate Pearson's correlation coefficient r from the displayed pairs.**

x: Study time (hours)	6	8	10	12	14	16	18	20
y: Quiz score (points)	66	56	48	40	40	32	30	18

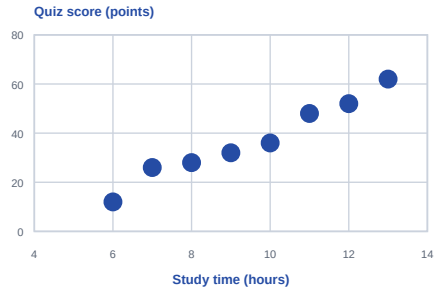


Answer: r = -0.982

1. x-bar = 13.000, y-bar = 41.250; Sxx = 168.000, Syy = 1631.500, and Sxy = -514.000.
2. r = Sxy / sqrt(Sxx x Syy) = -0.982 (rounded only here at the final answer).
3. Pearson r measures the direction and strength of linear association.

6. **Interpret Pearson r = 0.983 in context. State what the data do and do not justify.**

x: Study time (hours)	6	7	8	9	10	11	12	13
y: Quiz score (points)	12	26	28	32	36	48	52	62



Answer: strong positive linear association (r = 0.983). This is association, not evidence that study time causes the scores.

1. Classroom convention: |r| < 0.20 little or no, 0.20-0.39 weak, 0.40-0.69 moderate, and 0.70-1.00 strong linear association. By that convention these data show strong positive linear association (r = 0.983).
2. Correlation does not establish causation; lurking variables and study design still matter.
3. An r near 0 means little linear association, not independence; nonlinear dependence may remain.