

# Chapter 13

## Programming VBA in MS Word

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In this chapter, we will learn the following to World Class Standards:

- Setting the Margins
- Setting Font and Font Size
- Adding a Header and a Footer
- Adding Text to a Document
- Adding Numbers to the Beginning of a Sentence
- Inserting a Table
- Inserting the Control Toolbox Toolbar
- Inserting and Modifying the Option Button
- Inserting and Modifying Command Buttons
- Saving a Document
- Programming a Clear Button
- Programming the Score Button
- Adding Comments in VBA to Relay Programming Information
- Declaring Variables in a Program with the Dimension Statement
- Assigning Values to Variables
- Testing a Case with the If -Then Function
- Adding in Visual Basic
- Using a Message box in Visual Basic
- Using a Label in Visual Basic

## Setting the Margins

To set the margins, go to the Page Setup after selecting File on the Menu Bar. Select the Page Setup (Figure 13-1) and the Page Setup window will appear on the display. The traditional Word margins are 1-inch on the top and bottom and 1.25 inch on the left and right. We want to change the left and right margins to 1-inch (Figure 13-2).

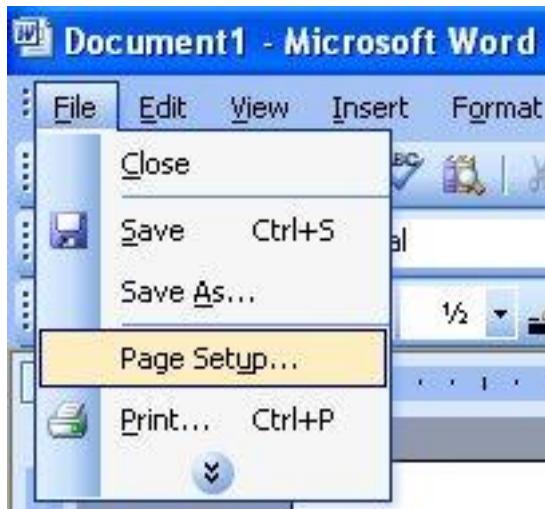


Figure 13-1 – Page Setup Panel

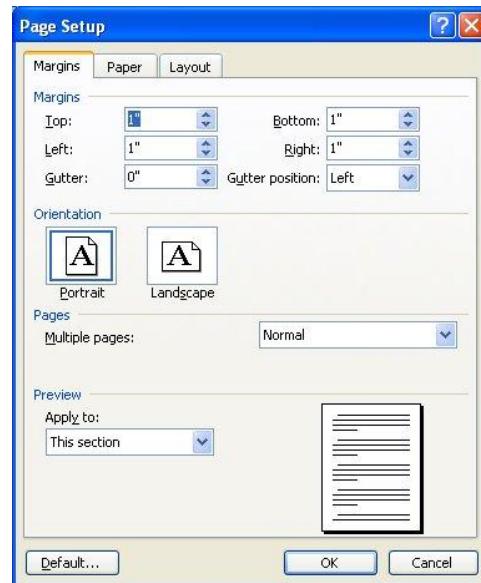


Figure 13-2 – Selecting Margin Setting

## Changing the Font and Font Size

On the left side of the **Formatting** toolbar is the **Font** Listbox. The default font and size for Microsoft Word 2003 is **Times New Roman** with a font size of **12**. We are going to change the font to **Gautami** and the size to **10**. Begin by clicking the top left drop-down arrow of the font Listbox to select the font style. The font styles are in alphabetical order so scroll down until we see **Gautami** and select it (Figure 13-3). After picking the style, click the drop-down arrow to the right of the font style box and select a font size of **10** (Figure 13-4).



Figure 13-3 – Selecting “Gautami”

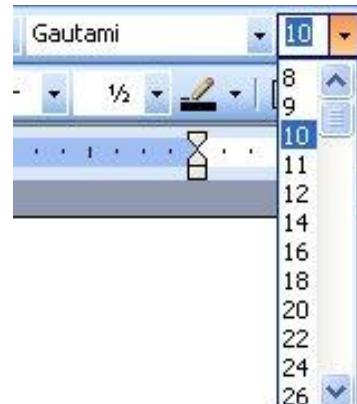


Figure 13-4 – Selecting Size “10” Font

## Adding a Header and a Footer

Now, we are going to add a header to our document that reads, “**Algebra Pretest.**” To do so, we need to select the **Header** tool from the **Header & Footer** from the list after selecting **View** on the Menu bar. Then the header and footer sections will appear along with the Header and Footer toolbar. On page one, place the cursor in the header section and choose the **Center** tool on the **Formatting** toolbar. With the header centered, we can now type in the text “**Algebra Pretest**” (Figure 13.6).

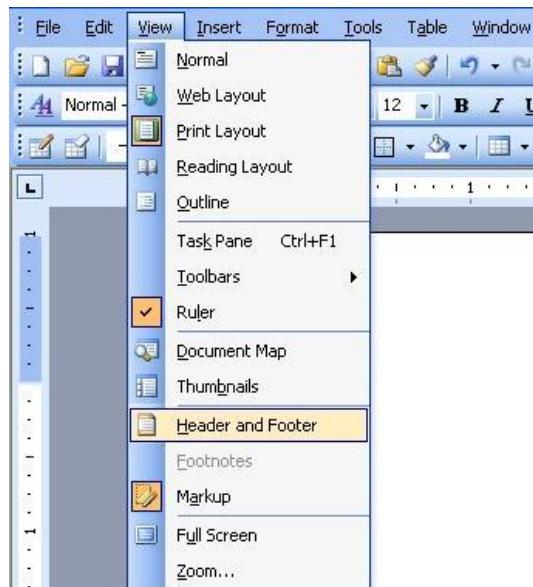


Figure 13.5 – Header and Footer

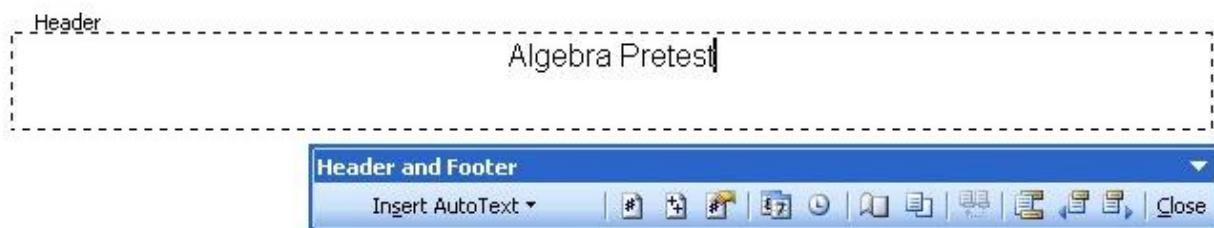


Figure 13.6 – Inserting the Header into the Document

## Adding Text to the Document

Now, we will type the instructions after the header as shown in figure 13.7.

