Task Real Life Regressions

Strand
Mathematical Models

Student Text Pages
336–337

Suggested Timing
80 min

Tools
- graphing calculators
- computers with Internet access and spreadsheet software

Related Resources
BLM 5-28 Chapter 5 Task Rubric

Specific Expectations

Modelling Graphically

MM2.01 interpret graphs to describe a relationship (e.g., distance travelled depends on driving time, pollution increases with traffic volume, maximum profit occurs at a certain sales volume), using language and units appropriate to the context

MM2.02 describe trends based on given graphs, and use the trends to make predictions or justify decisions (e.g., given a graph of the men's 100-m world record versus the year, predict the world record in the year 2050 and state your assumptions; given a graph showing the rising trend in graduation rates among Aboriginal youth, make predictions about future rates)

Modelling Algebraically

MM3.03 make connections between formulas and linear, quadratic, and exponential functions [e.g., recognize that the compound interest formula, $A = P(1 + i)^n$, is an example of an exponential function $A(n)$ when P and i are constant, and of a linear function $A(P)$ when i and n are constant], using a variety of tools and strategies (e.g., comparing the graphs generated with technology when different variables in a formula are set as constants)

Teaching Suggestions

- Have students read the Task and ensure they understand what they are being asked to do.
- Have students work in groups to brainstorm strategies for completing the Task. Discuss the strategies and review necessary skills and concepts for completing the problem.
- Circulate as students complete the Task and assist them as necessary.

Prompts for Getting Started

Ask students the following questions:
- What is the Task asking you to do?
- Is the given information complete enough to answer the questions?
- Where can you find information on constructing regression models?

Hints for Evaluating a Response

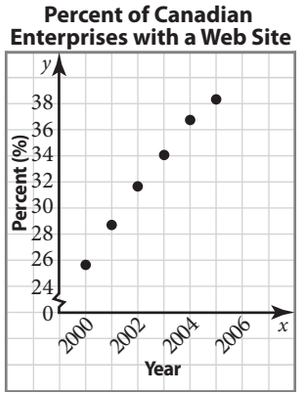
Student responses are being assessed for the level of mathematical understanding they represent. As you assess each response, consider these questions:
- How much assistance did the student need to understand what information was required?
- How much assistance did the student need to use technology effectively?
- How much assistance did the student need to complete the Task?
- What parts of the Task did the student complete or not complete?
- Did the student present work that is clear and easy to follow and understand?
- Are the student's answers supported by references to Internet sources used?

Level 3 Sample Response

A. Companies with a Web Site

1. The independent variable is the year. The dependent variable is the percent of companies with a Web site.

2.



3. The number of businesses with a Web site is increasing constantly.

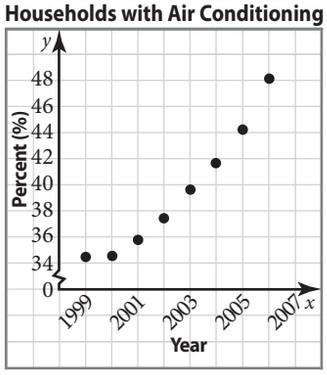
4. A linear model appears to best fit the data. The equation of the line of best fit is $y = 2.579x - 5133.3$.

5. This trend will continue so long as having a Web site is profitable to businesses. If it is no longer profitable, then the number of companies with Web sites will decrease.

B. Households With Air Conditioning

1. The independent variable is the year. The dependent variable is the percent of companies with a Web site.

2.



3. The number of households with air conditioning is increasing exponentially.

4. An exponential model appears to best fit the data. The equation of the curve of best fit is $y = (3.395 \times 10^{-41})(1.0496)^x$.

5. The number of households with air conditioning will likely continue to increase as summers get hotter and air conditioners become less expensive but it is unlikely to continue at the same rate. There will still be people who do not want air conditioning even if they can afford it.

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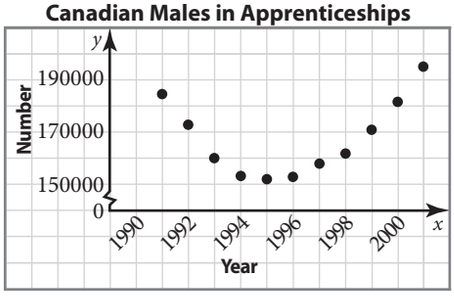
B. Males Registered in Apprenticeship Training in Canada

1. The independent variable is the year. The dependent variable is the number of males registered in apprenticeship training, in Canada.

2.



3. The number of males in apprenticeships decreases then increases.

4. A quadratic model appears to best fit the data. The equation of the curve of best fit is $y = 1501.45x^2 - 5\ 992\ 495.36x + 5\ 979\ 368\ 225$.

5. This trend may or may not continue depending on how many males are interested in apprenticeship programs. If more males choose to go to university or college, the number in apprenticeship programs will decrease.

6. Answers may vary.

Level 3 Notes

Look for the following:

- appropriate regression models are tested on the data
- solution is logically organised with most necessary explanations
- some conclusions are supported with mathematical reasoning; others are based on graphs but reasoning is not made explicit

What Distinguishes Level 2

Look for the following:

- regression models are tested on the data but might not be appropriate
- solution may lack in logical organisation; some explanations may be missing
- few conclusions are supported with mathematical reasoning

What Distinguishes Level 4

Look for the following:

- multiple regression models are tested on the data and the best one is chosen
- solution is logically organised and fully explained
- all conclusions are supported with mathematical reasoning

Summative Assessment

- Use **BLM 5-28 Chapter 5 Task Rubric** to assess student achievement.