

**Excel & Business Math**  
**Video/Class Project #38**  
**Invoices and Cash Discounts on Invoices**

**Topics**

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## 1) Date Number Format & Date Formulas:

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1. Enter Proper Excel Dates with forward slashes (there are other methods also) such as: 3/9/2018.
2. Keyboard for Today's Date is: **Ctrl + ;**
3. If you do not enter a Proper Date, Excel will think it is Text and not a Date Number
4. Regional Settings determine Dates: Start Menu, Regional and Language dialog box
5. When a cell has General Number Formatting, and then you type a proper date, like 3/9/2018, you are performing "Number Format As You Type". This means that when you type a proper date you are also applying a Date Number Formatting as you type. Enter dates with forward slashes (there are other methods also) such as: 3/9/2018.
6. When a cell has General Number Formatting, and then you type a proper date, like 3/9/2018, you are performing "Number Format As You Type". This means that when you type a proper date you are also applying a Date Number Formatting as you type.
7. Under the Date Number Format is a Serial Number that represents the number of days since December 31, 1899.
  1. Examples:
    - Jan 1, 1900 = 1
    - Jan 2, 1900 = 2
    - Oct 30, 2013 = 41577
    - March 10, 2018 = 43169
8. Excel Dates are sometimes called: "Serial Dates" or "Proper Dates" or "Excel Dates"
9. Date Formulas are possible because there are serial numbers underneath the Number Formatting that we can use to perform math operations.
10. Some Date Math Formulas:
  1. **=End Date – Start Date** = Number of Days Between Two Dates (Number of days an invoice is late).
  2. **=End Date – Start Date + 1**= Number of Days Between Two Dates Including the Start Date (Number of days for a project that includes the start date).
  3. **=Loan Issue Date + Number of Days Loan Outstanding** = Maturity Date.
11. Some examples of Excel Date Functions:
  1. **EDATE** function allows you to take a date and get the same day in a future or past month.
    - i. =EDATE(Date,2) jumps two months ahead
    - ii. =EDATE(Date,-2) jumps two months backwards.
  2. **EOMONTH** function allows you to take a date get the end of the month date for the current month, a future month, or a past month.
    - i. =EOMONTH(Date,0) gives you the end of the month
    - ii. =EOMONTH(Date,1) gives you the end of next month
    - iii. =EOMONTH(Date,-1) gives you the end of last month.
  3. **TODAY** function dynamically puts today's date in the cell and updates each new day you open the Workbook file.
    - i. =TODAY() is an argumentless function Date Keyboards:
12. Examples from Video on next page:

	A	B	C	D	E	F	G	H	I	J	K
1	<b>Entering Dates in Excel:</b>										
2											
3	Type Proper Date:	3/10/2018		1) Enter Proper Excel Dates with forward slashes (there are other methods also) such as: 3/10/2018.							
4	Keyboard for Today's Date:	3/10/2018		2) Keyboard for Today's Date is: <b>Ctrl + ;</b>							
5	Mistakenly Type Date:	28/2/2018		3) If you do not enter a Proper Date, Excel will think it is Text and not a Date Number							
6	Regional Settings determine Dates	28/2/2018		4) Regional Settings determine Dates: Start Menu, Regional and Language dialog box							
7	"Number Format As You Type"	3/10/2018		5) When a cell has General Number Formatting, and then you type a proper date, like 3/10/2018,							
8				you are performing "Number Format As You Type".							
9				This means that when you type a proper date you are also applying a Date Number Formatting as you type.							
10											
11	<b>Date Number Formatting:</b>										
12	6) Under dates, there are serial numbers, which are the number of days since Dec 31, 1899.										
13											
14	Enter Today's Date	3/10/2018		7) Excel Dates are sometimes called: "Serial Dates" or "Proper Dates" or "Excel Dates"							
15	Enter Today's Date, apply General	43169									
16	Type Number, then apply Date	3/10/2018									
17											
18	<b>Date</b>	<b>Actual Number in Cell</b>									
19	1/1/1900	1									
20	1/2/1900	2									
21	10/28/2017	43036									