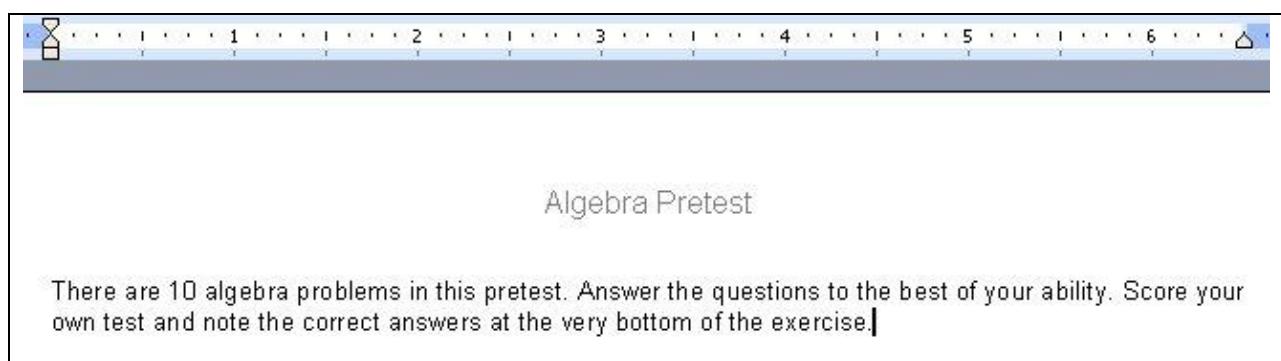


Figure 13.7 – Inserting the Text into the Document

## Adding Numbers to the Beginning of a Sentence

Next, we will pick the **Numbering** tool on the **Formatting** toolbar to begin the first question in the algebra pretest. After the number one, type the query “The answer to  $A = 2 + 5$  is” as shown in figure 13.8.

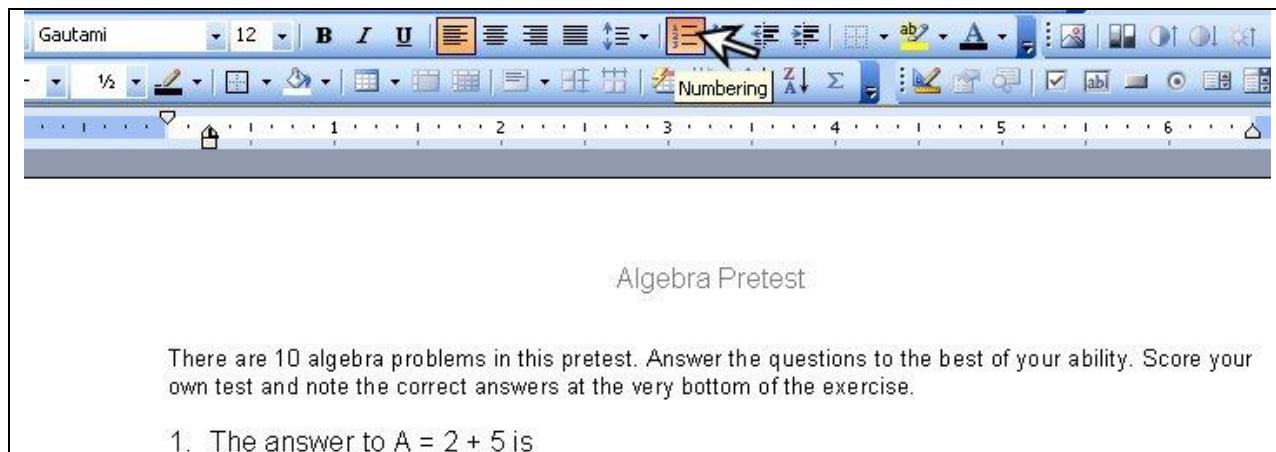


Figure 13.8 – Using the Numbering Tool to Place Numbers in Front of a Sentence

## Inserting a Table

After the first question, we will want to have four possible answers, so we will insert a four-column single row table below the question. To insert a table into our document, we go to the Insert table tool on the Standard toolbar. On the drop-down panel, that appears under the tool, select a 1x4 table (Figure 13-9). We can also insert a table by going to Table on the Menu Bar, and select Insert, and then Table. We can pick the number of rows and columns we want in the table in the Insert Table window that appears. In this case, we want 4 columns and 1 row (Figure 13-10). Both methods of inserting a table are equally effective but the first method is generally faster.

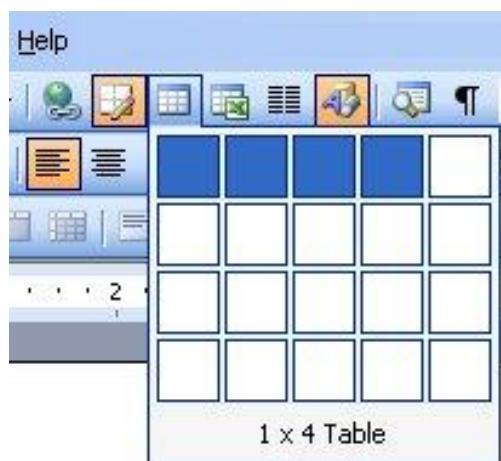


Figure 13-9 – Selecting 1x4 Table



Figure 13-10 – Insert Table Window

Figure 13-11 shows the seven rows and two columns in our document.

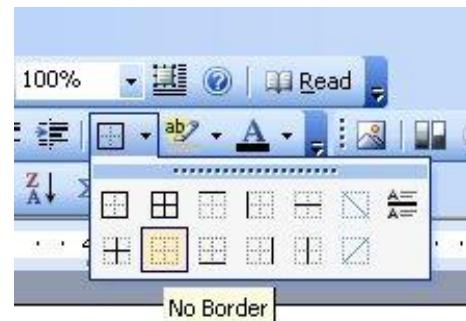
Algebra Pretest			
There are 10 algebra problems in this pretest. Answer the questions to the best of your ability. Score your own test and note the correct answers at the very bottom of the exercise.			
1. The answer to $A = 2 + 5$ is			

**Figure 13.11 – 1x4 Table to Hold the Answers to the Question**

After inserting the table, we want to remove the border from around the cells. Clicking on the move button will select the entire table. With the entire table selected, go to the border function on the **Formatting** toolbar and click the drop-down arrow on the bottom right tool (Border Settings). In the list of options that appears, select the **No Border** option (Figure 8.12). The dark lines bordering the table should now turn to light grey lines. Now the table should appear as in Figure 8.13.

