

COMPSCI 111 / 111G

Mastering Cyberspace:

An introduction to practical computing

Spreadsheets

IF functions

- **Makes a decision**

- Different values used in the cell depending on the logical test

- **IF(logical_test , value_if_true, value_if_false)**

Must be either true or false

- value
- condition (test)
- boolean function

This value appears
in the cell if the
boolean is true

This value appears
in the cell if the
boolean is false

Example - coffee data

- Imagine an experiment where we record the number of cups of coffee that we drink, and whether it was morning or afternoon. The table of data might appear as shown below:

	A	B
1	Cups of Coffee	AM/PM
2	3	am
3	1	pm
4	2	am
5	1	am
6	3	pm
7	5	am
8	1	pm

- How can we calculate the average number of coffees that we drink in the morning?

Example - coffee data

- **Add a new column to store the morning coffee data.**
 - If the contents of column B is the text "am" then use the value stored in column A. Otherwise, leave it blank.

	A	B	C
1	Cups Of Coffee	AM/PM	Morning
2	3	am	3
3	1	pm	
4	2	am	2
5	1	am	1
6	3	pm	
7	5	am	5
8	1	pm	
9	Average		2.8

=IF(B2="am", A2, "")

Exercise - Simple IF

- Given the wind speed as shown in the table below, write the formula that would appear in cell C2. Note that a Gale Warning is issued when the wind speed exceeds 63 km/hr.

	A	B	C
1	Date	Wind Speed	Warning Issued
2	1/01/2007	3	
3	2/01/2007	57	
4	3/01/2007	89	Gale Warning
5	4/01/2007	60	
6	5/01/2007	5	
7	6/01/2007	84	Gale Warning
8	7/01/2007	87	Gale Warning
9	8/01/2007	8	

Exercise - IF

IF less than 50 percent of tickets available at a venue were sold, then the venue is too large. To produce the result in cell F7, what formula should you use in this cell?

	A	B	C	D	E	F
1	Ticket Sales					
2						
3	Price	\$10.00				
4						
5	Event	Tickets Available	Tickets Sold	Remaining	Sales	Venue too large?
6	Cycling	4000	2000	2000	\$20,000.00	No
7	Weightlifting	2000	750	1250	\$7,500.00	Yes
8	Triathlon	1000	100	900	\$1,000.00	Yes
9	Football	3000	3000	0	\$30,000.00	No
10	Badminton	5000	4500	500	\$45,000.00	No
11		15000	10350	4650	\$103,500.00	

Example – IF with a Boolean Function

- **Ticket Sales**

- Check if more than 90% of the tickets were sold, or if less than 50% of the tickets were sold. In either case, a new venue is required next time.

	A	B	C	D	E	F	G
1	Ticket Sales						
2							
3	Price	\$10.00					
4							
5	Event	Tickets Available	Tickets Sold	Remaining	Sales	Venue too large?	New venue?
6	Cycling	4000	2000	2000	\$20,000.00	No	No
7	Weightlifting	2000	750	1250	\$7,500.00	Yes	Yes
8	Triathlon	1000	100	900	\$1,000.00	Yes	Yes
9	Football	3000	3000	0	\$30,000.00	No	Yes
10	Badminton	5000	4500	500	\$45,000.00	No	No
11		15000	10350	4650	\$103,500.00		



Looking up values in a table

- **Often have tables of data**
 - We want to look up a value
 - e.g. given ID number, what is the name?

Student ID	Name	Phone
9100983	Andrew	123-4567
2098382	Albert	234-7654
2289483	Adrienne	321-7839
2109374	Ann	567-8932

- **Use a lookup formula**
 - VLOOKUP - looking up values in a vertical table
 - HLOOKUP - looking up values in a horizontal table
-

VLOOKUP

VLOOKUP(value, table, column, [range])

Value.

This is the value we already have written down. We want to use this value to look up a corresponding value in a table.

Range of cells.

This is the table we are using to look up the value in.

Usually we want to use absolute references for the table.

Number.

This specifies which column in the table contains the data we want.

