Interpreting Slope and Intercept of a Linear Model Worksheet

Algebra 1 · Common Core HSS-ID.C.7

> Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.

Practice

Builds the skill step by step.

1. A plant's height is modeled by $y = 2.5x + 10$, in cm after x weeks. What does 2.5 mean?
   A. It grows 10 cm per week.
   B. The plant grows about 2.5 cm per week.
   C. The plant is 2.5 cm tall at the start.
   D. It grows for 2.5 weeks.

2. For $y = 2.5x + 10$ (plant height in cm after x weeks), what does 10 mean?
   A. The plant was about 10 cm tall at the start.
   B. It grows 10 cm per week.
   C. It grows for 10 weeks.
   D. Its final height is 10 cm.

3. Ticket sales are modeled by $y = -30p + 900$ at price p dollars. How many fewer tickets are sold for each 1-dollar price increase?

4. For $y = -30p + 900$, what does 900 represent?
   A. the price per ticket
   B. the most a ticket can cost
   C. the change in sales per dollar
   D. the predicted sales if tickets were free

5. A car's value is modeled by $y = -1500x + 24{,}000$ dollars after x years. What is its predicted value after 4 years?

6. For $y = -1500x + 24{,}000$, by how many dollars does the car lose value each year?

7. For $y = -1500x + 24{,}000$, what does 24,000 represent?

   A. the car's age

   B. the yearly loss

   C. the car's value when new

   D. the final value

8. A phone battery is modeled by $y = -12x + 100$ (percent after x hours). What does the model predict after 5 hours?

9. For $y = -12x + 100$, after how many hours does the model predict 0%, to the nearest tenth?

10. A linear model has a positive slope. What does that mean?

    A. As x increases, y decreases.

    B. As x increases, y tends to increase.

    C. y is always positive.

    D. x and y are unrelated.

ALBERT

Name _____ Date _____

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On Level

Grade-level practice.

1. Arm span is modeled by $y = 1.02x - 2$ (both in cm, x = height). What arm span does it predict for a height of 170 cm?

2. In $y = 1.02x - 2$ (arm span vs. height in cm), does the intercept -2 have a real meaning?

   A. Yes: newborns have negative arm spans.

   B. Yes: it is the slope.

   C. No: a height of 0 cm is outside the data.

   D. Yes: everyone's arm span is 2 cm less.

3. Fuel left is modeled by $y = 14 - 0.04m$ gallons after m miles. How many miles until the tank is empty?

4. Temperature is converted by $F = 1.8C + 32$. Interpret 1.8 and 32.

5. Sales are modeled by $y = 6.5x + 40$, where x is ad spending in hundreds of dollars and y is sales in thousands. By how many thousand dollars do sales increase for each additional 100 dollars of ads?

6. A model $y = 3x + 20$ has x in hours and y in miles. What are the units of the slope?

   A. miles per hour

   B. hours per mile

   C. miles

   D. hours

7. Ice remaining is modeled by $y = -0.5x + 98$ (percent after x minutes). After how many minutes does the model predict 50%?

8. Sleep is modeled by $y = -0.3x + 9$ (hours of sleep vs. hours of screen time). What does it predict for 5 hours of screen time?

9. In $y = -0.3x + 9$ (sleep vs. screen time in hours), what does -0.3 mean?

   A. People with no screen time sleep 0.3 hours.

   B. People sleep 0.3 hours a night.

   C. Screen time causes 0.3 hours less sleep.

   D. Each extra hour of screen time goes with about 0.3 fewer hours of sleep.

10. Model A has slope 2.1 and model B has slope 3.4. How much greater is B's rate of change?

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Challenge

Multi-step and word problems that stretch it.

1. A line fit to data passes through (2, 31) and (6, 47). What is its y-intercept?

2. Explain when the y-intercept of a linear model has no meaningful interpretation, with an example.

3. Income is modeled by $y = 5.2x - 20$, in thousands of dollars, where x is years of education. What does it predict for 16 years?

4. In $y = 5.2x - 20$ (income in thousands vs. years of education), what does 5.2 mean?

   A. Each extra year of education goes with about 5,200 dollars more income.

   B. Everyone earns 5,200 dollars.

   C. Income is 5.2 times education.

   D. Education causes 5.2 more years of work.

5. A linear model passes through (10, 35) and (20, 55). What is its slope?

6. A linear model has slope 2. By how much does y change when x increases by 5?

7. A model is y = 1.5x + 12. The data point (10, 30) is observed. What is its residual?

8. A model of children's height from age has intercept 75 cm. Why might that number be misleading?

   A. The slope is wrong.

   B. Height doesn't depend on age.

   C. Babies are always 75 cm.

   D. The data may not include newborns, so age 0 is an extrapolation.

9. A model is y = 0.75x + 5. For what x does it predict y = 50?

10. Two linear models have slopes 1.2 and 4.8. What does the steeper one show?

    A. a negative relationship

    B. a faster rate of change

    C. a larger starting value

    D. no relationship