There are 10 algebra problems in this pretest. Answer the questions to the best of your ability. Score your own test and note the correct answers at the very bottom of the exercise.			
1. The answer to $A = 2 + 5$ is			

**Figure 13.12 – Move Button**



**Figure 13.13 – No Border Option**

There are 10 algebra problems in this pretest. Answer the questions to the best of your ability. Score your own test and note the correct answers at the very bottom of the exercise.			
1. The answer to $A = 2 + 5$ is			

**Figure 13.14 – No Border on the Table**

## Inserting the Control Toolbox Toolbar

We began our first assignment in Microsoft Word 2003 by choosing the toolbars we wish to use frequently in this and other projects. The toolbars we picked are the **Standard**, **Formatting**, **Drawing**, **Table and Borders**, and **Picture**. Now, we want to add another toolbar, the Control Toolbox. We view the list of toolbars by right clicking on the menu bar and the list of available tools will appear. Select the Control Toolbox form the list as shown in figure 13.15.

The Control Toolbox gives us access to the Visual Basic tools we need to make this Word document a semi-automated program waiting for the reader to choose an answer for each of the ten questions and then score the pretest. Tools on toolbar we will use are the option button, command button and the label. We will use other tools in future lessons.

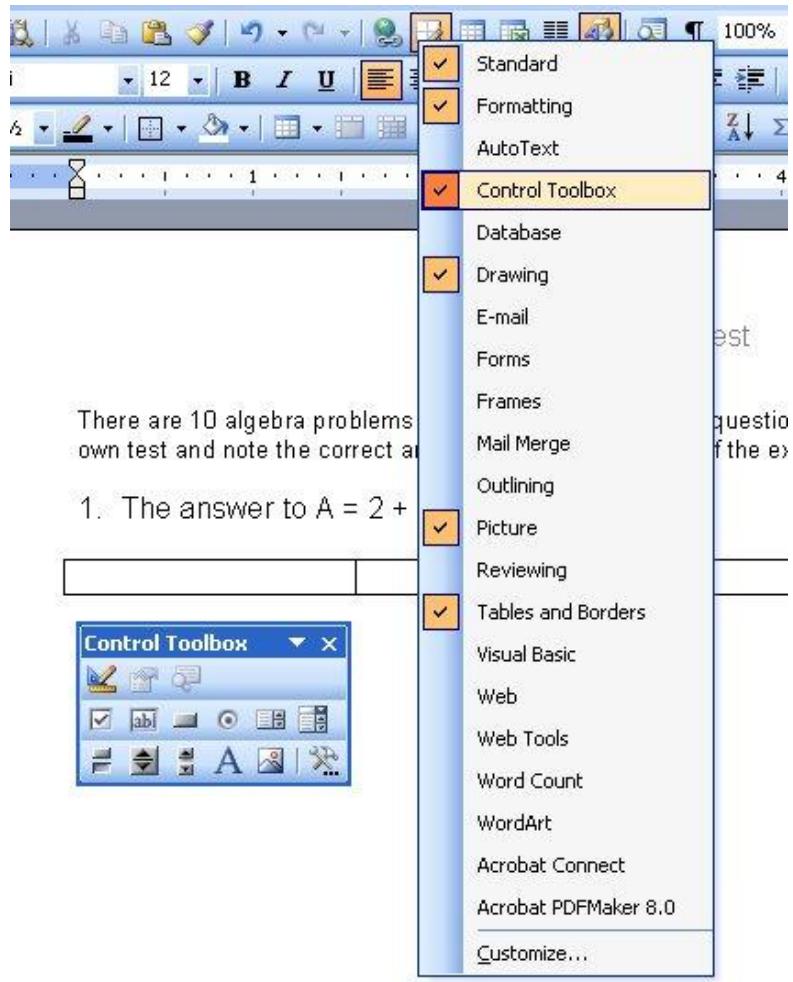


Figure 13.15 – Inserting the Control Toolbox Toolbar

## Inserting and Modifying the Option Button

To insert an option button into the first cell of the table, we select the Option Button tool on the Control Toolbox as shown in figure 13.16. OptionButton1 will appear as shown in figure 13.17.

1. The answer to  $A = 2 + 5$  is



Figure 13.16 – The Option Button Tool

Next, we will change the **name** in the Properties pane to **opt1A** since this is answer A for question 1. We make the first option for question 1 as 2 so we type the number 2 in the Caption box. To make the four option buttons for the first question belong to the same group, we call the property, **GroupName** “1”.

Alphabetic	
(Name)	opt1A
Caption	2
GroupName	1

When the four option buttons are in the same group, the black dot will move only to the option button we select.

1. The answer to  $A = 2 + 5$  is



Figure 13.17 – The Properties Tool

There are 10 algebra problems in this own test and note the correct answer.

1. The answer to  $A =$

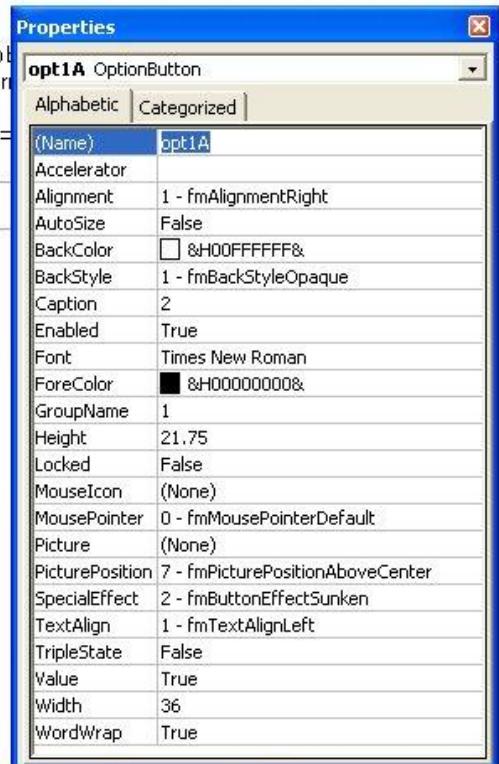
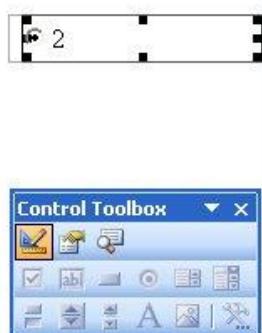


Figure 13.18 – Changing Properties

The second option button we insert into the next cell in the table, we will change the **name** in the Properties pane to **opt1B** since this is answer B for question 1. We will make this option for question 1 as 5 so we type the number 5 in the Caption box. We still call the property, GroupName "1".

