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Technical Analysis Module 3: Bollinger Bands

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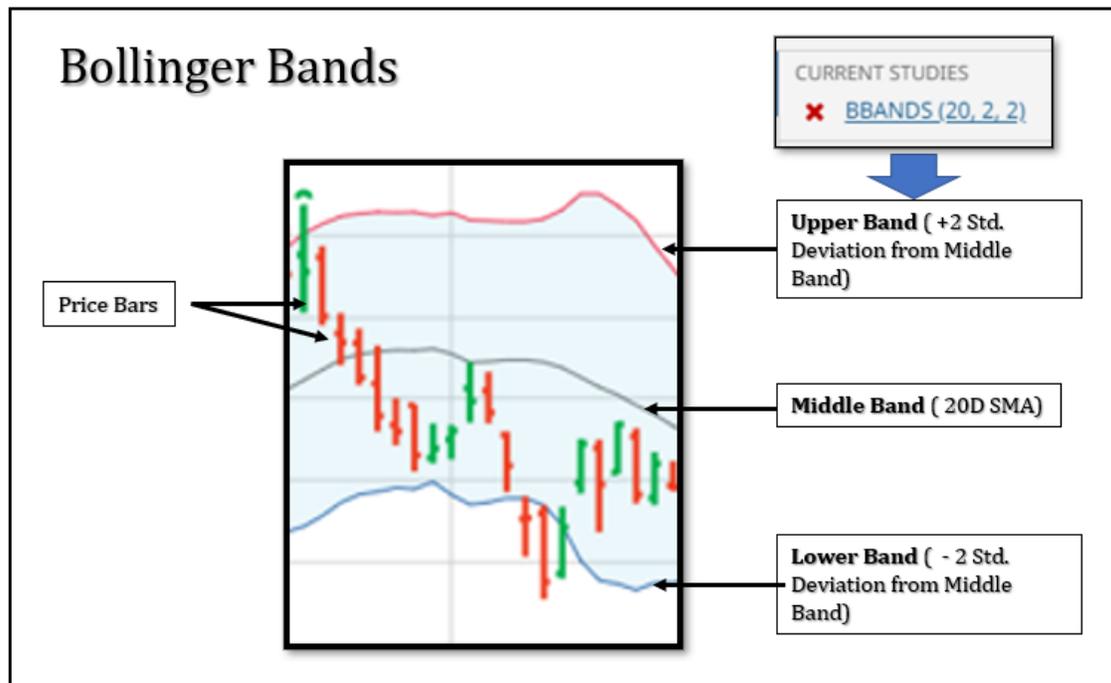
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Bollinger Bands

A technical analysis tool used in stock trading to measure the volatility of a security's price relative to its moving average. The bands consist of three lines: a simple moving average (SMA) line in the center, and two standard deviation lines above and below the SMA line.

The distance between the upper and lower bands is based on the standard deviation of the stock's price over a specified period of time, typically 20 days. The upper band is set at two standard deviations above the SMA line, and the lower band is set at two standard deviations below the SMA line.



There are 3 components to the Bollinger Band indicator:

- **Middle Band** – this is basically a 20 day Simple Moving Average that is used.
- **Upper Band** – this is usually 2 Standard Deviations ABOVE the simple moving average (calculated from 20 periods of closing data).
- **Lower Band** – This is usually 2 Standard Deviations BELOW the simple moving average.

There is a 95% chance that all price activity will be within the Upper & Lower Bands. If for some reason, the price moves OUT of the upper or lower band, the assumption is that it is likely to RETURN back to the Middle band (or the SMA price).

