Growing Your Money

Your Grandmother gave you a gift of $1,000. You have placed it in a certificate of deposit. The bank is paying you 5% annual interest, compounded each year.

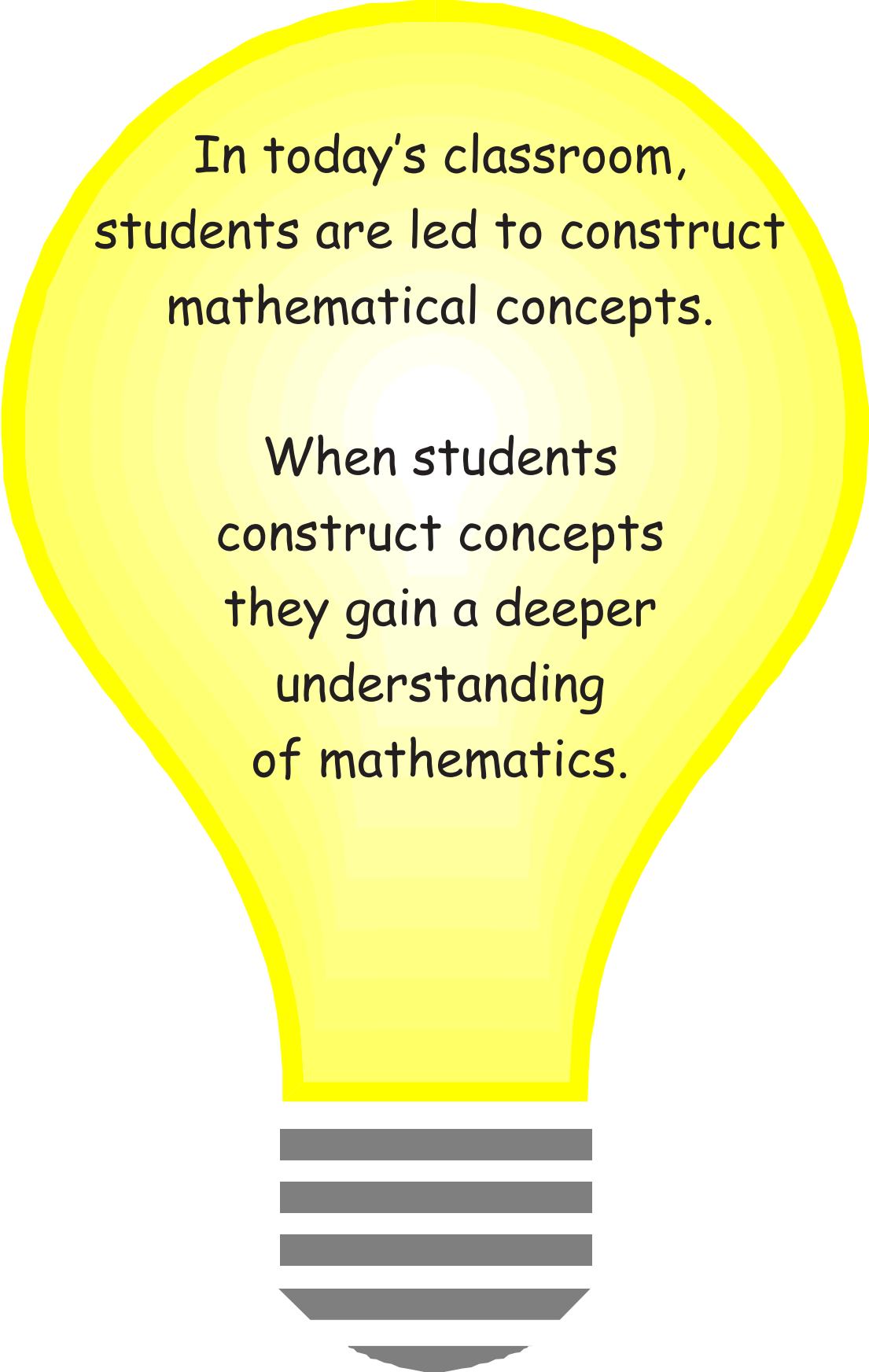Use a calculator to fill in the table below. To arrive at the new amount, add the amount in the account plus the interest earned.

YEAR NUMBER	AMOUNT IN ACCOUNT	INTEREST RATE (DECIMAL FORM)	INTEREST EARNED	NEW AMOUNT
YEAR 1	$1000.00	X .05	$50	$1050.00
YEAR 2	$1050.00	X .05	$53	$1102.50
YEAR 3	$1102.50	X .05	$55	$1157.63
YEAR 4	$1157.63	X .05	$	
YEAR 5				
YEAR 6				
YEAR 7				
YEAR 8				
YEAR 9				
YEAR 10				

Watch your money grow!