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
23	<b>Why are there serial numbers under Excel Dates? So we can do Date Math!</b>														
24															
25	Invoice Date	1/31/2018				Enter dates with forward slashes (there are other ways also)									
26	Invoice Payment Date	3/10/2018				Keyboard for today's date: Ctrl + ;									
27	How Many Days to Pay Invoice?	38	=B26-B25			<b>8) Important Formula:</b> Days between dates = <b>Later Date - Earlier Date</b>									
28															
29	Invoice Date	1/31/2018													
30	Invoice Payment Date	3/10/2018	=TODAY()			<b>9) TODAY</b> function dynamically puts today's date in the cell and updates each new day you open the Workbook file.									
31	How Many Days to Pay Invoice?	38	=B30-B29			=TODAY() is an argumentless function									
32															
33	Loan issue date	12/30/2017													
34	Days until loan due	120													
35	Maturity Date	4/29/2018	=B33+B34			10) You can add numbers to dates									
36															
37	Project Start Date	2/28/2018													
38	Project End Date	3/7/2018													
39	# days for project	8	=B38-B37+1			<b>11) Important Formula:</b> Days between dates where start date IS included= <b>Later Date - Earlier Date + 1</b>									
40															
41	Calculate the Due Date if the invoice contract says that the amount is due on the same day, two month's ahead.														
42															
43	Invoice Date	3/6/2018				Due in 2 Months									
44	Due Date	5/6/2018	=EDATE(B43,2)			12) EDATE function allows you to take a date and get the same day in a future or past month. =EDATE(Date,2) jumps two months ahead. =EDATE(Date,-2) jumps two months backwards.									
45															
46															
47	Calculate the Due Date if the invoice contract says that the amount is due at the end of the month.														
48															
49	Invoice Date	2/3/2016													
50	Due Date, EOM	2/29/2016	=EOMONTH(B49,0)			13) EOMONTH allows you to take a date get the end of the month date for the current month, a future month, or a past month. =EOMONTH(Date,0) gives you the end of the month =EOMONTH(Date,1) gives you the end of next month =EOMONTH(Date,-1) gives you the end of last month.									
51															
52	Invoice Date	2/3/2016													
53	Days Extra	10													
54	Due Date, EOM + 10	3/10/2016													

## 2) Invoices

1. Invoices are bills that list the items purchased, amount charged for each item, Shipping charges, Other fees, and terms for how and when payment is to be made.
2. When you receive an Invoice, you owe money. Invoices indicate that you are in debt.
3. Accounting Terms:
  1. To the Seller, Invoices represent **Accounts Receivable**. Accounts Receivable are assets that represent future cash coming into the business.
  2. To the Buyer, Invoices represent **Accounts Payable**. Accounts Payable are liabilities (debt) that indicate that the buyer owes money and is in debt.
4. Shipping Terms:
  1. FOB = "Free On Board"
    - i. **FOB Destination** = "Seller retains ownership of goods until they reach the destination.
      1. At Destination ownership of goods transfers to Buyer.
      2. Seller pays shipping charges.
      3. Because Seller owns goods during shipment, if they are damaged, Shipper records a loss."
    - ii. **FOB Shipping Point** = "Ownership of goods transfers to Buyer prior to shipment (usually when goods are handed to shipping company).
      1. Buyer pays shipping charges.
      2. Because Buyer owns goods during shipment, if they are damaged, Buyer records a loss."
  2. COD = Cash on delivery: Payment for goods is made when items are delivered.
  3. FAS = "Free alongside": Goods are delivered to the dock with all freight charges paid, any remaining charges are paid by Buyer.
  4. Note: Some Businesses will record Shipping on Sales Invoice and some will not (shipping bill comes separately).
5. Payment Terms:
  1. Invoices usually list the terms for how and when to pay such as when the invoice amount is due, how much of a discount you can have if you pay early and where the payment should be sent.
6. Picture of an Invoice:

