6.1) **Invoices and Trade Discounts**

Manufacturing and Retail businesses make a profit by buying items and then reselling for more than they cost.

**Manufacturers:**
- Buy raw materials and assemble them into products that they sell to wholesalers

**Wholesalers:**
- Buy goods from manufactures or other wholesalers and sell them to retailers

**Retailers:**
- Sell the goods to the consumer

**Examples:**
- Finish plywood manufacturers in Finland sold wood to wholesalers in USA
- Wholesalers in USA sold aircraft plywood to Gel Boomerangs
- Gel Boomerangs manufactured boomerangs
- Gel Boomerangs sold boomerangs to retailers
- Retailers sold boomerangs to consumers

**Dell’s operations span all three categories**

**Invoices:**
- Record of sales and purchases
- Proof that transaction occurred – very important document for business efficiency and for the audit trail

**Purchase invoice:**
- For the buyer it records a purchase – usually inventory or supplies

**Sales Invoice:**
- For the seller is records a sale – Proof that revenue was earned
<table>
<thead>
<tr>
<th>Qty</th>
<th>Description</th>
<th>Unit Price</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Sheets 10 ply, 5mm, Finish Birch</td>
<td>$ 90.00</td>
<td>$450.00</td>
</tr>
</tbody>
</table>

Terms: 1/15, N/45

SubTotal Shipping $450.00

TOTAL $450.00

Office Use Only
## Gel Boomerangs

Gel Boomerangs
2124 Kittredge St. PMB 61
Berkeley, CA 94704

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### INVOICE

- **Customer**
  - Name: Kite Flight
  - Address: 1414 43rd Ave.
  - City: Watermore
  - Phone:
  - State: MD
  - ZIP: 40025

- **Misc**
  - Date: 2/23/2003
  - Order No.
  - Rep:
  - FOB: Shipping Point

<table>
<thead>
<tr>
<th>Qty</th>
<th>Description</th>
<th>Unit Price</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Bellens</td>
<td>$10.00</td>
<td>$150.00</td>
</tr>
<tr>
<td>8</td>
<td>Duece</td>
<td>$12.50</td>
<td>$100.00</td>
</tr>
</tbody>
</table>

Terms: 2/10, N/30

- **SubTotal Shipping**: $250.00
- **Tax Rate(s)**:
- **TOTAL**: $250.00

---

**Our Customers Have Many Happy Returns!**

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**clean example**
<table>
<thead>
<tr>
<th>Qty</th>
<th>Description</th>
<th>Unit Price</th>
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</tr>
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<td>Sheets 10 ply, 5mm, Finish Birch</td>
<td>$90.00</td>
<td>$450.00</td>
</tr>
</tbody>
</table>

Terms: 1/15 N/45

Payment

Select One...

Discount date = March 15

1. $90.00 x 5 = 450

Start counting the next day March 1, 15 days...

2. So if Gel Boomerangs pays before or on March 15, they get cash discount of 1%

3. Due date without receiving discount

4. Cash discount, March has 31 days
   45 - 31 = 14 days
   April 14 is due date

5. Amount to pay if Gel Boomerangs pays on March 10
   $450 - $450 x 0.01 = $450 - 4.5 = $445.50
   OR $450 x (1 - 0.01) = $450 x 0.99 = $445.50

Math is Fun!  Page 2 of 17  Excel is Fun!
Sales Invoice because Gel Boomerang’s name is at the top of the invoice. Gel Boomerangs did the selling.

<table>
<thead>
<tr>
<th>Customer</th>
<th>Misc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name: Kite Flight</td>
<td>Date: 2/23/2003</td>
</tr>
<tr>
<td>Address: 1414 43rd Ave.</td>
<td>Order No.</td>
</tr>
<tr>
<td>State MD</td>
<td>FOB</td>
</tr>
<tr>
<td>ZIP 40025</td>
<td>Shipping Point</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit Price</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>(15) Bellens</td>
<td>$10.00</td>
<td>$150.00</td>
</tr>
<tr>
<td>(8) Duece</td>
<td>$12.50</td>
<td>$100.00</td>
</tr>
<tr>
<td>(10) Terms: 2/10 N/30</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SubTotal: $250.00

Our Customers Have Many Happy Returns!