Boolean value.

True if we want to match a range of values

False if we want an exact match.

Example

	A	B	C	D	E	F	G	H
1								
2		Students Enrolled			ID	UPI	Name	
3		ID	Name		199444	jhub001	Jacob	
4		800526	Ethan		303114	mkop032	Michael	
5		952348	William		465336	jjis012	Joshua	
6		303114	Michael		769866	mwen003	Matthew	
7		973748			800526	eupt008	Ethan	
8					812069	acut017	Andrew	
9					887268	dden011	Daniel	
10					952348	whur034	William	
11					973748	jfir002	Joseph	
12					997073	ccau005	Christopher	
13								

=VLOOKUP(value, table, column, range)

	A	B	C	D	E	F	G	H
1								
2		Students Enrolled			ID	UPI	Name	
3		ID	Name		199444	jhub001	Jacob	
4		800526	Ethan		303114	mkop032	Michael	
5		952348	William		465336	jjis012	Joshua	
6		303114	Michael		769866	mwen003	Matthew	
7		973748			800526	eupt008	Ethan	
8					812069	acut017	Andrew	
9					887268	dden011	Daniel	
10					952348	whur034	William	
11					973748	jfir002	Joseph	
12					997073	ccau005	Christopher	
13								

False

1

2

3

Example

- Use a VLOOKUP to find the description for a recorded wind speed

	A	B	C	D	E	F	G
23					Beaufort Scale		
24					Speed (km/hr)	Beaufort number	Description
25	Day	Wind Spd	Description		0	0	Calm
26	Mon	27	Moderate breeze		1	1	Light air
27	Tues	5	Light air		7	2	Light breeze
28	Wed	0	Calm		12	3	Gentle breeze
29	Thurs	15	Gentle breeze		20	4	Moderate breeze
30	Fri	20	Moderate breeze		30	5	Fresh breeze
31	Sat	40	Strong breeze		40	6	Strong breeze
32	Sun	78	Strong gale		51	7	Near gale
33					63	8	Gale
34					76	9	Strong gale
35					88	10	Storm
36					103	11	Violent storm
37					118	12	Hurricane

=VLOOKUP(value, table, column, range)



Exercise: ThinkGeek T-Shirts



<http://www.thinkgeek.com/>

Exercise

- What formulae should be used in cells D15, E15, F15 and F26?

	A	B	C	D	E	F
1	T-Shirt Sizes				T-Shirt Prints	
2	Size	Price			Code	Description
3	S	\$ 10.99			1001	2 + 2 = 5
4	M	\$ 11.99			1010	geek inside
5	L	\$ 12.99			1011	<BODY>
6	XL	\$ 13.99			1100	man woman
7	XXL	\$ 14.99			1101	obey gravity
8	XXXL	\$ 15.99			1110	I'm blogging this
9					1111	Arrrrrgh...
10						
11						
12						
13	Invoice					
14	Code	Size	Number	Description	Price	Cost
15	1010	M	1	geek inside	\$ 11.99	\$ 11.99
16	1010	L	1	geek inside	\$ 12.99	\$ 12.99
17	1011	S	3	<BODY>	\$ 10.99	\$ 32.97
18	1110	XL	1	I'm blogging this	\$ 13.99	\$ 13.99
19	1001	XL	1	2 + 2 = 5	\$ 13.99	\$ 13.99
20	1101	M	2	obey gravity	\$ 11.99	\$ 23.98
21	1111	M	1	Arrrrrgh...	\$ 11.99	\$ 11.99
22						
23						
24						
25						
26					Total	\$ 121.90

D15:

E15:

F15:

F26:

HLOOKUP

- Same as VLOOKUP, but for horizontal tables

HLOOKUP(value, table, row, [range])

Value.

This is the value we already have written down. We want to use this value to look up a corresponding value in a table.

Range of cells.

This is the table we are using to look up the value in.

Usually we want to use absolute references for the table.

Number.

This specifies which row in the table contains the data we want.

Boolean value.

True if we want to match a range of values

False if we want an exact match.