Invoice				
Seller		Gel Boomerangs, gel-boomerang.com		
Buyer	Sell To:	Invoice #	1255	
	Kite Flight	Date	2/28/2018	
	1414 43rd Ave. Watermore			
Item purchased	Quantity	Price Each	Line Item Total	
Quad	15	\$ 25.62	\$ 384.30	
Carlota	10	\$ 10.58	\$ 105.80	
Bellen	25	\$ 13.72	\$ 343.00	
			Subtotal	\$ 833.10
Shipping Terms: Shipping Point		Shipping	\$15.00	
Terms: 1/15, net 45		Invoice Total	\$ 848.10	

Invoice Date is used to calculate Cash Discount

Cash Discount is applied to Subtotal for Products Purchased

Cash Discount is NOT applied to Shipping Costs.

### 3) Cash Discounts: Incentive to Pay Invoice Early

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1. When a buyer receives an Invoice they often have a set amount of time to pay the invoice. In order to get buyers to pay their invoice quickly, sellers usually offer discounts are early payments, called “Cash Discounts”
2. Cash Discounts:
  1. **Cash Discounts** are discounts that are offered on invoices to encourage the purchaser to pay quickly.
  2. Cash Discounts = Incentive to Pay Invoice Total Early.
  3. Cash Discounts will offer a % Discount on the Invoice Total (without shipping, tax, insurance) if you pay the invoice within a given time frame.
3. Cash Discounts are applied to Subtotal for Products Purchased ONLY.
4. Do NOT apply Cash Discounts to:
  1. Shipping Charges
  2. Tax Charges
  3. Insurance fees
5. There are many, different types of Cash Discounts. You always have to read the contract carefully or contact the seller to verify that you are calculating the Cash Discounts correctly.
6. Some of the types of Cash Discounts we will see in this video:
  1. Ordinary Method
  2. AS OF Method
  3. EOM = End of Month Method
  4. ROG = Receipt of Goods Method
7. Cash Discounts are NOT the same as Trade Discounts.
  1. Trade Discount = Discount applied to List Price in order to calculate the Wholesale Cost.
  2. Cash Discounts = Offer of a discount on Invoice Total (not including Shipping or Tax) as an incentive to pay the bill early.



## Cash Discounts = Discount On Invoice Total If Invoice Paid Early

- Cash Discounts are discounts that are offered on invoices to encourage the purchaser to pay quickly.
- Cash Discounts = Incentive to Pay Invoice Total Early.
- Cash Discounts are applied to Subtotal for Products Purchased ONLY.
- Do NOT apply Cash Discounts to: Shipping Charges, Tax Charges, Insurance fees.
- There are many different types of Cash Discounts. We will look at these methods; **Ordinary, EOM, AS OF, ROG**
- Cash Discounts are NOT the same as Trade Discounts.
  - **Trade Discount** = Discount applied to List Price in order to calculate the Wholesale Cost.
  - **Cash Discounts** = Offer of a discount on Invoice Total as an incentive to pay the bill early.

#### 4) Ordinary Method for Calculating Cash Discounts

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1. If terms read: **2/10, Net 30**

- Read as: "Two Ten, Net Thirty" or "2 10, net 30"
- **2** means 2% discount on Invoice Total (without shipping, tax and insurance)
- **10** means if you pay within 10 days of Invoice Date, you can get the 2% discount.
  - **\*\*Note:** If you are paying exactly 10 days after Invoice Date, you DO get discount.
- **Net 30** Means if you pay 30 past the Invoice Date a late fee may apply (depending on contract)
- If no "Net" is given, it is assumed to be 20 days past cash discount period. This is true for all the Cash Discount Methods, such as Ordinary, AS OF, ROG and EOM.
- Usually, if payment date falls on Sunday or Holiday, you pay the following day.
- Know your contact:
  - i. Some contacts say a payment is made only when the money is received.
  - ii. Others say if payment made by mail, payments is made by the post mark.