In today's classroom, students are led to construct mathematical concepts.

When students construct concepts they gain a deeper understanding of mathematics.
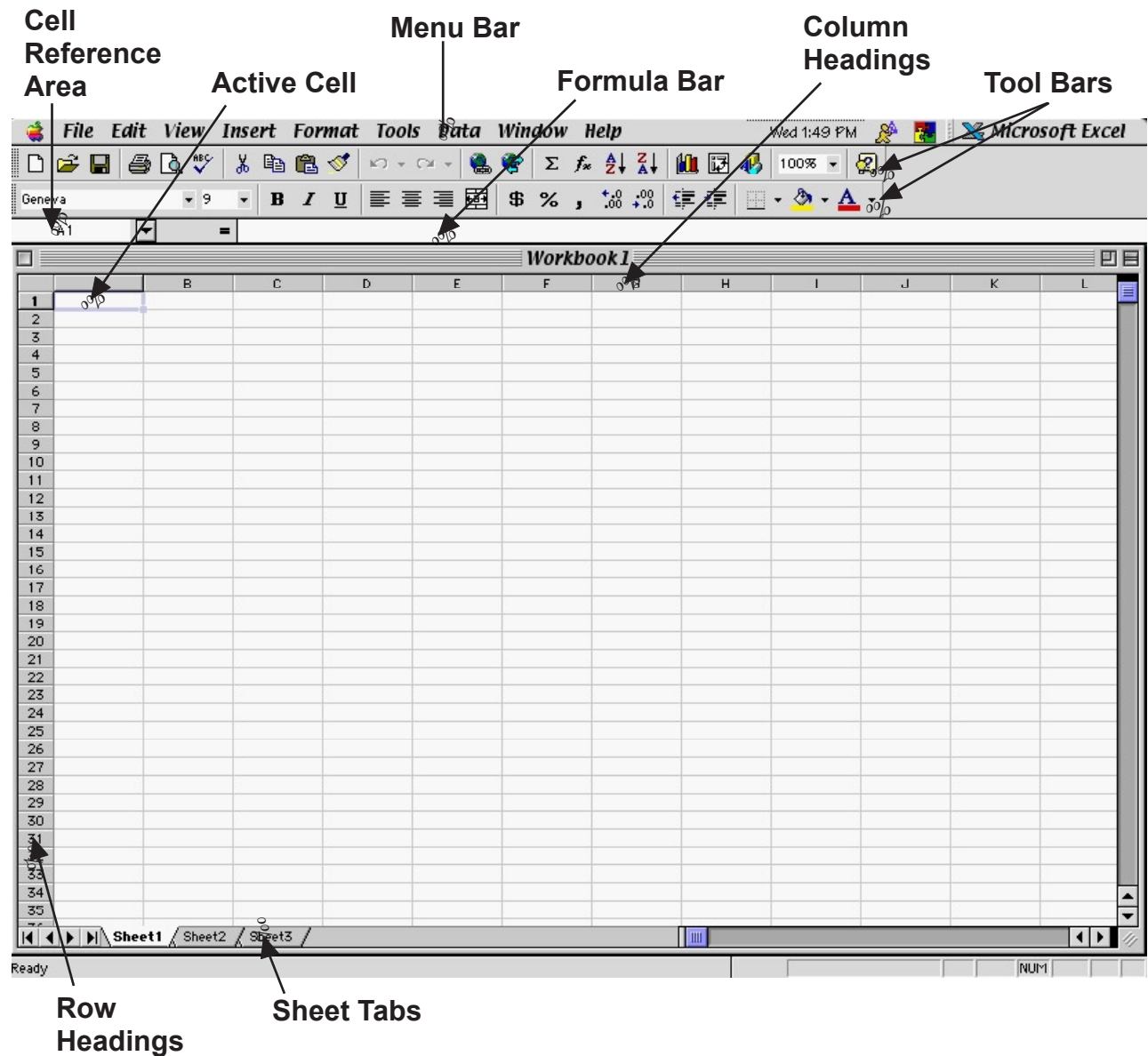
NTCM Technology Principle

Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students' learning.
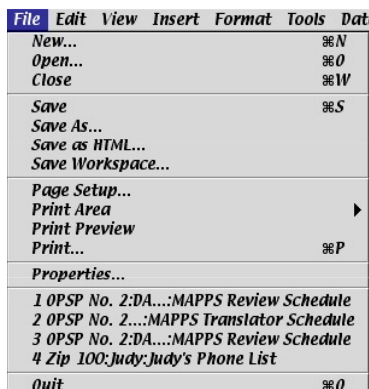
- **Technology enhances mathematics learning.**

- **Technology supports effective mathematics teaching.**

- **Technology influences what mathematics is taught.**

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Sample Excel Spreadsheet

Cell Reference Area

Active Cell

Menu Bar

Formula Bar
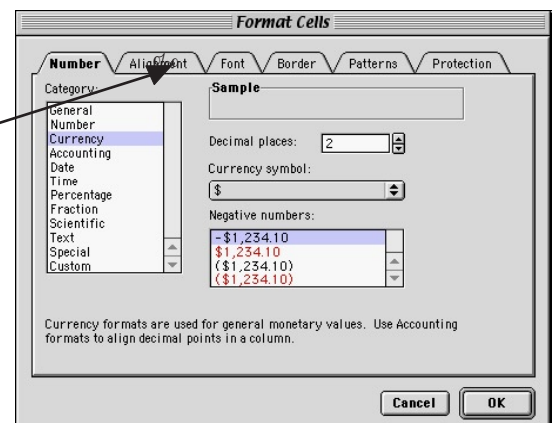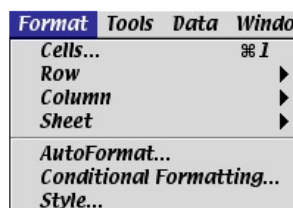
Column Headings

Tool Bars

Row Headings

Sheet Tabs

To save click on File Menu then choose Save

To format cells click on Format Menu then choose Cells to get this dialog box.

Spreadsheet Instructions

Putting *"Growing Your Money"* on a Spreadsheet

1. Creating a new spreadsheet
   a) Choose **Excel**.
   b) Pull down **FILE**.
   c) Choose **NEW**.
   d) Click **OK** for new workbook or double click on the workbook icon *(picture)*.

2. Setting up the spreadsheet
   a) Numbering from 1 to 20 *(These numbers represent 20 years of growth)*.
      1. Click on **cell A1** *(in upper left corner)*.
      2. Number from 1 to 20 in colum A *(the far left column)*.
         To number press **1** and press **return/enter**, then press **2** and **return/enter**.
         Repeat until you have reached 20.
      3. Save what you have done by pulling down **FILE** in the top left corner of your
         screen and choose **SAVE**.
      4. Name your document *"Growing Your Money Spreadsheet"* under **SAVE AS**,
         then click **SAVE**.
   b) Filling in the amount of money
      1. Click on **cell B1**.
      2. Write **1000** and press **return/enter**.
      3. Change to money by clicking on the **B** above cell B1. This will highlight the entire
         column.
      4. Pull down **FORMAT**. Choose **Cells**. *(A box will open.)*
         Click on the word **currency** and click **OK**. *(On some machines, you will have to
         look to the right for "list" to choose the .00 currency.)*
      5. Repeat instructions 3 and 4 for the column D and E.
      6. Save what you have done by pulling down **FILE** in the top left corner of your
         screen and choose **SAVE**.
   c) Choosing the interest rate *(decimal form)*
      1. Click on **cell C1**.
      2. Write in **.05** and press **return/enter**.
      3. Save what you have done by pulling down **FILE** in the top left corner of your
         screen and choose **SAVE**.

3. Setting formulas
   a) To find the interest, multiply B1 times C1 and place the answer in cell D1
      *(Refer to Growing Your Money worksheet. All formulas must start with an equal
      sign.)*
      1. Click on **cell D1**.
      2. Press the **=** sign.
         (It will appear in the formula bar above the spreadsheet.)
         Now you will tell the computer what to do.