(Name)	opt1B
Caption	5
GroupName	1

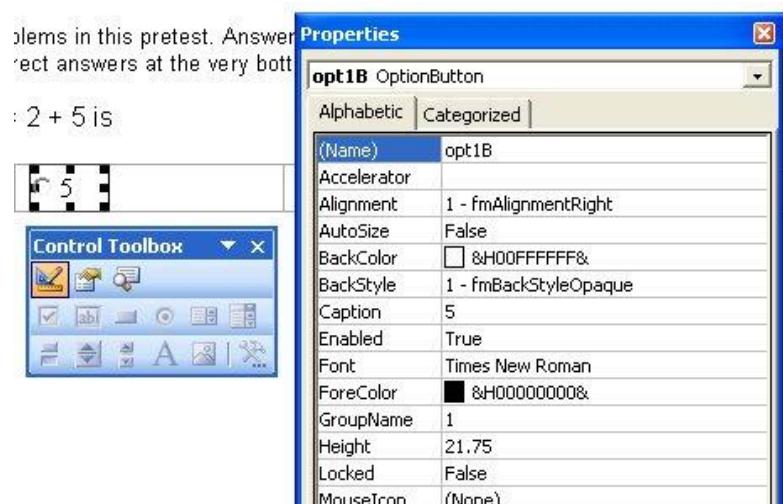


Figure 13.19 – Changing Properties

The third option button we insert into the next cell in the table, we will change the **name** in the Properties pane to **opt1C** since this is answer C for question 1. We will make this option for question 1 as 7 so we type the number 7 in the Caption box. We still call the property, GroupName "1".

(Name)	opt1C
Caption	7
GroupName	1

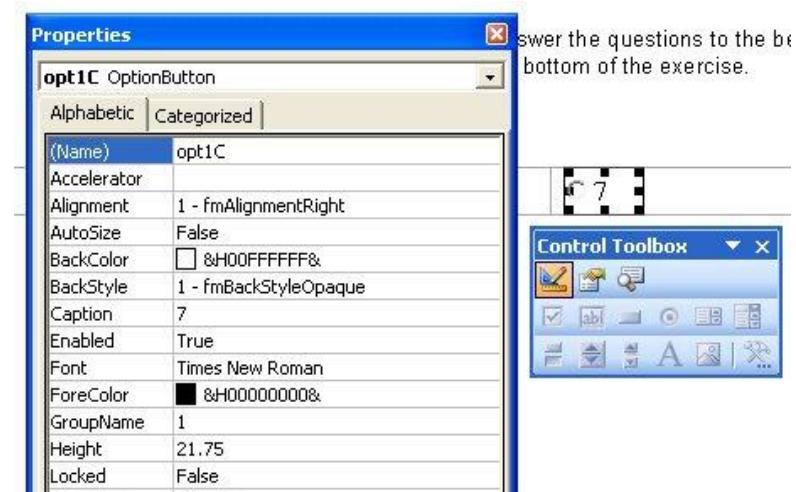


Figure 13.20 – Changing Properties

The second option button we insert in the next cell in the table, we will change the **name** in the Properties pane to **opt1D** since this is answer D for question 1. We will make this option for question 1 as A so we type the letter A in the Caption box. We still call the property, GroupName "1".

(Name)	opt1D
Caption	A
GroupName	1

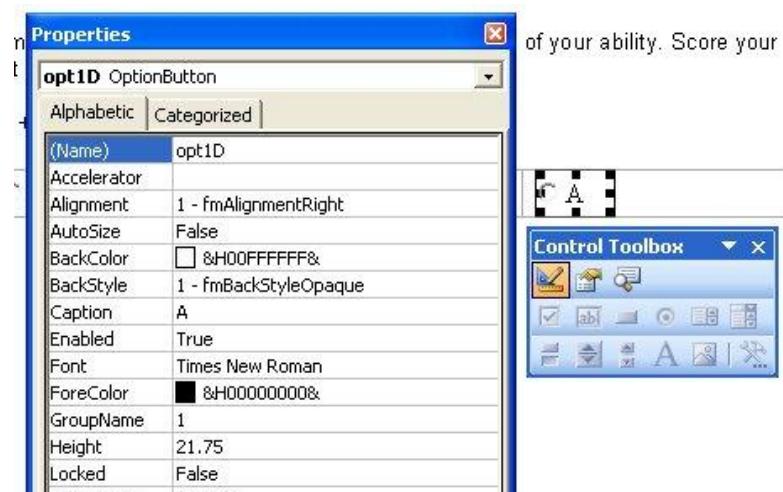


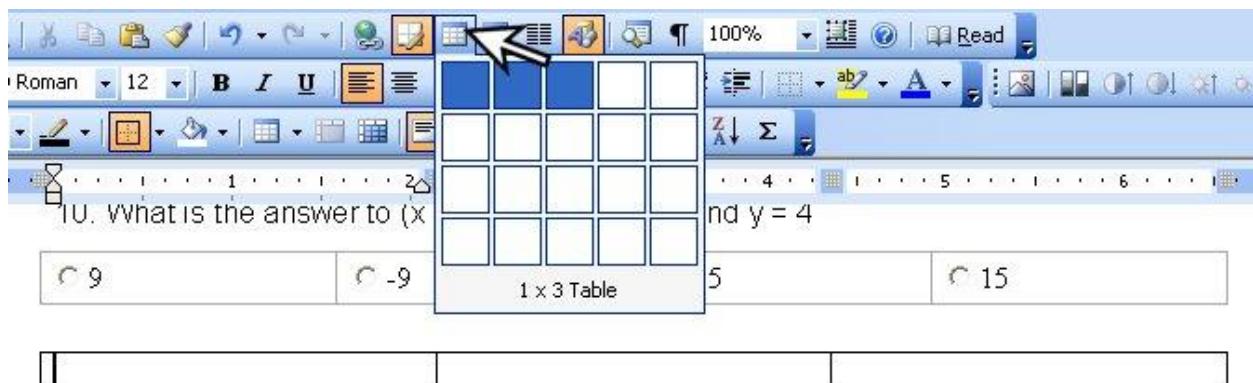
Figure 13.21 – Changing Properties

We continue to add ten questions, so we type “**2. The answer to  $B = -4 - 5$  is**” and then we add another  $4 \times 1$  table and place another four option buttons in the cells. Here is the list of questions and possible answers, so we can finish the document.