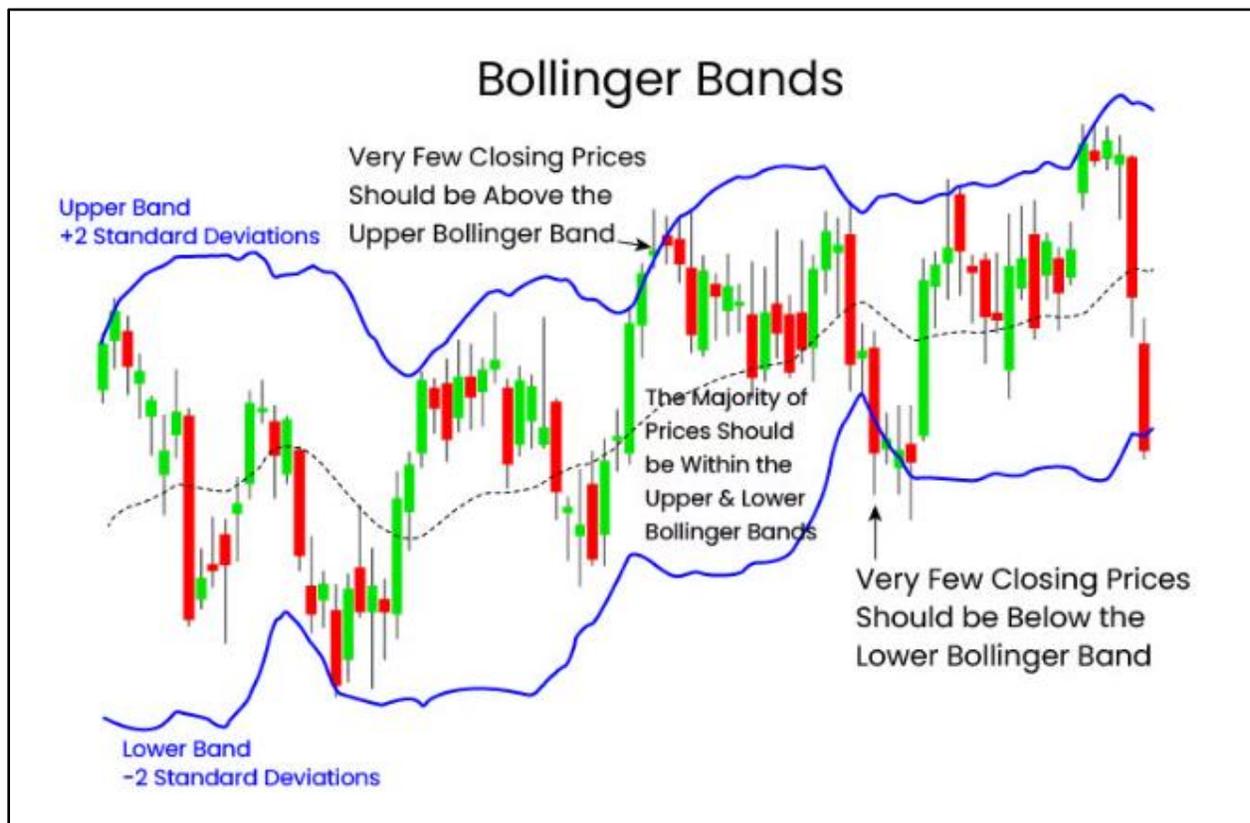
***Standard deviation** is a tool commonly used in statistics to find out how much a sample deviates from its mean. Standard deviation is a mathematical formula that measures*

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volatility, showing how the stock price can vary from its true value. By measuring price volatility, Bollinger Bands adjust themselves to market conditions. This is what makes them so handy for traders: they can find almost all of the price data needed between the two bands. (see Appendix : Standard Deviation)

