

## Examples of Tasks from ©2008 Course 1, Unit 3

### Getting Started

The tasks below are selected with the intent of presenting key ideas and skills. **Not every answer is complete**, so that teachers can still assign these questions and expect students to finish the tasks. If you are working with your student on homework, please use these solutions with the intention of increasing student understanding and independence. A list of questions to use as you work together, prepared in [English](#) and [Spanish](#), is available. Encourage students to refer to their class notes and Math Toolkit entries for assistance.

As you read these selected homework tasks and solutions, you will notice that some very sophisticated communication skills are expected. Students develop these over time. This is the standard for which to strive. See [Research on Communication](#).

The [Algebra](#) page or the [Scope and Sequence](#) (2nd edition) might help you follow the conceptual development of the ideas you see in these examples.

### Main Mathematical Goals for Unit 3

Upon completion of this unit, students should be able to:

- recognize patterns in tables of sample values, in problem conditions, and in data plots that can be described by linear functions (reconocer patrones en los cuadros de valores de muestra, en condiciones problemáticas, y en parcelas de datos que pueden ser descritos por funciones lineales).
- write linear function rules to describe linear, or approximately linear, patterns in graphs or numerical data (escribir normas para funciones lineales para describir lineal, o aproximadamente lineal, patrones en los gráficos o datos numéricos).
- use table, graph, or symbolic representations of linear functions to answer questions about the situations they represent: (1) calculate  $y$  for a given  $x$  (i.e., evaluate functions); (2) find  $x$  for a given  $y$  (i.e., solve equations and inequalities); and (3) describe the rate at which  $y$  changes as  $x$  changes (i.e., determine slope). (usar tablas, gráficos, o representaciones simbólicas de funciones lineales para contestar las preguntas acerca de las situaciones que representan: (1) calcular  $y$  para una  $x$  determinada (es decir, evaluar funciones); (2) encontrar  $x$  para una  $y$  determinada (es decir, resolver ecuaciones y las desigualdades), y (3) describir la velocidad a la  $y$  cambia en cuanto a los cambios de la  $x$  (es decir, determinar la pendiente).)
- rewrite linear expressions in equivalent forms (reescribir las expresiones lineales en formas equivalentes).

### What Solutions are Available?

- Lesson 1:** Investigation 1—Applications Task 1 (p. 168)  
 Investigation 2—Applications Task 8 (p. 171), Applications Task 9 (p. 171),  
 Connections Task 16 (p. 175)  
 Investigation 3—Applications Task 10 (p. 171), Applications Task 12 (p. 173),  
 Applications Task 13 (p. 174), Connections Task 19 (p. 176),  
 Extensions Task 34 (p. 182), Extensions Task 35 (p. 183)
- Lesson 2:** Investigation 1—Applications Task 1 (p. 224), Reflections Task 14 (p. 228)  
 Investigation 2—Applications Task 6 (p. 225)

### Technology

Many data sets used in this unit are available in [CPMP-Tools](http://www.wmich.edu/cpmp/CPMP-Tools/). This public domain software can be downloaded from: [www.wmich.edu/cpmp/CPMP-Tools/](http://www.wmich.edu/cpmp/CPMP-Tools/). Alternatively, students can enter the data into a graphing calculator with statistics capabilities for analysis purposes.

## Selected Homework Tasks and Expected Solutions

(These solutions are for tasks in the 2nd edition book—2008 copyright.  
 For homework tasks in books with earlier copyright dates, see [Helping with Homework](#).)