2. Ordinary Dating Example 1 on next page:



## Ordinary Dating Cash Discounts Method







### Example:


Cash Discount %:	0.02
Number Days to Take Discount:	10
Number of Days until Invoice is considered Late:	30
Invoice Total :	\$500.00 (without shipping, tax, insurance)
Invoice Date:	2/28/2018
Payment Date:	3/11/2018
Last Day To Earn A Discount:	3/10/2018
Final Due Date:	3/30/2018
How Many Days Between Payment Date & Invoice Date?	11
1) Is Cash Discount Earned? Paid in 10 or fewer days?	FALSE
1) Is Cash Discount Earned? Paid in 10 or fewer days?	FALSE
Amount of Discount:	\$10.00
Amount to Pay:	\$500.00
Amount to pay all in one formula:	\$500.00

- =E17+E14 ==>> Invoice Date + Number Days to Take Discount
- =E17+E15 ==>> Invoice Date + Number of Days until Invoice is considered Late
- =E18-E17 ==>> Later Date - Earlier Date = Payment Date - Invoice Date
- =E21<=E14 ==>> Days Between Payment Date & Invoice Date <= Number Days to Take Discount
- =E18<=E19 ==>> Payment Date <= Last Day To Earn A Discount
- =ROUND(E16\*E13,2)
- =IF(E22,E16-E24,E16)
- =IF(E18-E17<=E14,ROUND(E16\*(1-E13),2),E16)

3. Ordinary Dating Example 2:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N																																							
1	Invoice																																																				
2	Gel Boomerangs, gel-boomerang.com																																																				
3																																																					
4	<table border="1"> <tr> <td>Sell To:</td> <td>Invoice #</td> <td>1255</td> </tr> <tr> <td>Kite Flight</td> <td>Date</td> <td>2/19/2018</td> </tr> <tr> <td>1414 43rd Ave.</td> <td colspan="2">  </td> </tr> <tr> <td>Watermore</td> <td colspan="2"></td> </tr> </table>													Sell To:	Invoice #	1255	Kite Flight	Date	2/19/2018	1414 43rd Ave.			Watermore																														
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7	=H6+H4																																																				
8	=H7-H6																																																				
9	=H9<=H4																																																				
10	=E16																																																				
11	=IF(H10,ROUND(H11*H3,2),0)																																																				
12	=E17																																																				
13	=H11-H12+H13																																																				
14	=E16-IF(H7-H6<=H4,ROUND(E16*H3,2),0)+E17																																																				

#### 4. Ordinary Dating Example 3:

	A	B	C	D	E	F	G	H	I	J	K	L	M
1													
2		<b>Invoice</b>					<b>Ordinary Dating Method for Cash Discounts</b>						
3		 <b>Gel Boomerangs</b> , gel-boomerang.com					Invoice Date	2/19/2018	=E6				
4		Sell To: Kite Flight 1414 43rd Ave. Watermore					Invoice Payment Date	3/8/2018					
5							Invoice #	1255		Days Between Date Paid & Invoice Date:	17	=H4-H3	
6			Date	2/19/2018		Cash Discount % #1:	2.00%						
7						Number Days to Take Discount #1:	15						
8						Cash Discount % #2:	1.00%						
9						Number Days to Take Discount #2:	30						
10						Number of Days until Invoice is Late:	45						
11		<b>Item purchased</b>	<b>Quantity</b>	<b>Price Each</b>	<b>Line Item Total</b>	Discount Earned? Paid in 15 or fewer days?	FALSE	=H5<=H7					
12		Quad	15	\$25.62	\$384.30	Discount Earned? Paid in 30 or fewer days?	TRUE	=H5<=H9					
13		Carlota	10	10.58	105.80	Discount to use	0.01	=IF(H11,H6,IF(H12,H8,0))					
14		Bellen	25	13.72	343.00	Amount of Discount:	\$8.33	=ROUND(E16*H13,2)					
15						Amount to Pay	\$839.77	=E16-H14+E17					
16					Subtotal								
17		Shipping Terms:	Shipping Point	Shipping	\$15.00	Amount to pay all in one formula:	\$839.77						
18		Terms:	2/15, 1/30, net 45	Invoice Total	\$848.10								
19													

=E16-ROUND(E16\*IF(H4-H3<=H7,H6,IF(H4-H3<=H9,H8,0)),2)+E17

#### 5) Hint About Using Two IF Functions in a Formula

**Hint #1:** When you have 1 of 3 things to put into a cell, you can use two IF Functions.


=IF(H11,H6,IF(H12,H8,0))

IF(logical\_test, [value\_if\_true], [value\_if\_false])

**Hint #2:** When you get to the value\_if\_false argument and you still have two possible values, you know that you need to use a second IF Function.