Spreadsheet Instructions

Putting *"Growing Your Money"* on a Spreadsheet
Page 2

3. Click on **cell B1**.
   (This will also appear in the formula bar so that the bar now reads = B1.)
4. Press multipy *** sign**.
   (This symbol can be found above the 8 on the keyboard or on the number pad.)
5. Click on **cell C1**.
   (Your bar should now read = B1 * C1).
6. Press **return/enter**.
7. Save what you have done by pulling down **FILE** in the top left corner of your screen and choose **SAVE**.
8. Click on **cell E1**.
   (To find the new amount in your account, add B1 and D1 and place the answer in cell E1.)
9. Press the **= sign**.
   (All formulas must start with an equal sign. It will appear in the formula bar. Now you will tell the computer what to do.)
10. Click on **cell B1**.
    (This will also appear in the formula bar so that the bar now reads = B1.)
11. Press the **+ sign**.
    (The addition button is on the number pad to the right.)
12. Click on **cell D1**.
    (Your bar should now read = B1 + D1.)
13. Press **return/enter**.
14. Save what you have done by pulling down **FILE** in the top left corner of your screen and choose **SAVE**.
15. Click on **cell B2**.
    (To start the second year with the new amount of money, make B2 equal E1. The new amount is in cell E1. We want it to appear in cell B2. Refer to Growing Your Money worksheet.)
16. Press the **= sign**.
    (All formulas must start with an equal sign. It will appear in the formula bar. Now you will tell the computer what to do.)
17. Click on **cell E1**.
    (This will also appear in the formula bar so that the bar now reads = E1.)
18. Press **return/enter**.
    (Cell B2 should now contain $1050.00.)
19. Save what you have done by pulling down **FILE** in the top left corner of your screen and choose **SAVE**.

Spreadsheet Instructions

Putting "Growing Your Money" on a Spreadsheet
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4. Filling the Worksheet
   a) Now you are ready to have the computer do the work for you.
      1. Click and hold on **cell B2** and drag down to **cell B20**.
         (Highlighting B2-B20)
      2. Pull down **EDIT** and drag down to **FILL** *(moving on the right hand side of the box)* and across to **DOWN**. *(This may take several tries.)*
         Boxes will be filled with $0.00.
      3. Click and hold on **cell C1 (0.05)** and drag to **cell C20**.
         (C1 to C20 should be highlighted.)
      4. Pull down **EDIT** and drag down to **FILL** and across to **DOWN**.
         Boxes will be filled with 0.05.
      5. Click and hold on **cell D1 ($50.00)** and drag to cell **D20**.
         (D1 to D20 should be highlighted.)
      6. Pull down **EDIT** and drag down to **FILL** and across to **DOWN**.
         Boxes in column D will be filled with $0.00 except D1 and D2.
   b) Fill column E from E1 to E 20 by following the same pattern.
      (Now boxes in column B and column E will be filled with the growth of the money for 20 years.)

5. Fill in the information below.
   a) Percent of interest _____
   b) Years it took to double the money _____
   c) Product of these numbers _____ (a x b)

"Growing Your Money" Spreadsheet

This is what your spreadsheet should look like.

Growing Your Money Spreadsheet

	A	B	C	D	E	F	G	H	I	J	K
1	1	$1,000.00	0.05	$50.00	$1,050.00						
2	2	$1,050.00	0.05	$52.50	$1,102.50						
3	3	$1,102.50	0.05	$55.13	$1,157.63						
4	4	$1,157.63	0.05	$57.88	$1,215.51						
5	5	$1,215.51	0.05	$60.78	$1,276.28						
6	6	$1,276.28	0.05	$63.81	$1,340.10						
7	7	$1,340.10	0.05	$67.00	$1,407.10						
8	8	$1,407.10	0.05	$70.36	$1,477.46						
9	9	$1,477.46	0.05	$73.87	$1,551.33						
10	10	$1,551.33	0.05	$77.57	$1,628.89						
11	11	$1,628.89	0.05	$81.44	$1,710.34						
12	12	$1,710.34	0.05	$85.52	$1,795.86						
13	13	$1,795.86	0.05	$89.79	$1,885.65						
14	14	$1,885.65	0.05	$94.28	$1,979.93						
15	15	$1,979.93	0.05	$99.00	$2,078.93						
16	16	$2,078.93	0.05	$103.95	$2,182.87						
17	17	$2,182.87	0.05	$109.14	$2,292.02						
18	18	$2,292.02	0.05	$114.60	$2,406.62						
19	19	$2,406.62	0.05	$120.33	$2,526.95						
20	20	$2,526.95	0.05	$126.35	$2,653.30						

Sheet1 / Sheet2 / Sheet3 /

How long to double?

To do this investigation, change the interest rate in your spreadsheet.

1. Choose an interest rate from the chart.
2. Click on C1, and change the multipliar to the number in parenthesis.
3. Fill down the multiplier column as you have done before.
4. Look in column E to find when your money has grown to $2000 or more.
5. Record this number of years.

Interest Rate (computer multiplier)	Years to Double	Interst Rate X Years to Double	
4% (.04)			
5% (.05)	**14.5**	**5 X 14.5 =**	**72.5**
6% (.06)			
7% (.07)			
8% (.08)			
9% (.09)			
10% (.10)			
12% (.12)			
15% (.15)			
18% (.18)			

Now that we have filled this chart together, look at the far right column.