### Lesson 1, Investigation 1, Applications Task 1 (p. 168)

- a. i.** In the rule  $C = 150 + 2n$ , the 150 tells us that the fixed cost of recording the show is \$150, and the 2 tells us that reproduction of individual copies of the DVD will cost \$2 apiece. (En la regla  $C = 150 + 2n$ , los 150 nos dice que el costo fijo de la grabación del espectáculo es de \$ 150, y los 2 nos dice que la reproducción de las copias de los DVD costarán \$ 2 cada uno.)
- ii.** The rule says that the ordered pair (0, 150) will appear in the table and that as  $n$  increases in steps of 1, the values of  $C$  will increase in steps of 2. (La regla dice que el par ordenado (0, 150) aparecerá en el cuadro y como que  $n$  aumenta en pasos de 1, los valores de  $C$  aumentarán en pasos de 2.)
- iii.** The graph will be a line with  $y$ -intercept (intersección- $y$ ) (0, 150) and slope (pendiente) 2.
- iv.** The *NOW-NEXT* rule describing the pattern of change in total cost (el patrón de cambio en el costo total) will be  $NEXT = NOW + 2$ , starting at 150.
- b.** To be completed by the student. (Para ser completado por el estudiante.)
- c.** To be completed by the student.

**Lesson 1, Investigation 2, Applications Task 8 (p. 171)**

- a.** The constant term tells that  $(0, -4)$  appears in the table and that the  $y$ -intercept is  $(0, -4)$ . The coefficient of  $x$  tells that the table  $y$  values increase by 2 for each increase of 1 in  $x$  and that the slope of the graph is 2. (El término constante dice que  $(0, -4)$  aparece en la tabla y que el interceptar  $y$  es  $(0, -4)$ . El coeficiente de  $x$  dice que la tabla  $y$  los valores aumentan por 2 cada aumento de 1 en  $x$ , y que la pendiente del gráfico es 2.)
- b–d.** To be completed by the student. (Para ser completado por el estudiante.)

**Lesson 1, Investigation 2, Applications Task 9 (p. 171)**

- a.** To be completed by the student. (Para ser completado por el estudiante.)
- b.** To be completed by the student.
- c.**  $y = x + 1$

There are multiple ways to get the rule. One could purely use algebra or use a plot of the points to aid in finding the slope and  $y$ -intercept. (Existen varias maneras de obtener la regla. Se podría utilizar simplemente el álgebra o la utilización de una parcela de los puntos para ayudar en la búsqueda de la pendiente y la intersección- $y$ .)

- d.** To be completed by the student.

**Lesson 1, Investigation 2, Connections Task 16 (p. 175)**

Only solutions for Graph I are listed here. The others are to be completed by the student. (Sólo hay soluciones para el Gráfico I aquí. Los otros son para ser completado por el estudiante.)

- a.** The rate of change for Graph I is 2. (La tasa de cambio para el gráfico I 2.)
- b.** The *NOW-NEXT* rule for Graph I is  $NEXT = NOW + 2$ , starting at 0.
- c.** The function rule (función de la regla) for Graph I is  $y = 2x$ .
- d.** The rate of increase/decrease is the number added/subtracted from *NOW* in the *NOW-NEXT* rule. In this case, that number is 2 and is the coefficient of the term in the “ $y = \dots$ ” rule. The start value in the *NOW-NEXT* rule is 0 and is the constant term in the “ $y = \dots$ ” rule. (La tasa de aumento/disminución es el número agregado/restarado de *NOW* en la regla de *NOW-NEXT*. En este caso, el número es 2 y es el coeficiente del término en la regla de “ $y = \dots$ ”. El valor de comienzo en la regla de *NOW-NEXT* es 0 y es el término constante en la regla de “ $y = \dots$ ”.)

**Lesson 1, Investigation 3, Applications Task 10 (p. 171)**

These data are located in *CPMP-Tools* under Statistics, Data Analysis, Data>Unit 3 Linear Functions> Riverdale Adventure Club. You can then use the software to plot the data and find a linear model asked for in Task 10 Part a. Alternatively, you can use your graphing calculator and enter the data in lists, produce a scatterplot, and find a model using **linreg**. (Se encuentran estos datos en “*CPMP-Tools*” debajo de “Statistics, Data Analysis, Data>Unit 3 Linear Functions> Riverdale Adventure Club”. A continuación, usted puede utilizar el software para trazar los datos y encontrar un modelo lineal pedido en “Task 10 Part a”. Alternativamente, usted puede utilizar su calculadora gráfica y meter los datos de las listas, producir un scatterplot, y encontrar un modelo utilizando **linreg**.)