## 6) AS OF Method for Calculating Cash Discounts

The only difference between the “Ordinary Cash Discount Method” and the “AS OF Cash Discount Method”, is that you compare the Invoice Payment Date to the “AS OF Date” rather than the “Invoice Date”. As seen here:

	A	B	C	D	E	F	G	H	I	J	K	L
1												
2		<b>Invoice</b>					<b>AS OF Dating Method for Cash Discounts</b>					
3		 <b>Gel Boomerangs</b> , gel-boomerang.com					Cash Discount %:		1.50%			
4							Number Days to Take Discount:		25			
5		<b>Sell To:</b>		<b>Invoice #</b>				1255				
6		Kite Flight		<b>Date</b>				2/19/2018				
7		1414 43rd Ave.		<b>AS OF Date</b>				2/28/2018				
8		Watermore						<b>AS OF Date</b>		2/28/2018		
9								Invoice Payment Date		3/22/2018		
10								Days Between Date Paid & Invoice Date:		22		
11		<b>Item purchased</b>	<b>Quantity</b>	<b>Price Each</b>	<b>Line Item Total</b>			Discount Earned? Paid in 25 or fewer days?		TRUE		
12		Quad	15	\$25.62	\$384.30			Invoice Subtotal (Before Shipping)		\$833.10		
13		Carlota	10	10.58	105.80			Amount of Discount:		\$12.50		
14		Bellen	25	13.72	343.00			Shipping		\$15.00		
15								Amount to Pay		\$835.60		
16												
17												
18												

=H7-H6  
 =H8<=H4  
 =E16  
 =IF(H9,ROUND(H10\*H3,2),0)  
 =E17  
 =H10-H11+H12




## 7) ROG = Receipt of Goods Method for Calculating Cash Discounts

ROG Rule is same as "Ordinary Method" except for these two steps:

1. Compare Receipt of Goods Date to Payment Date
2. To calculate "Net" day (Number of Days until Invoice is Late), add 20 to the "Number of Days to Take Discount"

Example from Video:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N			
1																	
2		<b>Invoice</b>					<b>ROG Dating Method for Cash Discounts</b>										
3		 <b>Gel Boomerangs</b> , gel-boomerang.com					Cash Discount %:	2.00%									
4		<b>Sell To:</b> Kite Flight 1414 43rd Ave. Watermore				<b>Invoice #</b>	1255	Number Days to Take Discount:	10								
5						<b>Date</b>	2/19/2018	Number of Days until Invoice is Late:	30	=H4+20							
6						<b>Receipt of Goods</b>	2/24/2018	<b>Receipt of Goods</b>	2/24/2018								
7								<b>Invoice Payment Date</b>	3/22/2018								
8						<b>Days Between Date Paid &amp; Invoice Date:</b>	26	=H7-H6									
9						<b>Discount Earned? Paid in 10 or fewer days?</b>	FALSE	=H8<=H4									
10		<b>Item purchased</b>	<b>Quantity</b>	<b>Price Each</b>	<b>Line Item Total</b>	<b>Invoice Subtotal (Before Shipping)</b>	\$833.10	=E16									
11		Quad	15	\$25.62	\$384.30	<b>Amount of Discount:</b>	\$0.00	=IF(H9,ROUND(H10*H3,2),0)									
12		Carlota	10	10.58	105.80	<b>Shipping</b>	\$15.00	=E17									
13		Bellen	25	13.72	343.00	<b>Amount to Pay</b>	\$848.10	=H10-H11+H12									
14																	
15																	
16					<b>Subtotal</b>	\$833.10											
17		<b>Shipping Terms:</b>	<b>Shipping Point</b>	<b>Shipping</b>	\$15.00												
18		<b>Terms:</b>	2/10 ROG	<b>Invoice Total</b>	\$848.10												