---

1. $15 \times 10 = $150
2. $8 \times 12.5 = 100
3. \text{total} = 250

4. Discount date = (28-23) = 5 days in Feb.
5. Discount date = March 5.
6. Due date = 30-5 = 25 → March 25
7. Amount Gel Boomerangs will receive from Kite Flight if they pay on March 1 = $250 - $250 \times .02 = $250 - 5 = 245

Excel is Fun!
1) **Complete an invoice**

Number of items purchased * price per item = total for that item

Number of items purchased * price per item = total for that item

= Total for invoice

\[\text{15 Teller Boomerangs } \times \$10.00 \text{ each } = 150\]

\[\text{8 Duece Boomerangs } \times \$12.50 \text{ each } = 100\]

\[\text{total } \quad \$250\]

2) **Understand common shipping terms**

**FOB Shipping Point:**
- Free on Board Shipping Point
- Title of goods is transferred to the purchaser when the goods are handed over to the shipper
- Purchaser must pay for shipping

**FOB Destination:**
- Free on Board Destination
- Title of goods transfers to the purchaser when they receive the goods
- Seller pays for the shipping

**FAS:**
- Free Alongside Ship
- Term used when goods delivered by a ship
- Sender pays for shipping costs up to the dock

\[\text{From the next section,}\]

\[\text{the $10.00 & the 12.50 are called "Net Cost"}\]
3) Calculate trade discounts

Trade Discount:
- Given to businesses that resell the items
- Example: If Foot Locker sells the shoes for $150.00, Foot Locker did not pay $150.00 for the shoes. Foot Locker got a “trade discount” when they bought the shoes. When they bought the shoes they paid “net cost”:

\[ \text{Net cost} = \text{List price} - \text{Trade discount} \]

Example:
The list price of the shoes is $150.00. If the trade discount percentage is 25% what is the net cost?

1. \[ \text{Shoes price} = 150 \]
2. \[ \text{trade discount} = 25\% \text{ of list price} \]
3. \[ \text{what is net cost?} \]
4. \[ 150 - 150 \times 0.25 = 150 - 37.5 = 112.50 \]
5. \[ 150 \times (1 - 0.25) = 150 \times 0.75 = 112.50 \]
6. The net cost was $112.50

Series (Chain) discounts:
- Hold over from the past
- Each industry does it differently
- Example: discount is written as follows: 20/10
  - A 20% discount is subtracted from the list price, and from this difference, another 10% discount is subtracted

Three methods to calculate series discounts and net cost:
1) Discounts separately method
2) Compliment method
3) Table method
Discounts separately method:

Example:
The list price of a circular saw is $150. If the trade discount 20/10 what is the net cost?

1. Circular saw list price = $150
   Trade discount = 20/10
   What is net cost?

2. \[
\begin{align*}
150 & \quad \text{(list price)} \\
- 150 \times .2 & \quad \text{($30$)} \\
\hline
120 & \quad \text{First discount in series}
\end{align*}
\]

3. \[
\begin{align*}
120 & \quad \text{(price after first discount)} \\
- 120 \times .1 & \quad \text{($12$)} \\
\hline
108 & \quad \text{Second discount in series}
\end{align*}
\]

3. After the series trade discount of 20/10, the circular saw (with a list of 150) had a net cost of $108.00.

This is the net cost number that shows up on the invoice example:

Units \times price = 8 \times 108 = $864.00
**Compliment method:**

- The number that must be added to the discount to get one
- The compliment of a 20% discount is 80% because: 80% + 20% = 100%

The 80% is called the net cost equivalent (percent paid)

**Net Cost = List price * net cost equivalent (percent paid)**

**Net cost equivalent (percent paid) for a series discount:**

Complement of the first single discount * complement of the second single discount

**Example:**
Find the net cost equivalent (percent paid) for a 20/10 series discount.

\[(1 - .2) \times (1 - .1) = .8 \times .9 = .72\]

\[\text{compliments: .2 and .8 are compliments } \quad \text{and .1 and .9 are compliments}\]

**Example:**
The list price of a circular saw is $150. If the trade discount 20/10 what is the net cost?

\[\text{Net cost equivalent} = (1 - .2) \times (1 - .1) = .72\]

\[\text{Net cost} = \text{List price} \times \text{Net cost equivalent}\]

\[\frac{150}{.72} = \text{Net cost} = 108\]

**Example:**
Find the net cost equivalent of 20/10/15

\[(1 - .2) \times (1 - .1) \times (1 - .15) = .8 \times .9 \times .85 = .612\]

We don’t need to round net cost equivalents.

