

# Financial Services Metrics: Money Management & Investing

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# Money Managers

Generate a return on  
other people's \$\$

One-time  
investment paid  
in the future

Absolute rate of  
return

Annual rate  
of return

Continually  
compounded  
rate of return

Discrete rate  
of return

$$\log e \quad \ln \left( \frac{\text{final price}}{\text{first price}} \right)$$

$$\ln \left( \frac{\$130}{\$100} \right) = \ln(1.3) = .2624$$

$$\frac{26.24\%}{2 \text{ years}} = 13.12\% / \text{per year}$$

Discrete

$$\left( \frac{\text{final price}}{\text{first price}} \right) - 1 \quad \frac{\$130}{\$100} - 1$$

$$= .3$$

$$30\%$$

$$\left( \frac{\$130}{\$100} \right)^{\frac{1}{2 \text{ years}}} - 1$$

$$= 1.1402 - 1 = 14.02\%$$

Cash invested at  
different times

Same fixed  
discrete annual  
rate of return

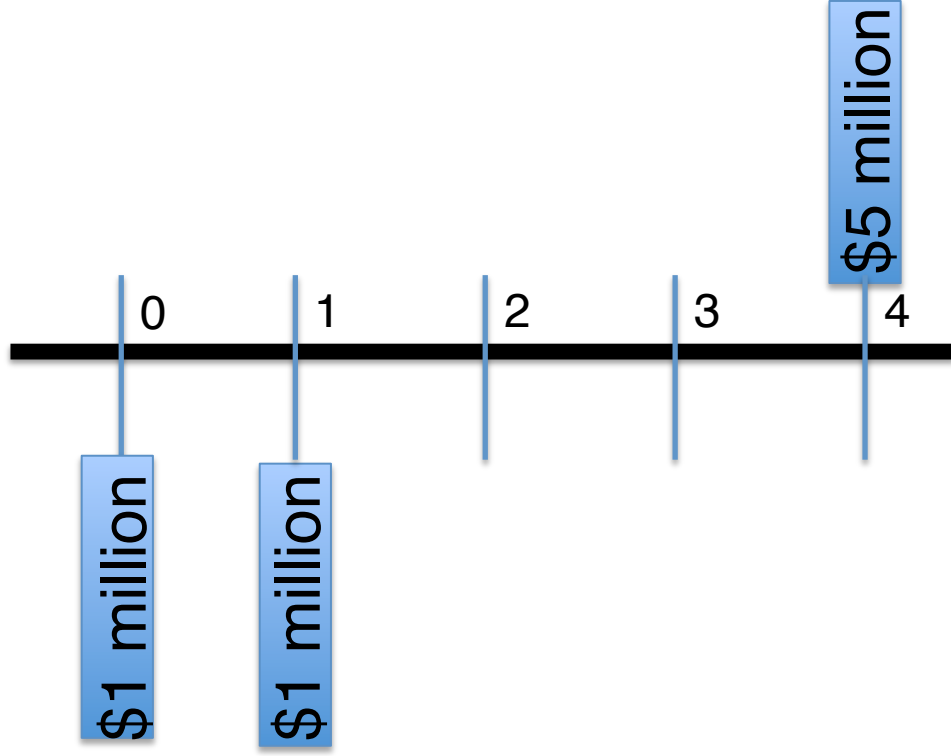
For each  
payment

=

Final pay out



Internal rate of return, IRR



$$(1 + x)^4 + (1 + x)^3 = 5$$

$$x = 29.62\%$$

$$(1 + .2962)^4 + (1.2962)^3 = 5$$



