LESSON MAKER PRO

Trends and Risks

Use linear patterns to estimate rates and assess claims.

HIGH SCHOOL · GDA.DSP.A.7

GDA.DSP.A.7 "Use mathematical and statistical reasoning with quantitative data, both univariate data (set of values) and bivariate data (set of pairs of values) that suggest a linear association, in order to draw conclusions and assess risk."

NAME _____ DATE _____

ESTIMATE WITH A TREND

For paired data that follow a linear pattern, divide the change in the rate by the change in the other value. Use that change to estimate a new rate. A trend does not prove cause, and a prediction beyond the data may be less reliable.

WORKED EXAMPLE

A bus survey tracked delays and riders who missed first period. Estimate the number per 100 riders who would miss first period after a 13-minute delay.

Delay (min)	Missed first period per 100 riders
7	21
9	25
11	29

1. From 7 to 9 minutes, the rate rises from 21 to 25.
2. The change per minute is 4/2 = 2 per 100 riders.
3. From 11 to 13 minutes is 2 more minutes, so 29 + 2(2) = 33.

Answer: 33 per 100 riders

PRACTICE 4 problems

1 Pairs (x, y): (0, 6), (2, 10). If the pattern stays linear, find y when x = 3.

ANSWER _____

2 Pairs (x, y): (1, 4), (3, 10). If the pattern stays linear, find y when x = 5.

ANSWER _____

3 Pairs (x, y): (0, 18), (2, 14), (4, 10). Find the change in y for each 1-unit increase in x.

ANSWER _____

4 At 1 hour online, 8 per 100 students report poor sleep. At 4 hours, 14 per 100 do. What is the change in reports per 100 for each extra hour?

ANSWER _____

APPLY IT Show your work

1 A school surveyed sleep hours and drowsiness in class. Predict the reports per 100 students at 12 hours of sleep. Does the association prove that more sleep prevents drowsiness?

SLEEP SURVEY

Sleep (hours)	Drowsy students per 100
6	50
8	40
10	30

ANSWER _____

2 A skate park tracked practice hours and falls per 100 sessions. Estimate the rate at 3 hours. How much lower is it than the rate at 0 hours?

SKATE PARK RECORDS

Practice (hours)	Falls per 100 sessions
0	18
2	14
4	10

ANSWER _____

CHALLENGE One step up

Two student groups tracked study hours and missed deadlines. At 6 hours, which group has the lower predicted rate, by how much, and why is the prediction uncertain?

MISSED DEADLINES PER 100 STUDENTS

Study (hours)	Group A	Group B
0	24	10
2	20	12
4	16	14

WORK SPACE AND ANSWER

ANSWER KEY

Trends and Risks

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Pairs (x, y): (0, 6), (2, 10). If the pattern stays linear, find y when x = 3.	**12**
2	Pairs (x, y): (1, 4), (3, 10). If the pattern stays linear, find y when x = 5.	**16**
3	Pairs (x, y): (0, 18), (2, 14), (4, 10). Find the change in y for each 1-unit increase in x.	**-2**
4	At 1 hour online, 8 per 100 students report poor sleep. At 4 hours, 14 per 100 do. What is the change in reports per 100 for each extra hour?	**An increase of 2 per 100 students per hour**

PART 2 · APPLY IT

1. **20 per 100 students. No, the association does not prove cause.** The rate drops by 10 per 100 for every 2 hours, so extend the pattern from 10 to 12 hours to get 20. Other factors could affect drowsiness.
2. **12 falls per 100 sessions, which is 6 fewer than at 0 hours.** The rate falls by 2 per 100 for each hour. At 3 hours it is 14 - 2 = 12, and 18 - 12 = 6.

CHALLENGE

Group A, by 4 per 100 students. At 6 hours, the predicted rates are 12 for Group A and 16 for Group B. The prediction is uncertain because 6 hours is beyond the observed data, so the patterns may not continue.

Accept equivalent wording for changes stated per 100. For the challenge, accept any specific explanation that the prediction extends beyond the observed range.