

Example 1:

An Investor purchased ^{Stock} \$1,000 of a mutual fund's shares.

The stock fund's values in Year 1, Year 2 and Year 3 are \$1,080, \$1,026, and \$1,149, respectively.

In addition, the stock fund paid annual dividends over the 3-year period: \$20, \$17, and \$21.

What is the return of this investment?

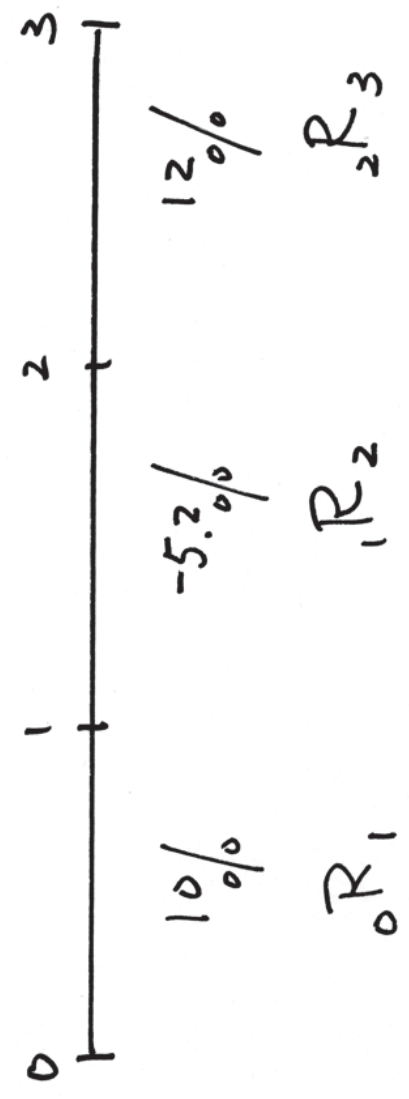
Risk & Return: Part I "Investment Return Measure"

	0	1	2	3
(Value)				
Stock Price	1000	1,080	1,026	1,149
Dividend		$\frac{20}{1100}$	$\frac{17}{1043}$	$\frac{21}{1170}$

$$R_1 = \frac{1100}{1000} - 1 = 10\%$$

$$R_3 = \frac{1170}{1043} - 1 = 12\%$$

$$R_2 = \frac{1043}{1100} - 1 = -5.2\%$$



Investment Return Measure

(A) What is the Holding Period Return?

$$\begin{aligned} {}_0\text{HPR}_3 &= [(1 + 10\%) \cdot (1 - 5.2\%) \cdot (1 + 12\%)] - 1 \\ &= (1.1)(.948)(1.12) - 1 \\ &= 16.8\% \end{aligned}$$

(B) What is the Arithmetic Mean Return?

$$\text{AMR} = \frac{10\% + (-5.2\%) + 12\%}{3} = 5.6\% \text{ per period}$$

(c) What is the Geometric Mean Return?

$$\text{GMR} = [(1.1)(.948)(1.12)]^{\frac{1}{3}} - 1 = 5.3\% \text{ per period}$$

Example 2:

An Investor has two investment accounts. The investor invested additional \$100,000 on 4/10 in account A, but withdrew \$35,000 from account B on 4/18. The market values of investment accounts are as follows:

	<u>A</u>	<u>B</u>
03/31	\$500,000	\$250,000
04/10	\$515,000	\$256,000
04/18	\$650,000	\$265,000
04/30	\$665,000	\$235,000

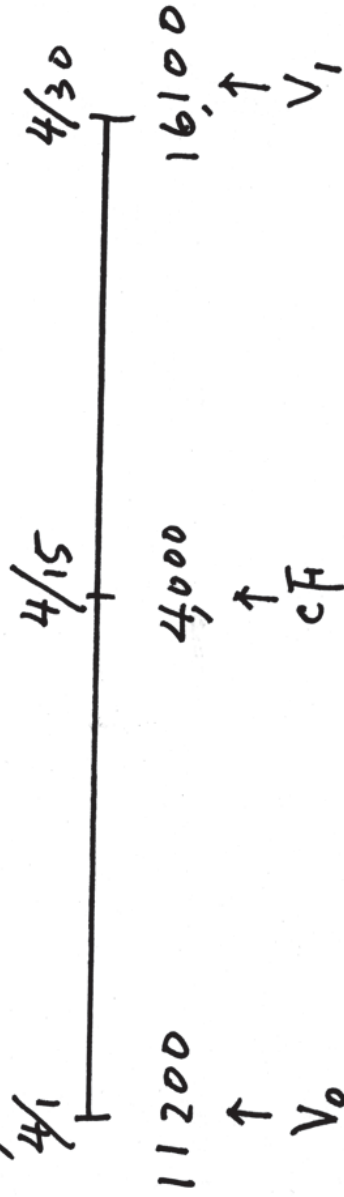
Time - Weighted Return

	3/31	4/10	4/18	4/30	
	----- ----- -----				
A	500	515	650	665	
		$\frac{+100}{615}$			
B	250	256	265	235	
			$\frac{-35}{230}$		
A+B	750	871	880	900	

$$\begin{aligned}
 TWR &= \left(\frac{871 - 100}{750} \right) \cdot \left(\frac{880 + 35}{871} \right) \cdot \left(\frac{900}{880} \right) - 1 \\
 &= \left(\frac{771}{750} \right) * \frac{915}{871} * \frac{900}{880} - 1 \\
 &= 10.45\%
 \end{aligned}$$

Money-Weighted Return = IRR

Example 3: An Investor invested additional \$4,000 on 4/15. The investment value on 4/1 and 4/30 were \$11,200 and \$16,100, respectively.



Find IRR using BA II plus Calculator:

Set $CF_0 = (11200)$ IRR (MWR)
 $CF_1 = (4000)$ → → IRR = 3.36%
 $CF_2 = 16100$ CPT

$$\text{Monthly return on April} = (1.0336)^2 - 1 = 6.8\%$$