**Table method:**
- Table on page 227
6.2) Single Discount Equivalents

1) **Express a series discount as an equivalent single discount**

- **Formula**: 
  \[ \text{Single discount equivalent} = 1 - \text{net cost equivalent (percent paid)} \]

Example:
If a 20/10 series discount is given, find the single discount equivalent.

- 1st: \[ \text{net cost equivalent} = (1 - .2) \times (1 - .1) = .72 \]
- 2nd: \[ \text{single discount equivalent} = 1 - .72 = .28 \]
- 3rd: The single Trade Discount would be .28

Example: to find net cost on $100 list price

\[ \text{Net cost} = 100 - 100 \times .28 = 100 - 28 = 72.00 \]

2) **Find the net cost by multiplying the list price by the complements of the single discounts in a series**

(we did this already on previous page)

Example:
The list price for a small compressor motor is $100.00, if the trade discount is 20/15/5, find the net cost.

- Step 1: \[ \text{List price} = 100 \]
  \[ \text{trade discount} = 20/15/5 \]
  \[ \text{Find net cost} \]

- Step 2:
  \[ 100 \times (1 - .2) \times (1 - .15) \times (1 - .05) = \]
  \[ 100 \times .8 \times .85 \times .95 = \]
  \[ 100 \times .646 = \$64.60 \]

- Step 3: The net cost for the compressor motor is $64.60. This is the net cost that appears on the invoice.
3) **Find the list price given the series discount and the net cost**

Net cost = list price x net cost equivalent (percent paid)

Net cost / net cost equivalent (percent paid) = list price

(P/R = B)

**Example:**
Series discount is 20/15/5 and the net cost after trade discount is $64.60. Find the list price.

**Step 1**

Series Trade Discount = 20/15/5

Net cost = 64.60

Find List Price

\[
\frac{P}{R} = B \quad \text{or} \quad \frac{\text{Net cost}}{\% \text{ paid}} = \text{List price}
\]

\[
\frac{64.60}{(1-.2)(1-.15)(1-.05)} = \frac{64.60}{.646} = \$100
\]

**Check:**

100 * .646 = 64.60

**Step 3**

With a series discount of 20/15/5 and a net cost of 64.60, the list price was \$100.00.
6.3) Cash Discounts: Ordinary Dating Method

Trade Discounts
- When you purchase to resell

Cash Discounts
- Incentive to pay early
  - "If you pay me by this date, I will give you a discount"
- The business wants to get paid quickly so they have cash to conduct their business
- Is applied to the invoice subtotal for the items only (not the shipping or insurance) "If you pay me by this date, I will give you a discount"
- The business wants to get paid quickly so they have cash to conduct their business
- Net cost = (List price – trade discount) – cash discount

Use the ordinary dating method

2/10/, net 30 or 2/10, n/30 read “two ten, net thirty”

If paid within 10 days (start counting the day after the date on the invoice)

If the invoice is paid within the first 10 days, the cash discount is earned

If the invoice is paid between the 11th day and 30th day, no cash discount is earned

Start the day after the invoice date and count forward. Invoice dates are never used as the starting point
Example:
Invoice date is October 20. The terms are 2/5, net 15. What is the due date?

Invoice date = Oct. 20
Cash Discount % = 2% \( \Rightarrow .02 \)

\# of days until discount offer expires = 5
With no discount you still must pay within = 15 days

1. There are 31 days in Oct.
2. 31 - 20 = 11 days used up in October
3. 15 - 11 = 4 days into November
4. Due date is November 4th

Example:
Invoice date is October 20. The terms are 2/5, net 15. What date must the invoice be paid by in order to take the discount?

Details
1. There are 31 days in October.
2. 11 days still to go if it is October 20
3. So we just add 5 days to October 20
4. 20 + 5 = 25
5. The due date is October 25
Comprehensive Example:
Invoice date is October 20
The terms are 2/5, net 15
The Invoice total is $100.00 and the “FOB shipping point” shipping charges are $8.00
Invoice is paid on October 22
What is the total amount due?