2. The answer to $B = -4 - 5$ is			
-5	4	9	-9
3. The answer to $y = 2x + 3$ when $x = -2$ is			
-1	-2	-7	1
4. The answer to $2y = 5x - 6$ when $x = 1$ is			
0.5	-0.5	1	-2
5. Simplify the expression $2A + 3B + 4A + B$			
$2A + 4B$	$4A + 4B$	$6A + 4B$	$7A + 3B$
6. Simplify the expression $-3M + M - 7 + 5M$			
$9M - 7$	$-3M + 7$	$3M + 7$	$3M - 7$
7. Simplify the expression $2(x + 2y)$			
$2x + 4y$	$x + 8y$	$4x + 4y$	$-2x - 4y$
8. Simplify the expression $-3(x - 4y)$			
$3x - 12y$	$12x - 3y$	$3x - 3y$	$-3x + 12y$
9. What is the answer to $(x + y)(x - y)$ if $x = 2$ and $y = 3$			
-10	5	-5	-3
10. What is the answer to $(x + y)(x - y)$ if $x = -1$ and $y = 4$			
9	-9	-15	15

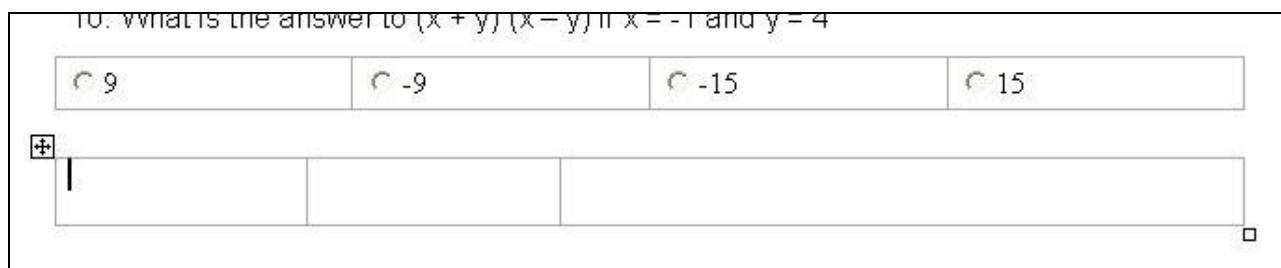
After the last question, we will want to have two command buttons and a label to show correct answers, so we will insert a three-column single row table below the last question. To insert another table into our document, we go to the Insert table tool on the Standard toolbar. On the

drop-down panel, that appears under the tool, select a  $1 \times 3$  table (Figure 13-22).



**Figure 13.22 – Inserting another Table**

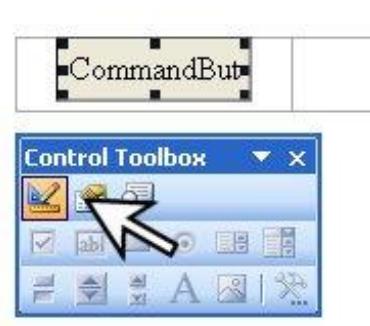
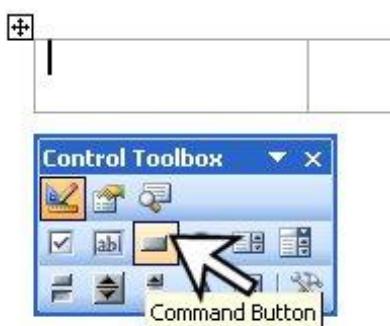
We place our mouse on the bottom horizontal table lines and we hold down the left button and we make the row higher. We need to resize the cells approximately as shown in figure 13.24. Now, we are ready to insert the command buttons.



**Figure 13.23 – Changing the Table Size and Turning Off the Border**

## Inserting and Modifying Command Buttons

We want to add a **Command Button** off the **Control Toolbox** that will score the pretest, so with the insertion point in the first cell of the new table, choose the tool as shown in figure 13.24. After the command button appears in the cell, pick the Properties tool on the Control Toolbox.



**Figure 13.24 – The Command Button Tool**

**Figure 13.25 – The Properties Tool**

Next, we will change the **name** in the Properties pane to **cmdScore\_quiz**. We use the cmd prefix for all command buttons. We type “Score” for the Caption.

Alphabetic	
(Name)	cmdScore_quiz
Caption	Score

After we finish the Score button, we will insert another Command Button in the next cell so we can clear our entries of we desire to do so. Highlight the second button and press the Properties tool on the Control Toolbox.

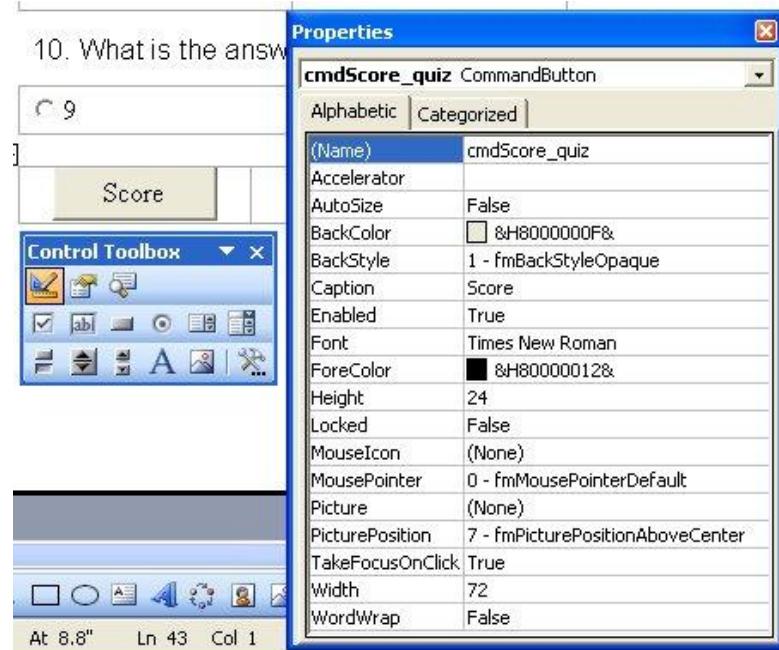


Figure 13.26 – The Properties Tool

For the Clear button, we will change the **name** in the Properties pane to **cmdClear**. We use the cmd prefix for all command buttons. We type “Clear” for the Caption.