Exercise

- What formula would be used in cell C7?
 - Use a HLOOKUP

	A	B	C	D	E	F	G	H
1		Movie Prices						
2	Day	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
3	Price	\$11.00	\$11.00	\$11.00	\$15.00	\$15.00	\$15.00	\$15.00
4								
5	Movie Tickets							
6	Name	Day	Cost					
7	John	Tues	\$11.00					
8	Jane	Thurs	\$15.00					
9	Tom	Sat	\$15.00					

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Graphing data

- **Start by sorting the data into dependent and independent variables**

Independent	Dependant
1	1.5
2	4.9
3	2.4
4	2.6
5	3.3

Enter the data

D10		=	8.8	
A	B	C	D	E
Chemistry 101, lab 1: Dissolved Oxygen Levels In A Closed				
J. Brown, D. Grey				
3/10/02		Trial 1:		
		Time	Disolved O2	
		1	1.5	
		2	3	
		3	5.5	
		4	4.4	
		5	6.8	
		6	8.8	

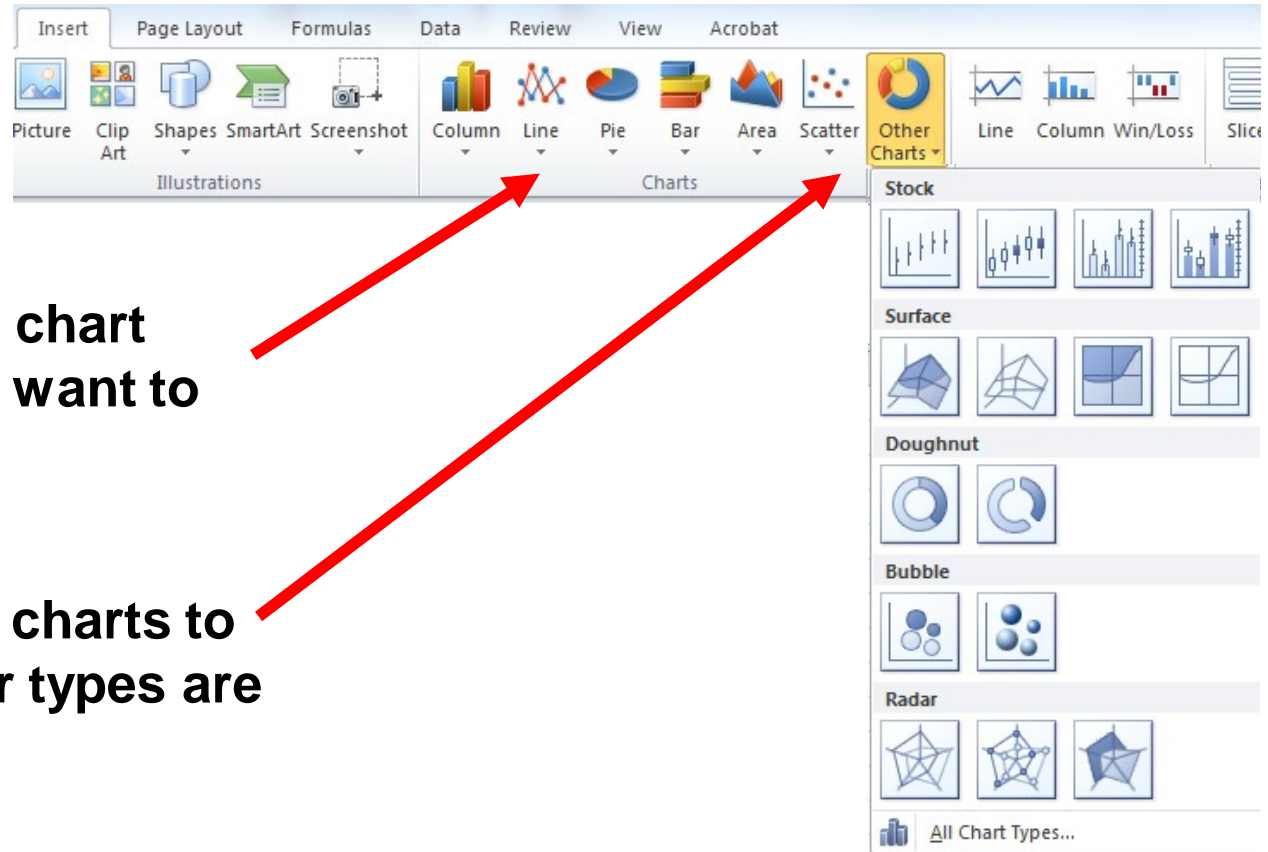
Highlight the data that you wish to graph by holding down the left mouse button & drag over your numbers, then release.