**Step 1:** Can the cash discount be taken?

\[ 20 + 5 = 25 \implies \text{Discount date} = \text{Oct. 25} \]

Because we pay on Oct. 22, before Oct. 25, we **CAN** take the cash discount

**Step 2:** How much is the cash discount? (Shipping is not included in calculation)

\[ 100 \times 0.02 = \$2.00 \]

**Step 3:** Find amount due before considering shipping

\[ 100 - 2 = \$98 \]

**Step 4:** Add total owed for merchandise and shipping

\[ 98 + 8 = \$106 \]

Use postdating when calculating cash discounts

Sometimes on an invoice you will see a date like this

\[ 3/22/2007 \text{ AS OF 4/01/2007} \]

**Multiple offers for discounts**

Invoice date = May 18
Terms = 4/10, 3/25, 1/40, n/60
First cash discount date = \( 18 + 10 = 28 \) \( \implies \text{May 28} \)
Second cash discount date = \( 25 - (31 - 18) = 12 \) \( \implies \text{June 12} \)
Third cash discount date = \( 40 - (31 - 18) = 27 \) \( \implies \text{June 27} \)
Net Payment Date = \( 60 - (30) - (31 - 18) = 17 \) \( \implies \text{July 17} \)

Math is Fun!  Page 12 of 17  Excel is Fun!
6.4) Cash Discounts: Other Dating Methods

Use the end-of-the-month dating method

3/10 EOM or 3/10 prox.

3\% cash discount if the payment is made by the 10\textsuperscript{th} of the month that follows the sale

"10 days after the end of March"

**If the invoice is dated the 26\textsuperscript{th} to the 31\textsuperscript{st} then you add one extra month
**If no due date is given, it is assumed to be 20 days after the discount date
**If due date falls on a Saturday or holiday, the following day becomes the due date

Example:
Invoice from Bay Air has an invoice date of April 6 with terms of 3/20 EOM, what is the discount date and what is the net payment date?

Discount date: 
May comes after April, so it is May 20

Net payment date:
May has 31 days
31 - 20 = 11 days left in May
20 - 11 = 9

Because there is no net payment date given it is assumed to be 20 days after May 20

Example:
Find amount paid given the following information:

Invoice total = $782.00
Invoice date: August 3
Terms: 1/10 prox.
Invoice paid on September 4

Step 1: find discount date

1/10 prox. means 10 days after end of August. So Discount Date is Sep. 10.

Step 2: Calculate amount owed

$$782 \times (1 - 0.1) = \$703.80$$
Use the receipts-of-goods method

**This method is used when the ship time is long

3/15 ROG  
3% cash discount  
Discount date is 15 days after the delivery date (Receipt of goods)

If net payment date is not stated add 20 days to Discount date

Example:
Oaks Hardware received an invoice dated December 12 with terms of 2/10 ROG. The goods were received on January 2. What are the discount date and the net payment date?

Discount date:

Invoice Date = Dec. 12  
Terms = 2/10 ROG  
Received Goods on Jan 2.  
cash discount % = 2% = .02

Discount Date

- start counting after Jan 2.  
- 10 days after Jan 2 is Jan 12  
- Discount Date is Jan. 12

Net payment date

Because net payment date is not stated, we add 20 days to Discount date

\[
\frac{Jan 12 + 20}{32} \Rightarrow \text{But there are only 31 days in January.} \Rightarrow 32 - 31 = 1
\]

Feb 1 is the Net Payment Date
Use the extra dating method
- When extra days are given to take advantage of the discount, above and beyond what is usually given.

2/10 – 50 extra or 2/10 – 50 ex. or 2/10 – 50 x

- Shown as 2/10 – 50 ex. And not 2/60
- Emphasis that it is “extra” given beyond what is usually given.

Example:

Invoice total = $750.00
Invoice date: August 5
Terms: 3/10-30 x
Invoice paid on September 12
Find the net payment

**Step 1:** find number of days until discount date

10 + 30 = 40

**Step 2:** find discount date

1. Aug 5 \Rightarrow 31 days in Aug.
   - 5
   \[ \frac{26 \text{ days used in Aug.}}{} \]
2. 40 - 26 = 14 \Rightarrow \text{Sep 14 is the cash discount date}

**Step 3:** Find net payment

\[ 750 \times (1 - 0.03) = \$727.50 \]
Determine credit given for partial payment of an invoice

If only partial payment is made on the total amount due, then the offered discount is only applied to the portion of the invoice that is paid.