Alphabetic	
(Name)	cmdClear
Caption	Clear

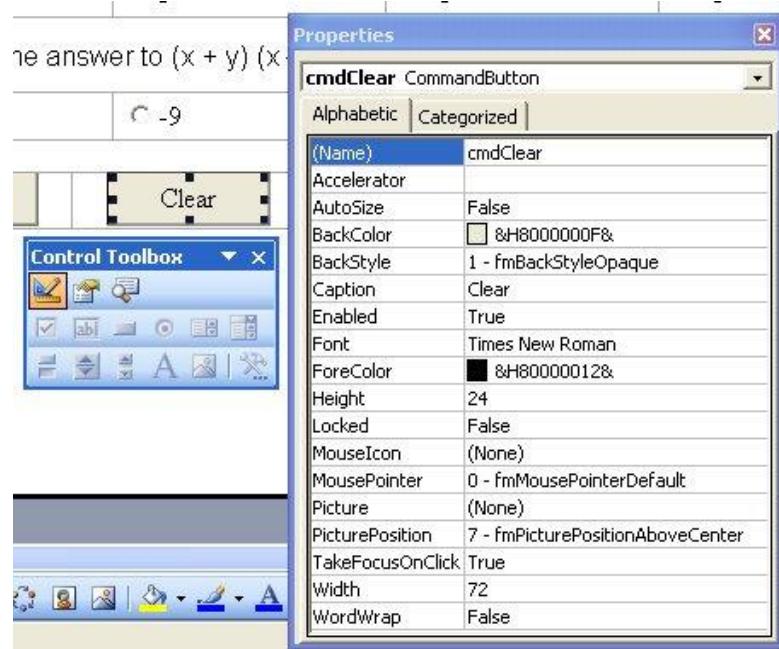
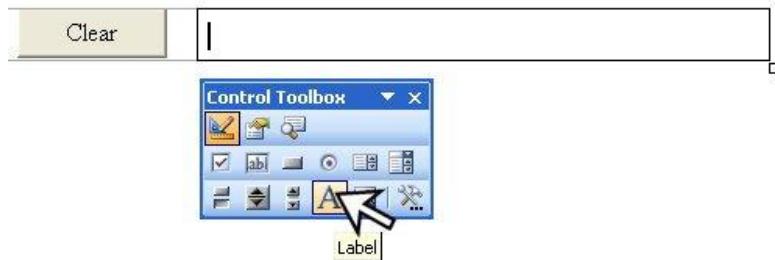


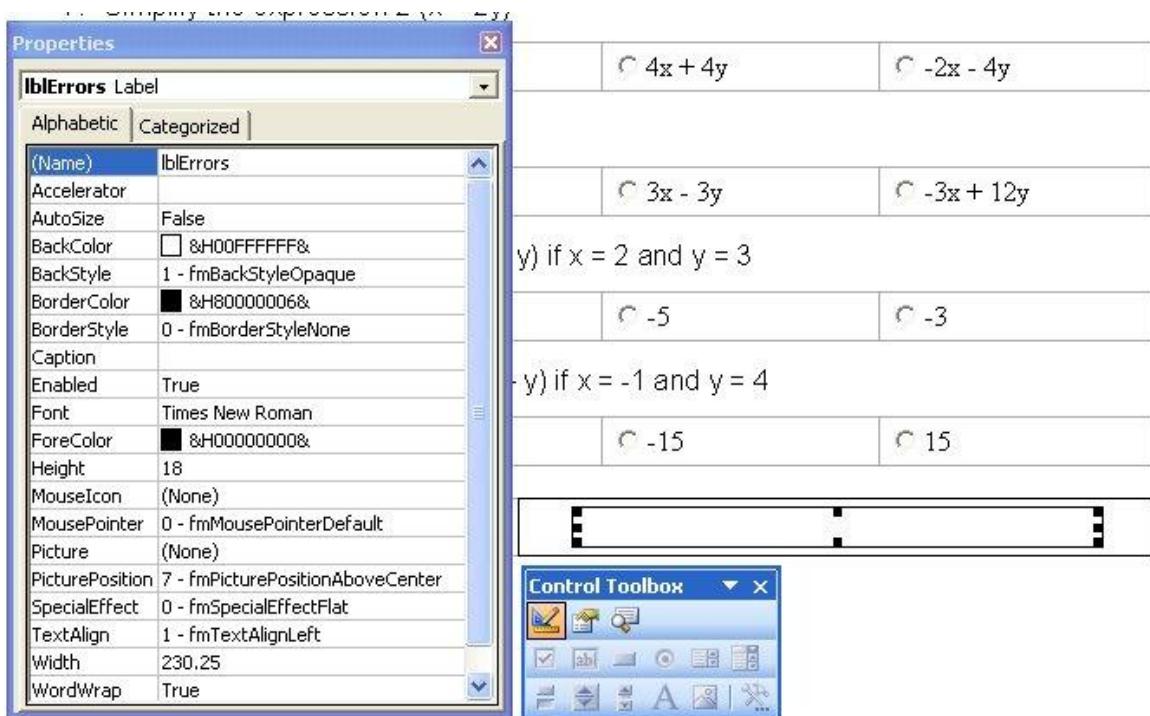
Figure 13.27 – The Properties Tool

Finally, we add a label in the last cell of the last table by picking the Label tool on the Control Toolbox as shown in figure 13.28. Then highlight the label in the cell and choose the Properties tool on the Control Toolbox.



**Figure 13.28 - The Label Tool**

Name the label, lblErrors and make the height 18 and the width 230. The BorderStyle should be set to 0.