+25%

-18%

+10%

-4%

$$(1.25)(.82)(1.10)(.96)$$

$$= 1.0824$$

$$(1.0824)^{\frac{1}{4} \text{ years}} - 1$$

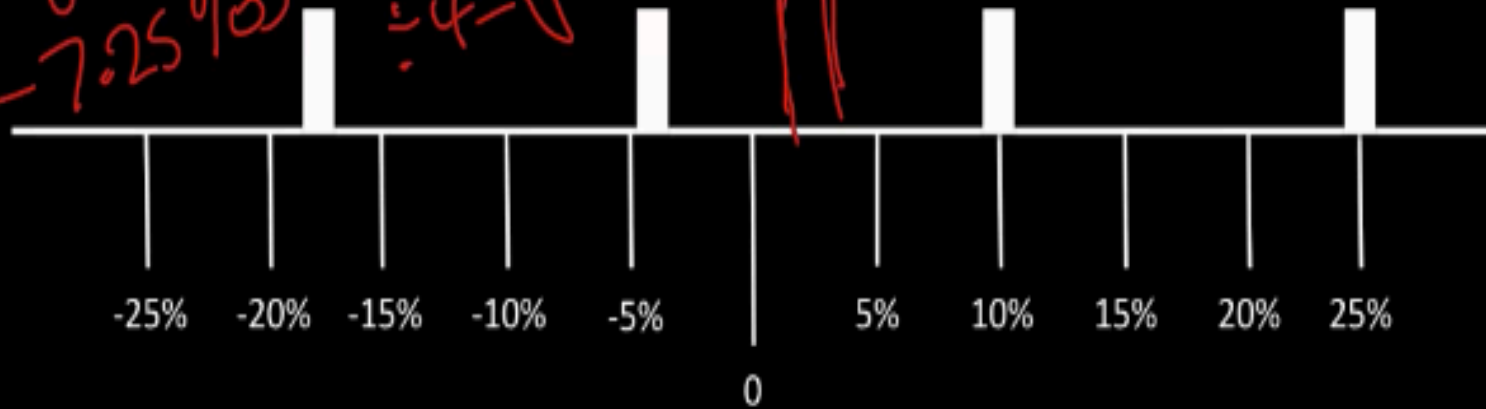
$$= 2\%$$

# STANDARD DEVIATION

$$\begin{aligned}
 (21.75\%)^2 &= .0473 \\
 (-21.25\%)^2 &+ .04515 \\
 (6.75\%)^2 &+ .00455 \\
 (-7.25\%)^2 &+ .005 \\
 &\div 4 = \sqrt{.025}
 \end{aligned}$$

$$\frac{+25\% - 18\% + 10\% - 4\%}{4} = 3.25\%$$

$$16\%$$



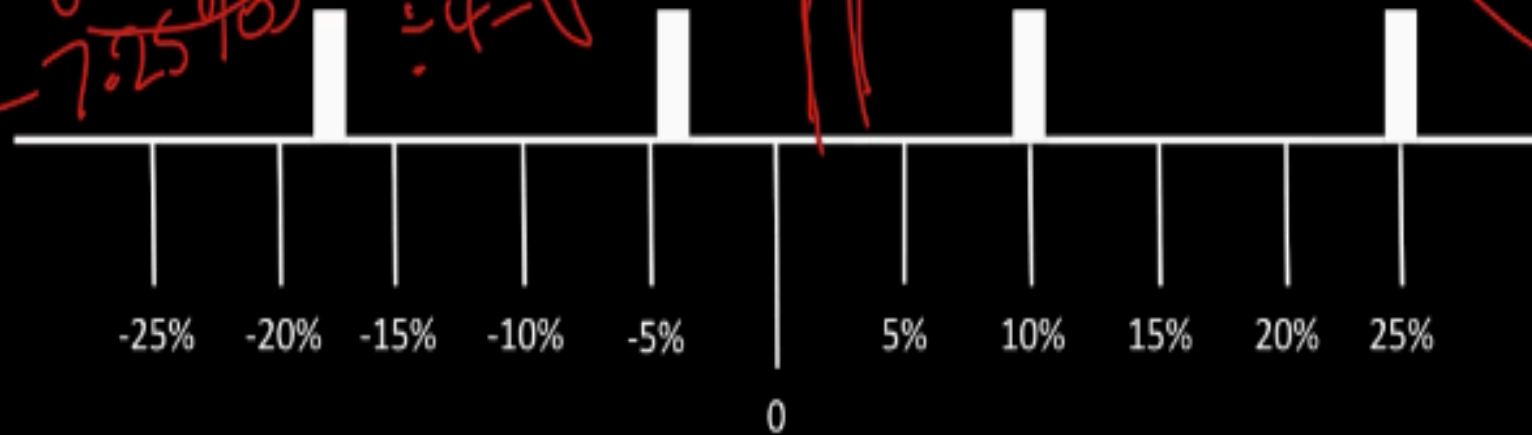
# STANDARD DEVIATION

$$+25\% - 18\% + 10\% - 4\% = 3.25\%$$

$$\begin{aligned} & (21.75\%)^2 = .0473 \\ & (-21.25\%)^2 = .04515 \\ & (6.75\%)^2 = .00455 \\ & (-7.25\%)^2 = .0053 \\ & \div 4 = \sqrt{.025} \end{aligned}$$

$$\sigma = 16\%$$

$$\sigma = 0$$



# STANDARD DEVIATION

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 \end{aligned}$$

$$+25\% - 18\% + 10\% - 4\% = 3.25\%$$

$$6 = 16\%$$

$$6 = 0$$

-25% -20% -15% -10% -5% 0 5% 10% 15% 20% 25%

VOLATILITY OF RETURNS

Zero chance of loss =  
Risk-free investment

Three-month Treasury  
Bill rate as of 2015 is 0.08%