Example:

1) If a 3% discount is given on an invoice total of $100, only $97 is paid \((100 \times (1-0.03))\).

   IF whole invoice is paid we only pay $97 for an $100 invoice.

2) The customer taking the discount is only paying \(\frac{97}{100} = 97\) cents for every dollar owed.

   This is like paying \$0.97 for every \$1.00 owed.

   So if we only pay part of our invoice we only pay \$0.97 for every \$1.00 we owe.

3) Formula to determine credit given for partial payment of an invoice:

   If we send them \$0.97 they must credit our account for \$1.00

Credit toward invoice when partial payments are made = \[
\frac{\text{Partial Payment}}{1 \text{ discount given}}
\]

This number is less than 1 and so the resultant quotient will be bigger than the partial payment.
Example:
Tom owes $125 total on his invoice and makes a partial payment of $50 within the discount period. The discount he is offered is 3%. What is the credit toward his invoice? What is the amount due on his account? What is the cash discount that he earned?

1) What is the credit toward his invoice?

\[
\frac{50}{1 - 0.03} = 51.546392 \approx \$51.55
\]

2) What is the amount due on his account?

\[
125 - 51.55 = \$73.45
\]

3) What is the cash discount that he earned?

\[
51.55 - 50 = \$1.55
\]
Auto Electric offers an oxygen sensor at a list price of $289, less trade discount of 20/30. What is net cost?

1st list variables and details

Business Name = Auto Electric
Item = Oxygen sensor
List Price = $289
Trade Discount = 20/30
What is net cost?

2nd setup and solve

\[
\begin{align*}
\text{Net Cost} &= \text{List Price} \times (1 - \text{Trade Discount}) \\
&= 289 \times (1 - 0.2) \times (1 - 0.3) \\
&= 289 \times 0.8 \times 0.7 \\
&= 161.84
\end{align*}
\]

3rd write answer in words

Answer: With trade discounts, the oxygen sensor net cost is $161.84.
Series Discounts Thick

List Price = $289
Trade Discount = 20/30 (This is called a series discount)

First Amount

\[
(289 - 289 \times 0.20) - (289 - 289 \times 0.20) \times 0.30
\]

\[\text{factor out } 289\]

\[
289 \times (1 - 0.20) - 289 \times (1 - 0.20) \times 0.30
\]

\[\text{factor out } 289 \times (1 - 0.20)\]

\[
289 \times (1 - 0.20) \times (1 - 0.30)
\]

\[= 289 \times (1 - 0.20) \times (1 - 0.30) = 289 \times 0.80 \times 0.7\]

\[= \$161.84\]

**Formula for calculating Net Cost**

\[
\text{Net Cost} = \text{List Price} \times (1 - \text{First Trade Discount}) \times (1 - \text{Second Trade Discount})
\]
Find the single discount equivalent to a series discount of 20/10

1st List variables and details
series discount = 20/10
find single discount equivalent

2nd set up and solve

\[(1-.2)(1-.1) = .8 \times .9 = .72 = \text{cost equivalent}\]

\[= 1 - (1-.2)(1-.1) = 1 - .8 \times .9\]

\[= 1 -.72 = .28 = \text{single discount equivalent}\]

3rd write answer in words

Answer The single discount equivalent is .28
An invoice from Collier Windows amounting to $20,250 is dated Oct 6 and offers terms of 3/10, n/30. If the invoice is paid on Oct 14, what is the amount due?

**List variables & details**

- Invoice total = $20,250
- Invoice Date = Oct 6
- Payment Date = Oct 14
- Terms = 3/10, n/30
- Discount % = 0.03

**Calculation**

- To get 30% discount you must pay within 10 days of Invoice Date
- Amount due if discount not taken within 30 days of Invoice Date
- Invoice Date is never counted

**Set up & solve**

1) Discount Date = 6 + 10 = 16 → Oct 16
2) Net payment Date = \[
\text{Oct 31} - \frac{\text{Oct 6}}{\text{days in Oct 25}} + 5 = \text{Nov 5}
\]
3) Because Oct 14 is before Oct 16, we can take discount
4) 20,250 * 0.03 = 607.50
5) Amount Due = 20,250 - 607.50 = $19,642.50

**Write Answers in words**

Answer: The amount due is $19,642.50