**Figure 13.29 – The Properties Tool for the Label**

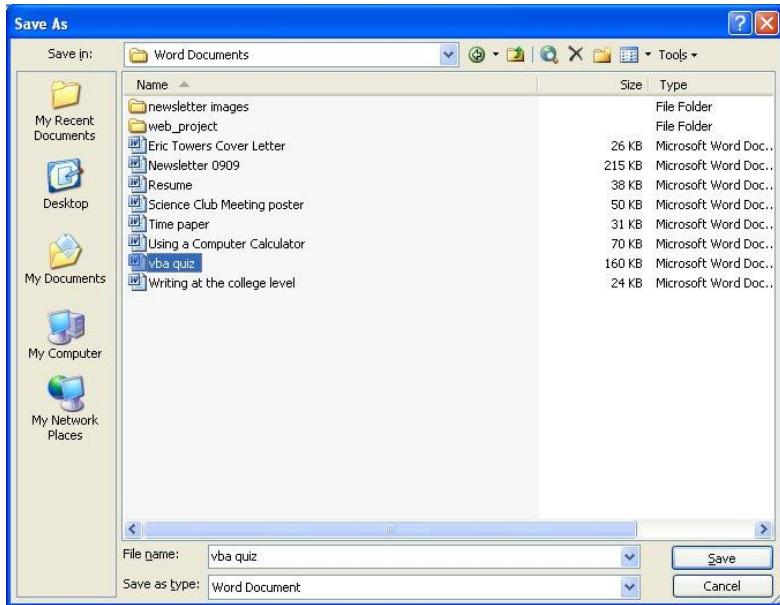
## Saving the Document

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To save the document, click on the **Save** tool on the **Standard** toolbar which is located at the top left of the program. The Save As window will appear in the display. We can save the file into a folder we have already created.



Save the document with a description, that tells us what the document is about without having to open the file. Typing our name followed by the words “vba quiz” is a good choice. Once we have typed in the file name, click on the Save button and our document will be saved (Figure 13-30).



**Figure 13.30 – Save the Document**

Our document will be one page long as shown in figure 13.31.

The document is titled "Algebra Pretest". It contains the following text:

There are 10 algebra problems in this pretest. Answer the questions to the best of your ability. Score your own test and note the correct answers at the very bottom of the exercise.

1. The answer to  $A = 2 + 5$  is  
 A       B       C       D

2. The answer to  $B = -4 - 5$  is  
 A       B       C       D

3. The answer to  $y = 2x + 3$  when  $x = -2$  is  
 A       B       C       D

4. The answer to  $2y = 5x - 6$  when  $x = 1$  is  
 A       B       C       D

5. Simplify the expression  $2A + 3B + 4A + B$   
 A  $2A + 4B$        B  $4A + 4B$        C  $6A + 4B$        D  $7A + 3B$

6. Simplify the expression  $-3M + M - 7 + 5M$   
 A  $9M - 7$        B  $-3M + 7$        C  $3M + 7$        D  $3M - 7$

7. Simplify the expression  $2(x + 2y)$   
 A  $2x + 4y$        B  $x + 8y$        C  $4x + 4y$        D  $-2x - 4y$

8. Simplify the expression  $-3(x - 4y)$   
 A  $3x - 12y$        B  $12x - 3y$        C  $3x - 3y$        D  $-3x + 12y$

9. What is the answer to  $(x + y)(x - y)$  if  $x = 2$  and  $y = 3$ ?  
 A  $-10$        B  $5$        C  $-5$        D  $-3$

10. What is the answer to  $(x + y)(x - y)$  if  $x = -1$  and  $y = 4$ ?  
 A  $9$        B  $-9$        C  $-15$        D  $15$

Score \_\_\_\_\_ Clear \_\_\_\_\_

**Figure 13.31 – The Finished VBA Document**

## **Programming a Clear Button**

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When we double click on the Clear Command Button, we enter the Visual Basic Application program and we see:

**Private Sub cmdClear\_Click()**

**End Sub**

After the first line, **Private Sub cmdClear\_Click()**, we will type the code to clear all of the option buttons and the label.

To clear the option buttons containing the user input, we will set the option buttons value property to false by using the equal sign “=”. This makes the property equal to false as a default. We do this for 40 option buttons. For the first option button, opt1A this would be:

**opt1A.Value = False**

To clear the single label containing the list of errors, we will set the label caption value property to null (“”) by using the equal sign “=”. This makes the property equal to nothing as a default. For the label this would be:

**lblErrors.Caption = ""**

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## **Programming the Score Button**

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When we double click on the Score Command Button, we enter the Visual Basic Application program and we see:

**Private Sub cmdScore\_quiz\_Click()**

**End Sub**

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## **Adding Comments in VBA to Relay Programming Information**

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The comments we place in the program will inform the individual opening and reading the code. We place a single quote character (‘) in front of a comment and when the code is compiled, the comments are ignored. An example is:

**' Declare variables**

## **Declaring Variables in a Program with the Dimension Statement**

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When we are going to use a number, text string or object that may change throughout the life of the code, we create a variable to hold the value of that changing entity. In Visual Basic, the dimension or dim statement is one of the ways to declare a variable at the script or procedure level. The other two ways are the Private and Public statements, which we will use in later chapters.

In our program, we will declare a variable to enable us to capture the score for each correct answer, to total the score, to capture a statement and to report errors in the user choices. Type the following lines of code after the comment.

**' Declare variables**

```
Dim A1 As Double  
Dim A2 As Double  
Dim A3 As Double  
Dim A4 As Double  
Dim A5 As Double  
Dim A6 As Double  
Dim A7 As Double  
Dim A8 As Double  
Dim A9 As Double  
Dim A10 As Double  
Dim Score As Double  
Dim Com As String  
Dim Err As String
```

When selecting variable names, they should be a word or a phrase without spaces that represents the value that the variable contains. If we want to hold a value of one's date of birth, we can call the variable, DateofBirth. The keywords Date and Birth are in sentence case with the first letter capitalized. There are no spaces in the name. Some programmers use the underscore character (\_) to separate words in phrases. This is acceptable, but a double underscore (\_\_) can cause errors if we do not detect the repeated character.

## **Assigning Values to Variables**

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After we declare the variables and before we start to score the answers, we will assign the variables the value of zero or nil. Type the following code right below the declared variables

**' set variables**

```
A1 = 0  
A2 = 0  
A3 = 0  
A4 = 0  
A5 = 0
```

```
A6 = 0  
A7 = 0  
A8 = 0  
A9 = 0  
A10 = 0  
Score = 0  
Com = nil  
Err = nil
```

## Testing a Case with the If -Then Function

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Whenever we are confronted with making a choice between two or more options in a computer program, then the **if-then** function becomes a very popular solution to this challenge. The **if-then** function will execute the statements within the then section of the **if-then** expression when the logical test is true. The **if-then** function also will execute the else section of the **if-then** expression when the logical test is false.

The **if-then** function is arranged to work in a more complex fashion than other Visual Basic tools. If is initially, and after that an expression containing the logical test is written right after the **if**. The logical expression tests for a true or false response. In this program, the test is whether the logical value is true. If the answer is true, then the variable **A1** is assigned the value of 10. If the answer is false, then the variable **A1** remains a zero as assigned earlier in the program.

