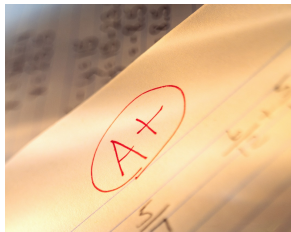


Transposition & Conversions: Optical Math for Techs & Opticians



- Transposition
- Spherical Equivalent
- Multifocal to Single Vision

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OBJECTIVES:



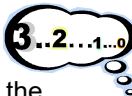
- Given a SPHEROCYLINDRICAL Rx, accurately **TRANSPOSE** it from one CYLINDER form (+ or -) to the other
- Given a SPHEROCYLINDRICAL Rx, convert it to a **SPHERICAL EQUIVALENT** Rx
- Given a MULTIFOCAL Rx, correctly **CONVERT** it to single vision near or intermediate Rx.

We'll begin with: TRANSPPOSITION



The act of converting an Rx from **plus (+)** cylinder form to **minus (-)** cylinder form, or **(-)** to **(+)**!

How to TRANSPPOSE an Rx:

- Must go in correct order! 
- **STEP 1:** **add cylinder** power to the **sphere** power (algebraically!); this becomes your new sphere power
- **STEP 2:** **change the cylinder sign:** if its **plus (+)**, make it **minus (-)**, or vice-versa.
- **STEP 3:** **change the axis by 90 degrees** (can't go over 180!)

TRANSPPOSITION (cont.)

EXAMPLE: **Transpose** the following Rx from (+ cylinder to - cylinder): **+2.00 +2.00 X 090**

- **STEP ONE:** **cylinder added to sphere**
+4.00 +2.00 X 090
- **STEP TWO:** **cylinder sign changed**
+4.00 -2.00 X 090
- **STEP THREE:** **(axis changed 90°)**
+4.00 -2.00 X 180

DONE! **+2.00 +2.00 X 090** is the same as
+4.00 -2.00 X 180

TRANSPPOSITION (cont.)

You try! **TRANSPPOSE** the following Rx's:

- 1) +5.00 - 3.00 X 085
- 2) - 4.25 +1.75 X 001
- 3) PL - 2.50 X 175
- 4) +3.25 - 3.25 X 005

TRANSPOSITION was pretty easy!



Let's move on to...
SPHERICAL EQUIVALENTS

SPHERICAL EQUIVALENTS

EXAMPLE 1:

- A patient comes in after cataract surgery. The doctor checks their Rx & she finds it to be:
+1.00 - 2.00 X 180
- You are bummed! You did the A-scan & Ks & did the IOL calcs to make the patient **PLANO SPHERE**.
Did you screw up?

EXAMPLE 2:

- A patient comes in. They normally wear a **Toric SCL**. The Rx is: **- 2.00 - 1.50 X 090**
- Their Contact Lens tore!** The Pt has a big meeting. They can't see! You ordered more CLs, but in the meantime, they need **SOMETHING** to get by for a few hours!
Can you help them?

SPHERICAL EQUIVALENTS (cont.)

There are times you need to know the *Spherical Equivalent*; I've just given you two examples.

To calculate it:

- Take **HALF** the cylinder power (50%) & **ADD** it to the **sphere** power (algebraically)
- Drop** the remaining **cyl & axis**

What you have left is the *Spherical Equivalent!*

SPHERICAL EQUIVALENTS (cont.)

Let's do "example #1":

- The pt came in after cataract surgery. Their Final Rx ended up as:

$$+1.00 - 2.00 X 180$$

- Half (50%) of the cylinder would be: **-1.00**
- Add that to the sphere:

$$-1.00 \text{ added to } +1.00 = 0 \text{ (zero)}$$

Spherical Equivalent = **PLANO SPHERE!!!**

SPHERICAL EQUIVALENTS (cont.)

Let's do "example #2":

A patient tore their last Toric SCL w/an Rx of:
- 2.00 - 1.50 X 090

- Half (50%) of the cylinder would be: **- 0.75**
- Add that to sphere: **- 0.75** plus **- 2.00 = - 2.75**



Spherical Equivalent = **- 2.75 SPHERE!**

Ask the doc if you can hook the patient up w/a **Spherical SCL** of that power (**-2.75 SPH**) to get the Pt through their meeting!

