Name: _____   Date: _____

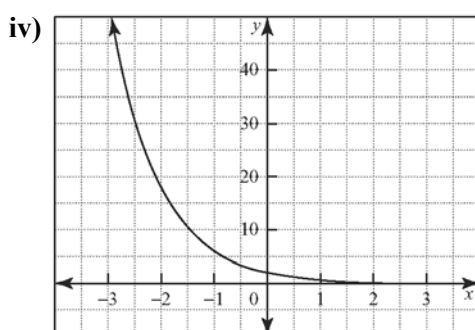## 3.6 Making Connections: Tools and Strategies for Applying Exponential Models

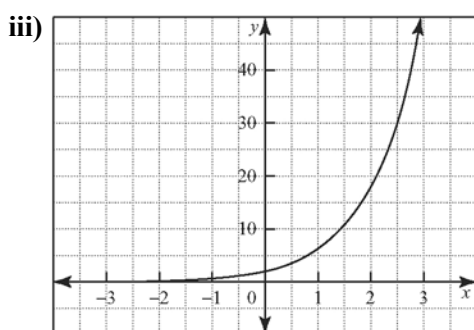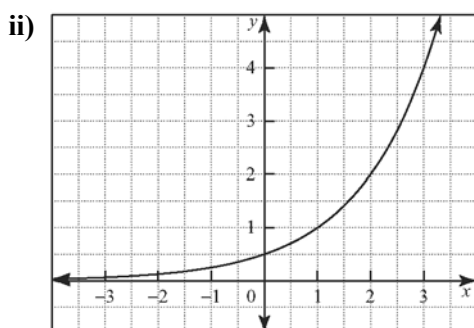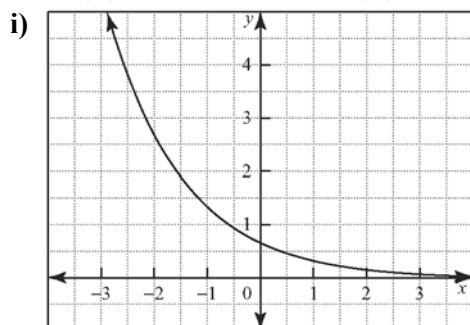**1.** Match each equation with its corresponding graph.

a) $y = 2(3)^x$

b) $y = \dfrac{1}{2}(2)^x$

c) $y = 2\left(\dfrac{1}{3}\right)^x$

d) $y = \dfrac{2}{3}\left(\dfrac{1}{2}\right)^x$

i)

ii)

iii)

iv)

2. Simon and his parents agree to the following allowance system: At the end of week 1, he is to be paid 1 cent. At the end of week 2, he is to be paid 2 cents. At the end of week 3, he is to be paid 4 cents. The allowance is to continue to double at the end of each week for the next 4 months.

a) Model this allowance system with an equation that can be used to calculate the amount his allowance, A, in dollars, at the end of week x.

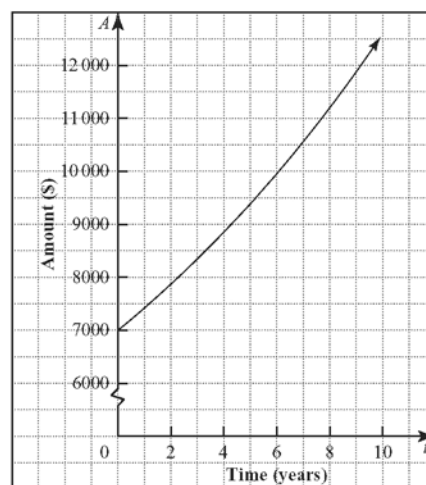**b)** Use the equation in part a) to determine Simon's allowance at the end of
  i) week 4
  ii) week 8
  iii) week 16

c) Describe the effect on the value of the allowance if payments are based on a starting amount of 2 cents.

3. The graph illustrates the exponential growth in the value of an investment during a 10-year period.

a) Estimate the values of a and b in $A = a(b)^t$ for this function.

b) Explain the roles of a and b in this question as related to the investment.

c) Use the tool of your choice to determine the exponential model for this function.

d) Compare the result of this tool with your estimated function from part a).

Name: _____

Date: _____

4. The table shows the total amount of carbon dioxide (CO_2) emissions, in megatonnes (Mt), produced in Canada in selected years.

Year	CO_2 Emissions (Mt)
1960	189
1965	254
1970	334
1975	381
1980	414
1985	385
1990	432
1995	452
2000	505

a) Modify the table of values to change each entry in the Year column to a relative year using 1960 as $t = 0$.
b) Plot the data using a scatter plot.
c) Use the tool of your choice to find an exponential function of the form $y = ab^x$ to model the data.
d) Plot this function on the same set of axes as the data and comment on the fit.
e) Use this function to determine the amount of CO_2 emissions, in megatonnes, expected to be produced in Canada in 2015.
f) How accurate do you expect your answer to part e) will be? Explain.

5. Gurpreet is evaluating employment offers from two companies. Company A offers a starting salary of $40 000 with a yearly increase of 3%. Company B offers a starting salary of $44 000 with a yearly increase of 2%.
a) Make a table of values for both offers for $t = 0$ to $t = 10$ years.
b) Graph the data from the table of values.
c) Use the graph to determine the time, t, in years, before the two jobs pay the same annual salary.
d) What is this amount?
e) Which company should Gurpreet choose if she plans to work for that company for
   i) 5 years?
   ii) 10 years?

6. The table shows the average annual income, in dollars, for full-time workers in Canada, by gender, from 1990 to 1999.

Year	Average Income ($)	
	Female	Male
1990	29 050	42 913
1991	29 654	42 575
1992	30 903	42 984
1993	30 466	42 161
1994	30 274	43 362
1995	30 959	42 338
1996	30 606	41 897
1997	30 484	43 804
1998	32 553	45 070
1999	32 026	45 800

Source: Statistics Canada

a) Modify the table of values to change each entry in the Year column to a relative year using 1990 as $t = 0$.
b) Make a scatter plot for the data in this modified chart.
c) Use the tool of your choice to find an exponential function of the form $y = ab^x$ to model the two sets of data.
d) Based on these functions, which average income is growing at a faster rate? Explain.
e) Plot the functions on the same set of axes as the data and comment on their fit.
f) Use these functions to determine the average incomes, to the nearest dollar, expected in the year 2015.
g) How accurate do you expect your answer to part e) will be? Explain.

Functions 11: Teacher's Resource
BLM 3–8 Section 3.6 Making Connections: Tools and Strategies for Applying Exponential Models

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