The area highlighted will be graphed. So make sure that you have selected all the data that you want to appear on your graph.

Create a chart

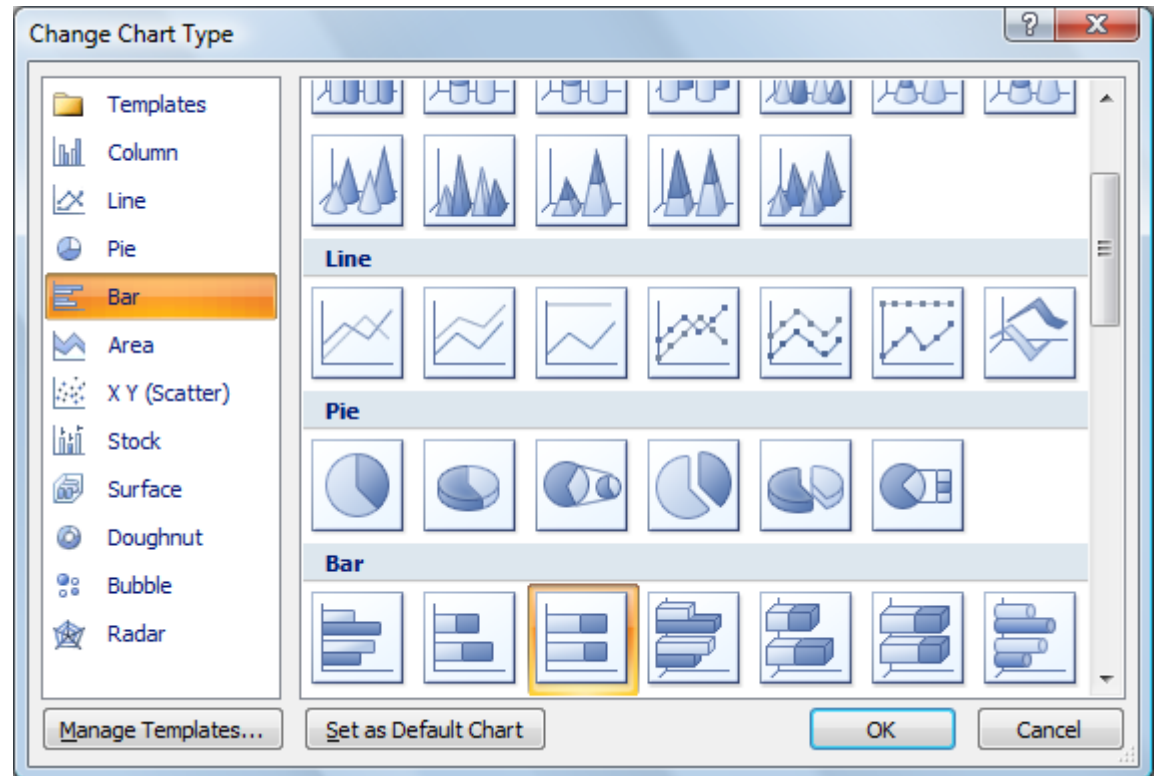
With your data highlighted, left click on the chart type which you want to use