SPHERICAL EQUIVALENTS (cont.)

Now you do some!


Calculate *Spherical Equivalents* for the following:

- +7.00 - 2.50 X 175**
- 5.00 +1.00 X 162**
- PL - 4.25 X 094**
- +1.00 - 2.00 X 009**

Now that you have 'mastered' Spherical Equivalents, let's move on to **CONVERSION!**




CONVERSION



Your patient has a **multifocal (MF) Rx**


- They want simple **reading glasses** (Near Vision Only, or NVO)
- They also want **computer only glasses** (Intermediate Vision Only, or IVO)




Can **YOU** convert their **MultiFocal (MF) Rx** to help them out?

CONVERSION (cont.)

Converting a **Multifocal Rx** to a **Single Vision Rx** boils down to simply changing the **SPHERE** power.




The **closer** you want the "new" single vision glasses to focus, the **more PLUS (+)** power the **SPHERE** will need to have...



CONVERSION (cont.)

- Steps to Convert **MF** to Near Vision Only (**NVO**)
 - 1) Take **ALL** of the "ADD" power & algebraically **add it** to the **SPHERE** power.
 - 2) Drop the ADD portion off the Rx (*because you "used it up"!*) Here's an **EXAMPLE:**
- **Multi Focal Rx:**
 - OD: - 1.00 SPH Add +3.00
 - OS: - 0.50 SPH Add +3.00
 - » **Near Vision Only (NVO) Rx**
 - » OD: +2.00 SPH
 - » OS: +2.50 SPH




CONVERSION (cont.)

Converting to **Intermediate Vision Only (IVO)** [**computer glasses**] is nearly as easy:

- Take **50%** of the "ADD" power & add it to the **SPHERE** power
- Now **drop** the remaining "ADD"; you don't need it anymore!

– **Side Note:** If you want a **CPU Bifocal**, you will **keep the 50% of "ADD"** that is "**leftover**" for the "new" Rx



CONVERSION (cont.)

- Example of converting **MF** to **Intermediate:**
 - **MF RX reads:**
 - OD: +2.00 SPH ADD +2.00
 - OS: +2.25 SPH ADD +2.00

- Int. Vision Only (**IVO**) Rx would be:
 - » OD: **+3.00 SPH**
 - » OS: **+3.25 SPH**

- **CPU BF Rx** would be:
 - » OD: **+3.00 SPH ADD +1.00**
 - » OS: **+3.25 SPH ADD +1.00**

CONVERSION (cont.)

What if there is **CYLINDER** power & an **AXIS**?

- **Nothing changes!** The cylinder & axis move to the new Rx **without change**. The only part of the "original Rx" that changes is the **SPHERE**

– **MF Rx** for OD: **-1.50 -1.25 X 090 ADD +2.50**

– **NVO Rx** for OD: **+1.00 -1.25 X 090**

– **IVO Rx** for OD: **- 0.25 -1.25 X 090**

– **CPU BF Rx** for OD: **- 0.25 -1.25 X 090
ADD +1.25**

CONVERSION (cont.)

Now YOU try! Convert to **NVO** & **IVO**

- 1) **- 0.25 SPH Add +1.50**
- 0.50 SPH Add +1.50
- 2) **+1.75 - 0.25 X 101 Add +2.00**
+2.25 - 1.75 X 002 Add +2.00
- 3) **-1.50 + 2.00 X 078 Add +1.00**
PL + 0.25 X 055 Add +1.00
- 4) **- 4.00 – 2.75 X 009 Add +2.25**
- 0.50 – 0.75 X 010 Add +2.25

Think you've got it? Let's see!

Rx is: OD **+3.00 +1.50 X 045 ADD +2.50**

OS **-1.75 +2.25 X 055 ADD +2.50**

- First, **TRANSPOSE** this RX
- Second, calculate the **SPHERICAL EQUIVALENT** of the DISTANT RX
- Third, **CONVERT** to Near Vision Only (**NVO**)