**Lesson 1, Investigation 3, Applications Task 12 (p. 173)**

These data are located in *CPMP-Tools* under Statistics, Data Analysis, Data>Unit 3 Linear Functions> Selected Fast Food. (Se encuentran estos datos en “*CPMP-Tools*” debajo de “Statistics, Data Analysis, Data>Unit 3 Linear Functions> Selected Fast Food”).)

**Lesson 1, Investigation 3, Applications Task 13 (p. 174)**

These data are located in *CPMP-Tools* under Statistics, Data Analysis, Data>Unit 3 Linear Functions> Median Income. (Se encuentran estos datos en “*CPMP-Tools*” debajo de “Statistics, Data Analysis, Data>Unit 3 Linear Functions> Median Income”).)

**Lesson 1, Investigation 3, Connections Task 19 (p. 176)**

These data are located in *CPMP-Tools* under Statistics, Data Analysis, Data>Unit 3 Linear Functions> Taking Chances. (Se encuentran estos datos en “*CPMP-Tools*” debajo de “Statistics, Data Analysis, Data>Unit 3 Linear Functions> Taking Chances”).)

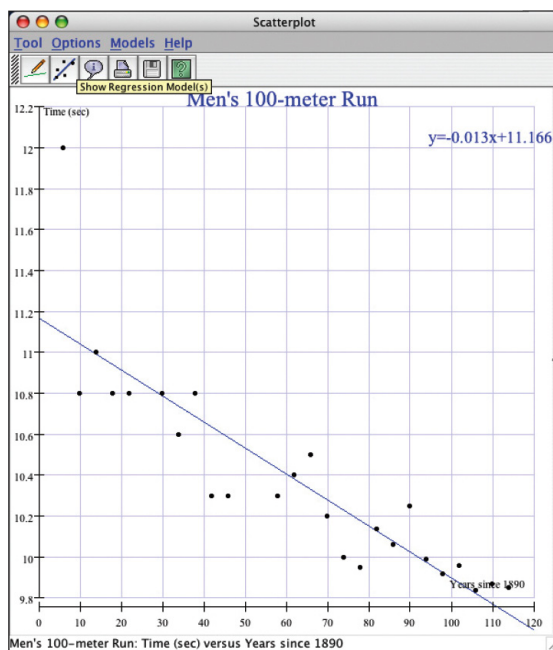
**Lesson 1, Investigation 3, Extensions Task 34 (p. 182)**

These data are located in *CPMP-Tools* under Statistics, Data Analysis, Data>Unit 3 Linear Functions> 100 Meter Freestyle. They can also be called up directly by launching the “Modeling Line” custom tool under the Statistics menu. (Se encuentran estos datos en “*CPMP-Tools*” debajo de “Statistics, Data Analysis, Data>Unit 3 Linear Functions> 100 Meter Freestyle.” También pueden ser llamados directamente por el lanzamiento de “Modeling Line” herramienta costumbre debajo del menú “Statistics”).)

- a. World War I accounts for the 1916 gap, while World War II accounts for the 1940 and 1944 gaps. (La Primera Guerra Mundial, es responsable por el vacío de 1916, mientras que la Segunda Guerra Mundial es responsable por los vacíos en los años 1940 y 1944.)

- b. The data are approximately linear, particularly if you ignore the first data point. (Los datos son aproximadamente lineales, sobre todo si usted ignora el primer punto de los datos.)

**CPMP-Tools Display**



- c.  $y = 11.116 - 0.013x$ , where  $x$  is the number of years after (el número de años después de) 1890. This model is used for the remainder of the task. (Se utiliza este modelo para el resto de la tarea.)

d–f. To be completed by the student. (Para ser completado por el estudiante.)