What number would best represent all of those numbers?

The Rule of 72

You have just discovered:

The Rule of 72!

The rule states that if you divide 72 by an interest rate, you will estimate the number of years for doubling your money.

Let's say that your interest rate is 8%.
Divide 72 by 8.
The answer is 9.

$$72 ÷ 8 = 9$$

Your money will double in approximately 9 years.
Check this answer with our "How Long to Double" chart.

Approximately how long would it take for
your money to double if your interest rate was 12%?
Check your answer with our chart.

Baby Jebidiah's Fund

Zack and Ellie Mae are looking for a way to invest money so that in **18 years** they will have **$100,000** for baby Jebidiah's college education. They are looking into an investment account that earns **8.25% interest**, compounded annually.

They want to know how much money they should deposit today in this account so that in 18 years the account will have $100,000.
- Make a guess for the amount they need today _____.
- Enter that guess on the spreadsheet to see how close you are.
- Keep guessing and checking on the spreadsheet. See how close you can come.
- Record your guesses in the table below.

Guesses	Money after 18 years

Your conclusion:
Zack and Ellie Mae should invest $_____today in order to have $100,000 in 18 years.

Extension:
If Zack and Ellie Mae needed $200,000 instead, what interest rate would they need to find?_____

Technology in the Classroom

Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students' learning.
Calculators and computers are essential tools for teaching, learning, and doing mathematics. They help organize and analyze information, and they compute efficiently and accurately. Because of this, they can help students to do investigations in every area of mathematics. When technology is available, students can focus on decision making, reflection, reasoning, and problem solving. Students learn more mathematics in greater depth with the use of technology. Technology should not be used as a replacement for basic understandings and intuitions; rather, it can and should be used to foster those understandings and intuitions.

The power and speed of technology make it possible and necessary to reexamine what mathematics students should learn, and how they should learn it.

Technology enhances mathematics learning.
Students can decide on possible patterns and rules for experiments and then check these conjectures with technology. Students can gather large amounts of information rapidly in order to learn about patterns. It is not unusual for students to exchange information with classes across the country through the use of technology. Students can quickly make changes in information and see how the graph of that information changes. Technology is a dynamic tool in today's classroom. The effective use of technology depends on the teacher.

Technology influences what mathematics is taught.
Technology has also changed what is taught. With calculators, young students can explore patterns with large numbers. Middle school students can use scientific probes attached to calculators that combine science experiments with the sound mathematical concepts of slopes and rates of change. There are geometry programs for computers that allow students of all ages to explore the relationships in geometry. Using the internet, students are able to ask experts questions and receive answers. Through technology, students can explore complicated problems that were not available several years ago.

Using Technology

Where can I borrow a computer?
Your Public Library generally has computers available that
have internet access. You can sign up for an hour at a time.
In order to get this time, sometimes you need to sign up a
day or two in advance. Computers are available in most
larger cities in the world.

What can I do with one when I find it?
You can use the internet to find information about careers, purchases, directions for driving, and an
unlimited amount of information. Have the librarian help you find some of the more popular sites to
visit.

Translations: systransoft.com
To translate a passage into almost any language, you can visit this site.
Teachers use this or any of several other translating services in order to help students who speak
another language. The student can translate homework or tests into their own language.

Homework help: mathforum.org/dr.math
This site offers a place for students (or parents) to ask mathematical questions and get an answer.
The site is provided for us by Swarthmore College. Their site also has problem of the week contests
and mathematics discussion forums. This is one of the most extensive sites promoting mathematics.

Family Mathematics: figurethis.org
Figure This! is a program that provides a fun way for you and your son/daughter to explore how
math is an important part of everyday life. It offers monthly challenges that are interesting and chal-
lenging. You can recieve a free challenge book with tips for parents in English or Spanish by calling
1-877-GO SOLVE.

Maps for going anywhere you would like to go: local.excite.com/maps
This site will provide you with directions for driving from your house to wherever you would like to
drive! It will provide a map and directions.

Email free of charge: mail.yahoo.com
There are many sites that give you free email. One of them is yahoo. You have to register and give
yourself a name. Chances are that your name will be taken, so you can add some numbers after it,
like Darcy808. Then you have to enter a password that you want to use. It will ask for personal
information, like address. You can give your work address if you want to remain private. After you
have set up the account, you can communicate with anyone else that has an email. When my family
goes out of the country on a trip, we always communicate through email.

The opportunities are limitless. It is no wonder that today is called the Information Age.