Click on other charts to see what other types are available

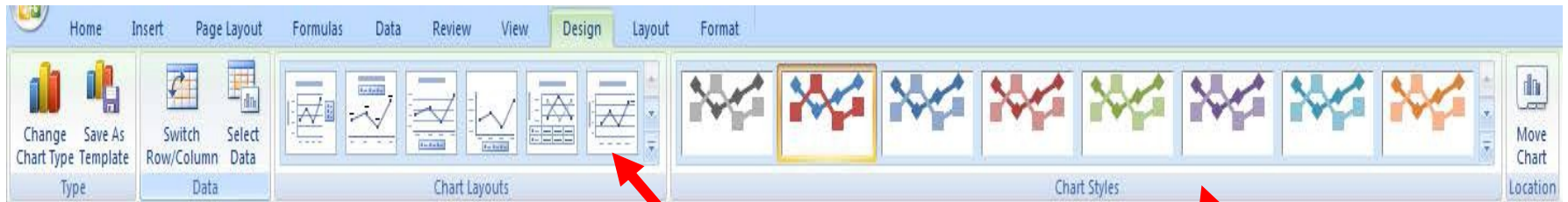


Change Chart

- Click right on your chart and select “Change chart type”



Change layout/style



- **Select your chart and select the “Design” ribbon**

Layouts

Styles

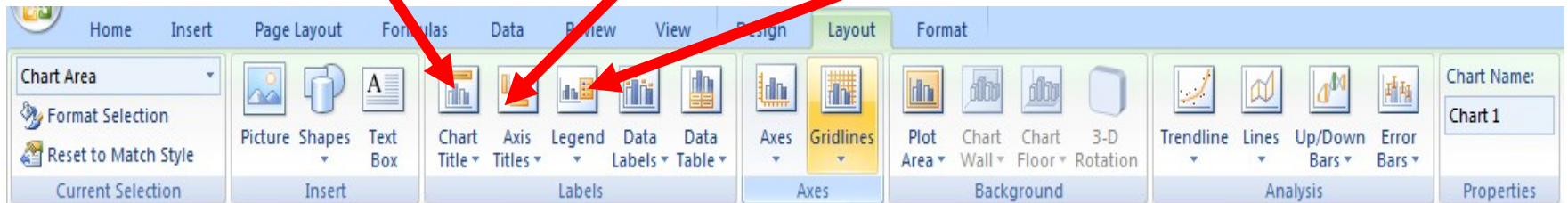
Enter labels

- Enter a title
- Label the X and Y axes.