**Lesson 1, Investigation 3, Extensions Task 35 (p. 183)**

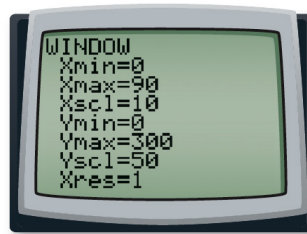
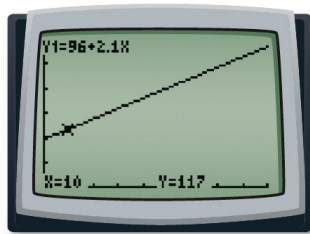
These data are located in *CPMP-Tools* under Statistics, Data Analysis, Data>Unit 3 Linear Functions> 100 Meter Freestyle. They can also be called up directly by launching the “Modeling Line” custom tool under the Statistics menu. (Se encuentran estos datos en “*CPMP-Tools*” debajo de “Statistics, Data Analysis, Data>Unit 3 Linear Functions> 100 Meter Freestyle.” También pueden ser llamados directamente por el lanzamiento de “Modeling Line” herramienta costumbre debajo del menú “Statistics”.)

**Lesson 2, Investigation 1, Applications Task 1 (p. 201)**

a. Rachel weighed 96 ounces at birth.

b.

X	Y1
0	96
15	127.5
30	159
45	190.5
60	222
75	253.5
90	285



c. Students should use their tables or graphs to find the solutions below.

i.  $y = 117$ . When Rachel is 10 days old, she will weigh 117 ounces.

ii–iv. To be completed by the student. (Para ser completado por el estudiante.)

**Lesson 2, Investigation 2, Applications Task 5 (p. 202)**

Unless specified, some students may solve algebraically and others using technology. Multiple approaches promote access for all students. (A menos que se especifique lo contrario, algunos estudiantes pueden resolver algebraicamente y otros utilizando la tecnología. Hay varios enfoques para promover el acceso de todos los estudiantes.)

a.  $g = 8$ . Victoria can only miss 8 games if she wants to earn \$306. (Victoria sólo puede perder 8 partidos si quiere ganar \$306.)

b–f. To be completed by the student. (Para ser completado por el estudiante.)

**Lesson 2, Investigation 3, Connections Task 15 (p. 205)**

a. If  $3x + 12 = 45$ , then  $3x = 45 - 12$ , or 33. If we suppose  $a = 3x$ ,  $b = 12$ , and  $c = 45$ , then this matches the addition...subtraction property. (Si  $3x + 12 = 45$ , entonces,  $3x = 45 - 12$ , o el 33. Si suponemos que  $a = 3x$ ,  $b = 12$ , y  $c = 45$ , este coincide con el “addition...subtraction” propiedad.)

b. To be completed by the student. (Para ser completado por el estudiante.)

**Lesson 2, Investigation 3, Connections Task 18 (p. 206)**

These data are located in *CPMP-Tools* under Statistics, Data Analysis, Data>Unit 3 Linear Functions> 100 Meter Freestyle. (Se encuentran estos datos en “*CPMP-Tools*” debajo de “Statistics, Data Analysis, Data>Unit 3 Linear Functions> 100 Meter Freestyle”.)

**Lesson 2, Investigation 3, Reflections Task 23 (p. 208)**

- a. Four possible (and reasonable, or productive) first steps (Cuatro posibles (y razonables, o productivos) primeros pasos):
- (1) subtracting 8 from both sides,  $2x > 5x - 12$ ;
  - (2) adding 4 to both sides,  $2x + 12 > 5x$ ;
  - (3) subtracting  $2x$  from both sides,  $8 > 3x - 4$ ;
  - (4) subtracting  $5x$  from both sides,  $-3x + 8 > -4$ .
- b. The solution tells the  $x$  values where the graph of  $y = 2x + 8$  is above the graph of  $y = 5x - 4$ . (La solución muestra los valores  $x$ , donde los valores del gráfico de  $y = 2x + 8$  están por encima de la gráfica de  $y = 5x - 4$ .) (The solution is  $x < 4$ .)
- c. The solution tells the  $x$  values that will have  $y$  values for  $y = 2x + 8$  that are greater than the  $y$  values for  $y = 5x - 4$ . (La solución muestra los valores de  $x$  que van a tener valores de  $y$  para  $y = 2x + 8$  que son más grandes que los valores de  $y$  para  $y = 5x - 4$ .) ( $x < 4$ .)