So type the following expression in the routine:

```
' check test  
  
If opt1C.Value = True Then A1 = 10 Else Err = "1C"
```

In our first **if-then** statement, we are going to use the **else** section of the function. If the person taking the pretest gets the answer wrong, the correct answer will be saved to the variable **Err** and reported in the label at the when the user presses the Score command button. In this program, we get to practice our first **if-then** statements another nine times. Type the following lines of code to test the answers for the other nine questions.

```
If opt2D.Value = True Then A2 = 10 Else Err = Err & " 2D"  
If opt3A.Value = True Then A3 = 10 Else Err = Err & " 3A"  
If opt4B.Value = True Then A4 = 10 Else Err = Err & " 4B"  
If opt5C.Value = True Then A5 = 10 Else Err = Err & " 5C"  
If opt6D.Value = True Then A6 = 10 Else Err = Err & " 6D"  
If opt7A.Value = True Then A7 = 10 Else Err = Err & " 7A"  
If opt8D.Value = True Then A8 = 10 Else Err = Err & " 8D"  
If opt9C.Value = True Then A9 = 10 Else Err = Err & " 9C"  
If opt10C.Value = True Then A10 = 10 Else Err = Err & " 10C"
```

## **Adding in Visual Basic**

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The first arithmetic function we will address is one of the most common, the adding function which is displayed by the icon +. The addition function allows us to add two or more numbers. The values of the numbers can be whole like 1,2,3... or decimals, positive or negative. Remember we can have more than two numbers like  $(2 + 3 + 7 + 4)$ .

In this program, we will add the ten variables that are holding the numbers. Type the following code:

**Score = A1 + A2 + A3 + A4 + A5 + A6 + A7 + A8 + A9 + A10**

The variable **score** will equal the sum of the value in variables **A1** through **A10**.

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## **Using a Message box in Visual Basic**

The function MsgBox will launch a message box in Windows. The text or as programmers state “string” will be enclosed in quotes. Before we launch the message box, we use an if-then-else statement to assign the phrase “excellent work” to the message or assign the correct answers to the error statement. Type the following code:

**If Score = 100 Then Com = "Excellent work." Else Err = "Answers: " & Err**

When typing the message box, we have the string “Your score is ” & Score & “.” & com concatenated with the & sign. We can use multiple & signs to add text strings and variables containing text together. Type the following code.

**MsgBox "Your score is " & Score & ". " & Com**

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## **Using a Label in Visual Basic**

Remember when we made the label earlier we left the caption blank. Therefore, the last Visual Basic code will set the caption for lblErrors to the string in variable Err. Type the following code.

**lblErrors.Caption = Err**

Written below is the entire program for the Algebra pretest.

**Private Sub cmdClear\_Click()**

```
opt1A.Value = False  
opt1B.Value = False  
opt1C.Value = False  
opt1D.Value = False  
opt2A.Value = False  
opt2B.Value = False  
opt2C.Value = False  
opt2D.Value = False  
opt3A.Value = False  
opt3B.Value = False  
opt3C.Value = False  
opt3D.Value = False  
opt4A.Value = False  
opt4B.Value = False  
opt4C.Value = False  
opt4D.Value = False  
opt5A.Value = False  
opt5B.Value = False  
opt5C.Value = False  
opt5D.Value = False  
opt6A.Value = False  
opt6B.Value = False  
opt6C.Value = False  
opt6D.Value = False  
opt7A.Value = False  
opt7B.Value = False  
opt7C.Value = False  
opt7D.Value = False  
opt8A.Value = False  
opt8B.Value = False  
opt8C.Value = False  
opt8D.Value = False  
opt9A.Value = False  
opt9B.Value = False  
opt9C.Value = False  
opt9D.Value = False  
opt10A.Value = False  
opt10B.Value = False  
opt10C.Value = False  
opt10D.Value = False  
lblErrors.Caption = ""
```

**End Sub**

```
Private Sub cmdScore_quiz_Click()
```

```
' Declare variables
```

```
Dim A1 As Double  
Dim A2 As Double  
Dim A3 As Double  
Dim A4 As Double  
Dim A5 As Double  
Dim A6 As Double  
Dim A7 As Double  
Dim A8 As Double  
Dim A9 As Double  
Dim A10 As Double  
Dim Score As Double  
Dim Com As String  
Dim Err As String
```

```
' set variables
```

```
A1 = 0  
A2 = 0  
A3 = 0  
A4 = 0  
A5 = 0  
A6 = 0  
A7 = 0  
A8 = 0  
A9 = 0  
A10 = 0  
Score = 0  
Com = nil  
Err = nil
```

```
' check test
```

```
If opt1C.Value = True Then A1 = 10 Else Err = "1C"  
If opt2D.Value = True Then A2 = 10 Else Err = Err & " 2D"  
If opt3A.Value = True Then A3 = 10 Else Err = Err & " 3A"  
If opt4B.Value = True Then A4 = 10 Else Err = Err & " 4B"  
If opt5C.Value = True Then A5 = 10 Else Err = Err & " 5C"  
If opt6D.Value = True Then A6 = 10 Else Err = Err & " 6D"  
If opt7A.Value = True Then A7 = 10 Else Err = Err & " 7A"  
If opt8D.Value = True Then A8 = 10 Else Err = Err & " 8D"  
If opt9C.Value = True Then A9 = 10 Else Err = Err & " 9C"  
If opt10C.Value = True Then A10 = 10 Else Err = Err & " 10C"
```

```
Score = A1 + A2 + A3 + A4 + A5 + A6 + A7 + A8 + A9 + A10  
If Score = 100 Then Com = "Excellent work." Else Err = "Answers: " & Err  
MsgBox "Your score is " & Score & ". " & Com  
lblErrors.Caption = Err  
End Sub
```

After we save the file, we can release the pretest onto the school server and students can open the file on their personal computer across the network, take the test, and view their score and see the correct answers after they press the score command button. We can practice the skills learned in this lesson by making tens to hundreds of training documents that are challenging and where it is easy for individuals to learn.

\* World Class CAD Challenge 30-12 \* - Create a simple test using VBA that has ten questions. Use options buttons or check boxes to record the user's responses. Have two command buttons, one to score the pretest and the other to clear the responses. Have a label to show incorrect responses. Repeat this exercise at least three more times to maintain your World Class ranking.