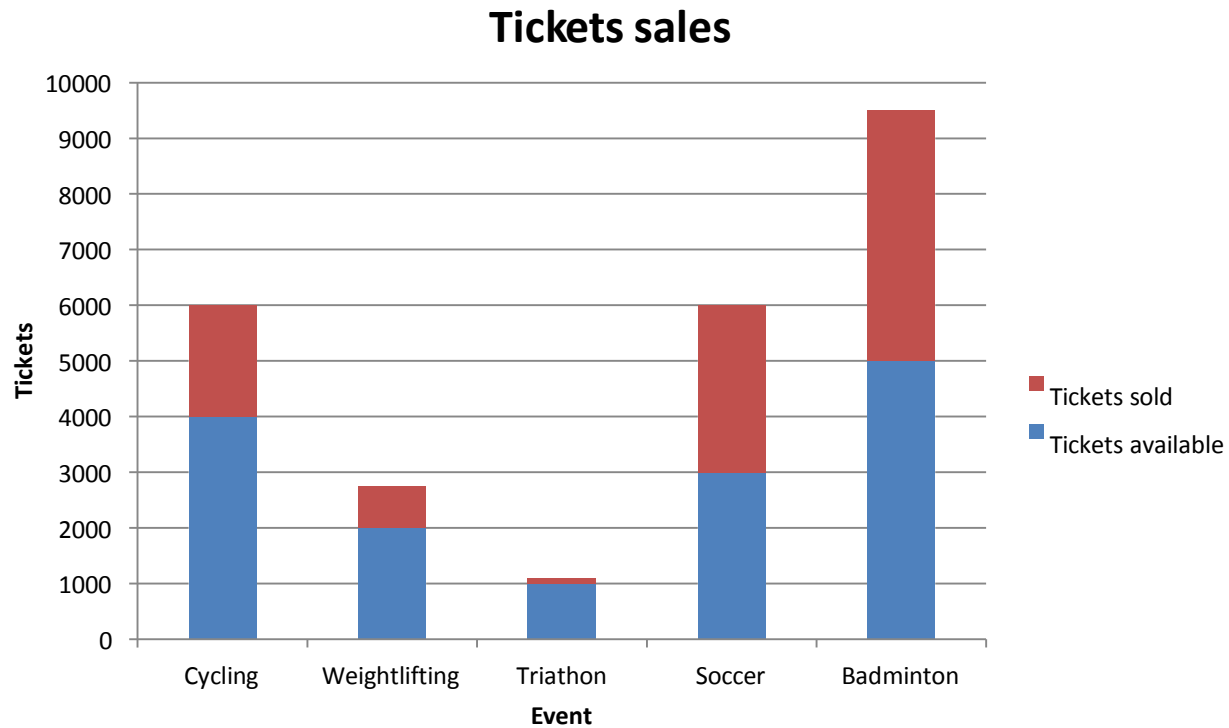
Enter title

Label axis

Format legend



A completed graph

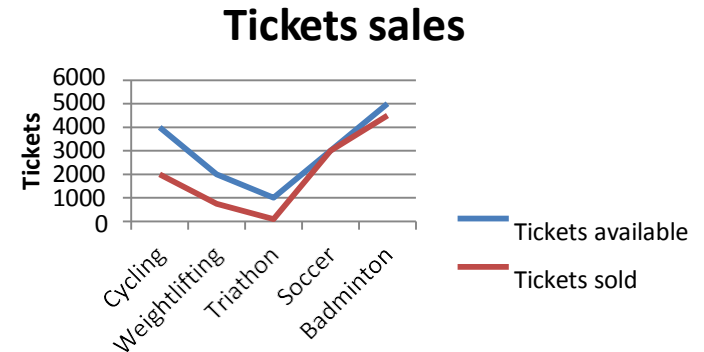


Simple data analysis

- Congratulations you have made a graph, but you still have to draw a line or curve to relate the data.
 - Rarely in science do we “connect the dots” in a graph. Rather, we would like to show the trend of our data in the form of a *best fit* line.
 - How do we do this in Excel?
-

Adding a Trendline

- Make sure the chart is selected
- Select “Chart”
- Select “Select Area”
- Right click on chart and select
- “Add Trendline”

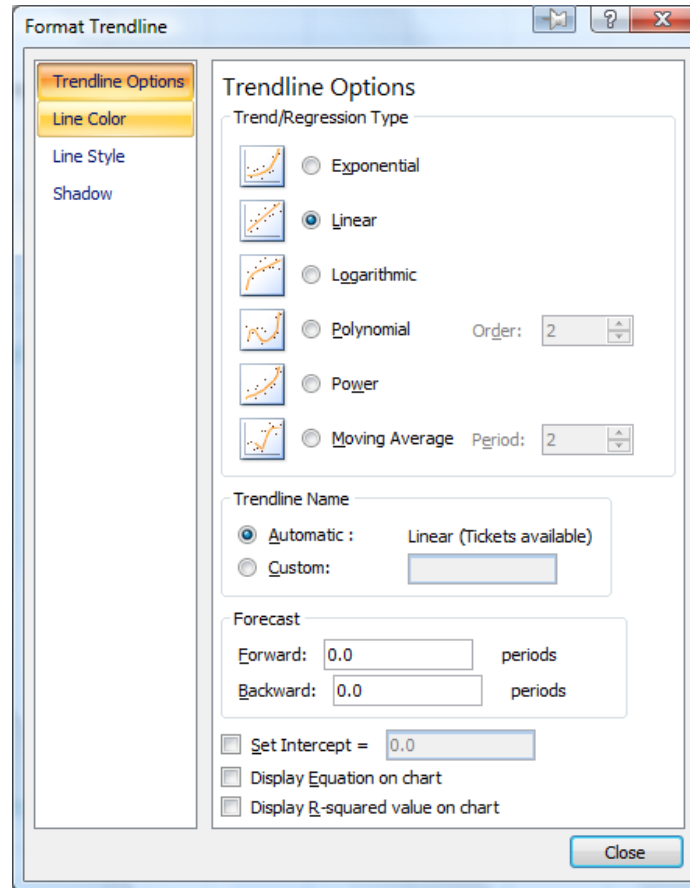


The screenshot shows the Excel interface with the 'Format' ribbon active. A context menu is open over the chart, with 'Add Trendline...' highlighted. The chart data is the same as in the previous figure.

