The lowest of these yields is called the **yield-to-worst**.

$$YTW = Min\left[y_{t_1}, y_{t_2}, \cdots, y_{t_k}\right] = \text{Yield to worst, given } P$$

If the bond is not redeemed until maturity, then its yield is known as its **yield-to-maturity**:

$$YTM = \text{Yield to maturity} = y_{t_k}$$

For a given yield y, there are k possible prices, depending on when the bond is redeemed. Each of these prices is a price to redemption (PTR):

$$PTR_{t_1}, PTR_{t_2}, \cdots, PTR_{t_k}$$

We call the minimum of these prices the **price-to-worst**, which is denoted by PTW:

$$PTW = Min\left[PTR_{t_1}, PTR_{t_2}, \cdots, PTR_{t_k}\right] = \text{Minimum price, given } y$$

If a YTW is used to calculate a PTW, then the resulting price is the price that was originally used to calculate the YTW. And if a PTW is used to calculate a YTW, then the resulting yield is the yield that was originally used to calculate the PTW.

Example 13.07	A 4-year bond makes annual coupon payments at an annual rate 10% per year. The par value is $100. The annual effective yield is 6.50% per year.
	The bond is callable after 1 year for $110, after 2 years for $106, and after 3 years for $104. The redemption value after 4 years is $100.
	Calculate the price-to-worst.
Solution	Let's use the BA II Plus to obtain the 4 prices to redemption.

   1 [N] 6.5 [I/Y] 10 [PMT] 110 [FV]

   [CPT] [PV]

   Result is -112.68. $PTR_1 = 112.68$

   2 [N] 106 [FV]

   [CPT] [PV]

   Result is -111.66. $PTR_2 = 111.66$

   3 [N] 104 [FV]

   [CPT] [PV]

   Result is -112.58. $PTR_3 = 112.58$

   4 [N] 100 [FV]

   [CPT] [PV]

   Result is -111.99. $PTR_4 = 111.99$

The price-to-worst is:

$$PTW = Min\left[112.68, 111.66, 112.58, 111.99\right] = \mathbf{111.66}$$

In the next example, we use the same bond as in the example above, and we use the PTW to find the YTW.

Example 13.08	A 4-year bond makes annual coupon payments at an annual rate 10% per year. The par value is $100. The price of the bond is $111.66.
	The bond is callable after 1 year for $110, after 2 years for $106, and after 3 years for $104. The redemption value after 4 years is $100.
	Calculate the yield-to-worst.
Solution	Let's use the BA II Plus to obtain the 4 possible yields.

   1 [N] -111.66 [PV] 10 [PMT] 110 [FV]