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**Moneyiness**

# Option Relationship to Underlying Price

- An option is often described by its relationship to the underlying stock price
  - **At-The-Money (ATM)**
    - The underlying stock price is the same as the option strike price
    - Applies to both calls and options
  - **In-The-Money (ITM)**
    - Calls: The underlying stock price is higher than the option strike price
    - Puts: The underlying stock price is lower than the option strike price
  - **Out-Of-The-Money (OTM)**
    - Calls: The underlying stock price is lower than the option strike price
    - Puts: The underlying stock price is higher than the option strike price
- The option whose strike price is closest to the underlying stock price is considered the ATM option



# Premium, Intrinsic, and Extrinsic Value

- **Premium:** the price of the option, excluding commissions
- **Intrinsic value (parity):** the amount by which an option is in-the-money
  - Call: amount by which stock price is higher than strike price
  - Put: amount by which stock price is lower than strike price
  - There is no intrinsic value in an out-of-the-money call or put
- **Extrinsic value:** the time-value of the option
  - There is no extrinsic value at option expiration
- **Premium = Intrinsic value + extrinsic value**

# Example: XYZ Jan 11 Calls and Puts

## 2 months to expiration



Stock Price: 50.00      Expiration: 2 months

<u>Strike Price</u>	<u>Call Status</u>	<u>Option Price</u>	<u>Intrinsic Value</u>	<u>Extrinsic value</u>
35	ITM	15.10	15.00	0.10
40	ITM	10.30	10.00	0.30
45	ITM	5.80	5.00	0.80
50	ATM	1.60	0.00	1.60
55	OTM	0.80	0.00	0.80
60	OTM	0.30	0.00	0.30
65	OTM	0.10	0.00	0.10

<u>Strike Price</u>	<u>Put Status</u>	<u>Option Price</u>	<u>Intrinsic Value</u>	<u>Extrinsic value</u>
35	OTM	0.10	0.00	0.10
40	OTM	0.30	0.00	0.30
45	OTM	0.80	0.00	0.80
50	ATM	1.60	0.00	1.60
55	ITM	5.80	5.00	0.80
60	ITM	10.30	10.00	0.30
65	ITM	15.10	15.00	0.10

# Example XYZ Jan 12 Calls and Puts

## 14 months to expiration

Stock Price: 50.00      Expiration: 14 months

<u>Strike Price</u>	<u>Call Status</u>	<u>Option Price</u>	<u>Intrinsic Value</u>	<u>Extrinsic value</u>
35	ITM	15.30	15.00	0.30
40	ITM	10.90	10.00	0.90
45	ITM	7.10	5.00	2.10
50	ATM	4.20	0.00	4.20
55	OTM	2.10	0.00	2.10
60	OTM	0.90	0.00	0.90
65	OTM	0.30	0.00	0.30

<u>Strike Price</u>	<u>Put Status</u>	<u>Option Price</u>	<u>Intrinsic Value</u>	<u>Extrinsic value</u>
35	OTM	0.30	0.00	0.30
40	OTM	0.90	0.00	0.90
45	OTM	2.10	0.00	2.10
50	ATM	4.20	0.00	4.20
55	ITM	7.10	5.00	2.10
60	ITM	10.90	10.00	0.90
65	ITM	15.30	15.00	0.30