Event	Tickets available	Tickets sold
Cycling	4000	2000
Weightlifting	2000	1000
Triathlon	1000	500
Soccer	3000	3000
Badminton	5000	4500

Graphing – Adding a Trendline

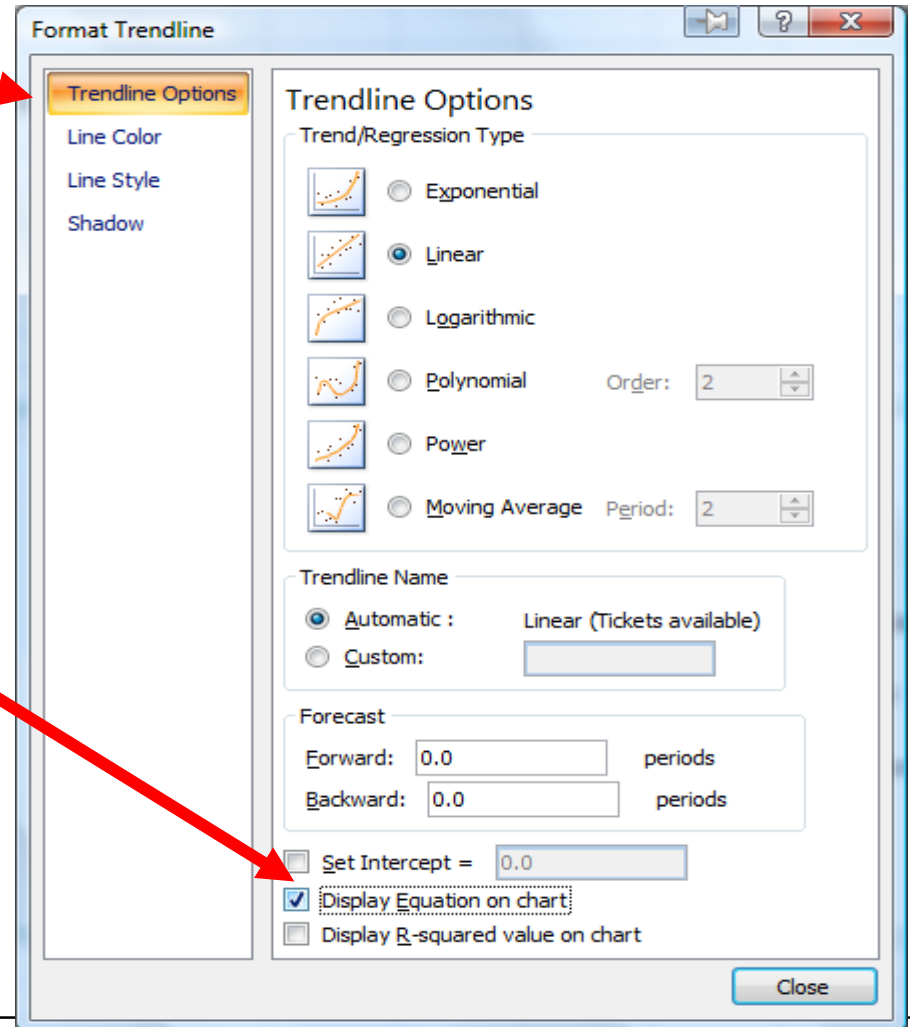
- Choose the trend that you wish to show with your data.



Adding equation

- To add the equation of the line, choose the tab entitled “Trendline Options”

- Select “Display equation on chart”



The completed graph