**Lesson 2, Investigation 4, Applications Task 10 (p. 204)**

- a.  $y = 3.95 + 0.03x$ , where  $x$  is the number of minutes used in a day and  $y$  is the total daily charge.
- b. The two service charges begin at the same base price, so both graphs have the same  $y$ -intercept. Since the original charge per minute was greater than the new, the graph of the original pricing plan is steeper. (El costo de los dos servicios comienzan en la misma base de precios, por lo tanto los dos gráficos tienen el mismo  $y$ -interceptar. Dado que el original costo por minuto fue mayor que el nuevo, el gráfico del plan de precios original es más pronunciado.)
- c. The cost of 30 minutes of Internet use under the new plan is \$4.85. (El costo de 30 minutos de uso de Internet en el nuevo plan es \$ 4,85.)
- Hint:* \$4.85 can be found using the table, graph, or rule. (*Pista:* Se puede encontrar \$ 4,85 utilizando la tabla, gráfico, o la norma.)
- d. To be completed by the student. (Para ser completado por el estudiante.)
- e. To be completed by the student.

**Lesson 2, Investigation 4, Extensions Task 30 (p. 210)**

- a. They will cross at or before (20, 4), since Byte to Eat charges \$4 for 20 minutes of Internet use in a day. (Se cruzarán en o antes (20, 4), Byte to Eat cobra \$ 4 para 20 minutos de uso de Internet en un día.)
- b.  $2.95 + p(20) = 4$ ;  $p = 0.0525$ . Around \$0.05 per minute will meet the condition. (Alrededor de \$0,05 por minuto se cumple la condición.)

- c. To be completed by the student. (Para ser completado por el estudiante.)
- d. To be completed by the student.

**Lesson 3, Investigation 1, Applications Task 1 (p. 224)**

- a.  $C = 2.5n + 2,500$ , where  $n$  represents the number of posters printed and  $C$  represents the cost.  
( $C = 2.5n + 2,500$ , donde  $n$  representa el número de pósters imprimidos y  $C$  representa el costo.)  
 $I = 7.95n$ , where  $n$  represents the number of posters printed and  $I$  represents the income (los ingresos).  
 $P = 5.45n - 2,500$ , where  $n$  represents the number of posters printed and  $P$  represents the profit (el beneficio).
- b.  $7.95n - (2.5n + 2,500)$  and  $7.95n - 2.5n - 2,500$   
To justify equivalence, students should note that table entries or graphs for their two expressions entered as functions are the same. Students might also verify equivalence using algebraic reasoning.  
(Para justificar la equivalencia, los estudiantes deben tomar en cuenta que entradas de la tabla o gráficos para sus dos expresiones entradas como funciones son las mismas. Los estudiantes también pueden verificar la equivalencia utilizando razonamiento algebraico.)

**Lesson 3, Investigation 1, Reflections Task 14 (p. 228)**

- a. Students might explain equivalence by comparing graphs, tables, or algebraic thinking. (Los estudiantes podrían explicar la equivalencia mediante la comparación de gráficos, tablas, o el pensamiento algebraico.)
- b. One possible response: The best expression showing all the conditions is the first one,  $35.50N - 4.75N - 5,000,000$ , because it shows each condition separately—sale price, production cost, and fixed development cost. (Una respuesta posible: La mejor expresión que muestra todas las condiciones es la primera,  $35.50N - 4.75N - 5000000$ , ya que muestra cada condición aparte-precio de venta, el costo de producción, y el costo de desarrollo fijo.)

**Lesson 3, Investigation 2, Applications Task 6 (p. 225)**

- a.  $11x + 5$
- b, d, f–h. To be completed by the student. (Para ser completado por el estudiante.)
- c.  $4 + 16x$
- e.  $2x - 8$