### ROG Rule:

- 1) Compare Receipt of Goods Date to Payment Date
- 2) To calculate "Net" day (Number of Days until Invoice is Late), add 20 to the "Number of Days to Take Discount"

## 8) EOM = End of Month Method for Calculating Cash Discounts

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EOM Rule:

- 1) If your terms are gives as: 3/15 EOM
  - Situation 1 for 3/15 EOM:
    1. If Invoice Date is before the 26th of the month (25, 24, 23...),
    2. Final Date To Take Discount = the 15th of next month.
    3. Invoice Due Date = Final Date To Take Discount + 20
  - Situation 2 for 3/15 EOM:
    4. If Invoice Date is after the 25th of the month (26, 27, 28...),
    5. Final Date To Take Discount = the 15th of two months ahead.
    6. Invoice Due Date = Final Date To Take Discount + 20

## EOM (End Of Month) Dating Cash Discounts Method



Situation 1:		
Cash Discount %:	3.00%	
Last Day in Month To Earn A Discount	15	
Invoice Date:	2/19/2018	
Invoice Payment Date	3/17/2018	
Day of Month in Invoice Date?	19	=DAY(C14)
Day Hurdle	26	
Is Day 26 or Bigger?	FALSE	=C16>=C17
Number of Months to Jump Forward	0	=C18+0
Last Day in Month To Earn A Discount	3/15/2018	=EOMONTH(C14,C19)+C13
Final Due Date	4/4/2018	=C20+20
Invoice Subtotal (Before Shipping):	\$833.10	
Earn a Discount?	FALSE	=C15<=C20
Amount of Discount:	\$0.00	=ROUND(C22*C12*C23,2)
Shipping:	\$15.00	
Amount to Pay:	\$848.10	=C22-C24+C25

Terms:  
3/15 EOM

Situation 2:		
Cash Discount %:	3.00%	
Last Day in Month To Earn A Discount	15	
Invoice Date:	2/26/2018	
Invoice Payment Date	3/17/2018	
Day of Month in Invoice Date?	26	=DAY(H14)
Day Hurdle	26	
Is Day 26 or Bigger?	TRUE	=H16>=H17
Number of Months to Jump Forward	1	=H18+0
Last Day in Month To Earn A Discount	4/15/2018	=EOMONTH(H14,H19)+H13
Final Due Date	5/5/2018	=H20+20
Invoice Subtotal (Before Shipping):	\$833.10	
Earn a Discount?	TRUE	=H15<=H20
Amount of Discount:	\$24.99	=ROUND(H22*H12*H23,2)
Shipping:	\$15.00	
Amount to Pay:	\$823.11	=H22-H24+H25



## 9) Logical TRUE FALSE Values can be used as 0 and 1 in formulas

Situation 1:		
Cash Discount %:	3.00%	
Last Day in Month To Earn A Discount	15	
Invoice Date:	2/19/2018	
Invoice Payment Date	3/17/2018	
Day of Month in Invoice Date?	19	=DAY(C14)
Day Hurdle	26	
Is Day 26 or Bigger?	FALSE	=C16>=C17
Number of Months to Jump Forward	0	=C18+0
Last Day in Month To Earn A Discount	3/15/2018	=EOMONTH(C14,C19)+C13
Final Due Date	4/4/2018	=C20+20
Invoice Subtotal (Before Shipping):	\$833.10	
Earn a Discount?	FALSE	=C15<=C20
Amount of Discount:	\$0.00	=ROUND(C22*C12*C23,2)
Shipping:	\$15.00	
Amount to Pay:	\$848.10	=C22-C24+C25

Terms:  
3/15 EOM

When we use a TRUE in a math formula, the TRUE will be converted to the number 1.

When we use a FALSE in a math formula, the FALSE will be converted to the number 0.

## New Keyboards Seen In Video:

- **Ctrl + ;** = Insert Today's Date (as a Hard Coded Value)
- **Ctrl + F1** = Toggle to Show & Hide Ribbon