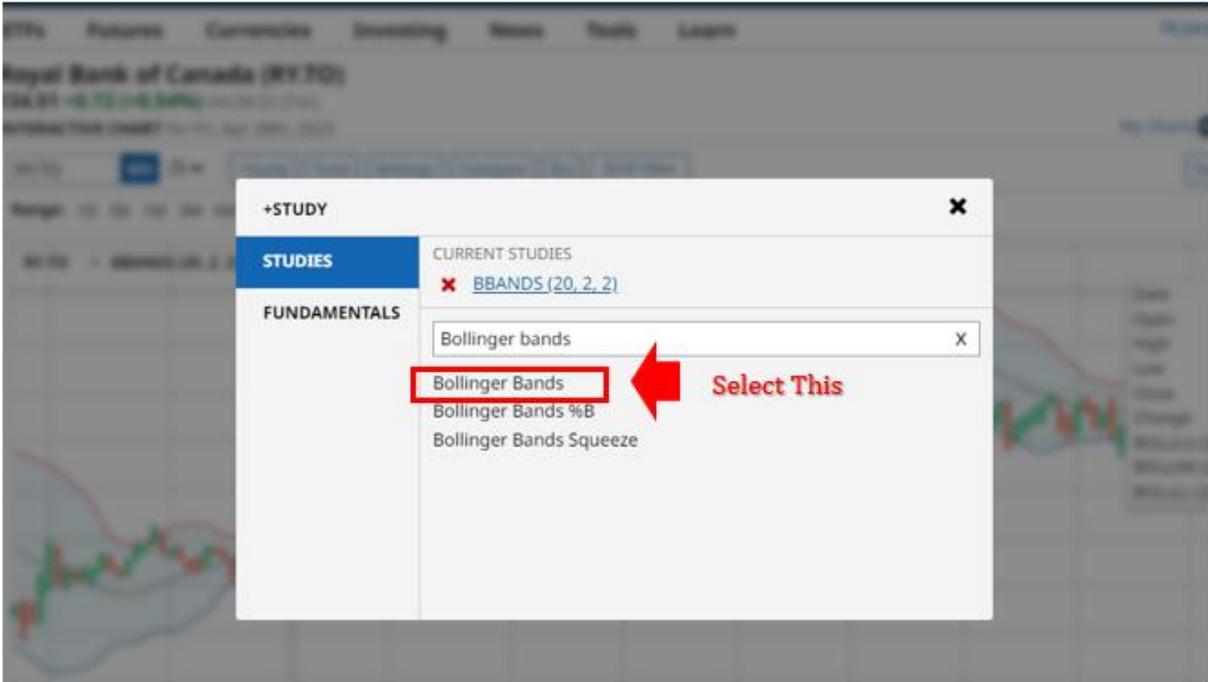
Bollinger Bands are volatility bands placed above and below a moving average. Volatility is based on the standard deviation, which changes a volatility increase and decreases. The bands automatically widen when volatility increases and narrow when volatility decreases.

When the price of a stock is trending close to the upper band, it is considered **overbought**, meaning that the price may be due for a correction. Similarly, when the price of a stock is trending close to the lower band, it is considered **oversold**, meaning that the price may be due for a rebound.



Bar Chart Set-Up:

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Example: ENB 6M Daily



Over Bought & Over Sold Positions

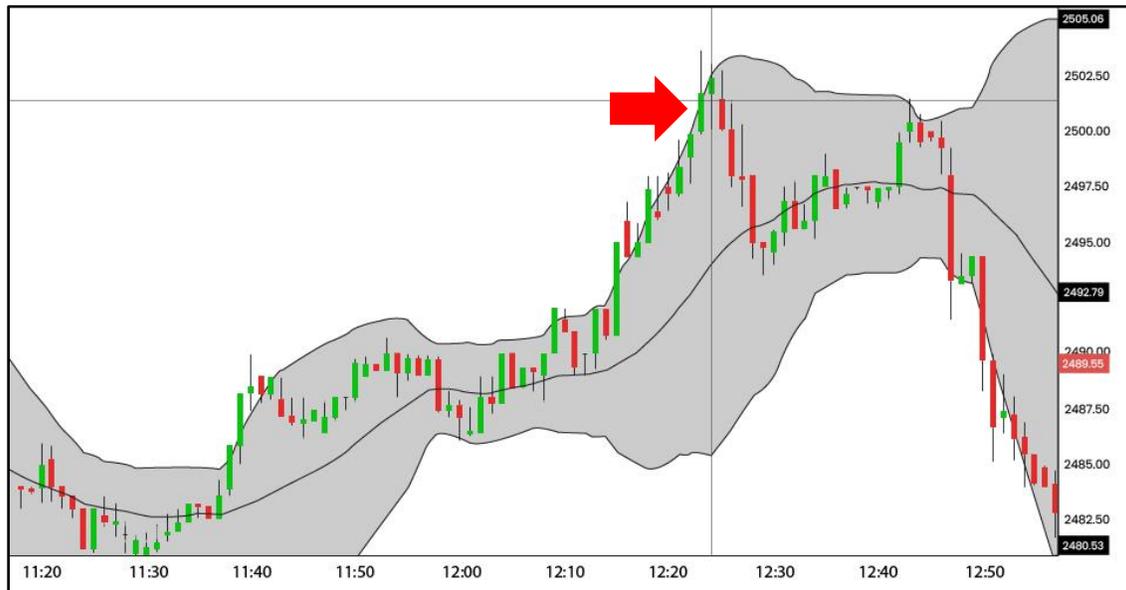
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SUPPORT & RESISTANCE

- Upper Band represents resistance.
- Lower Band represents support.

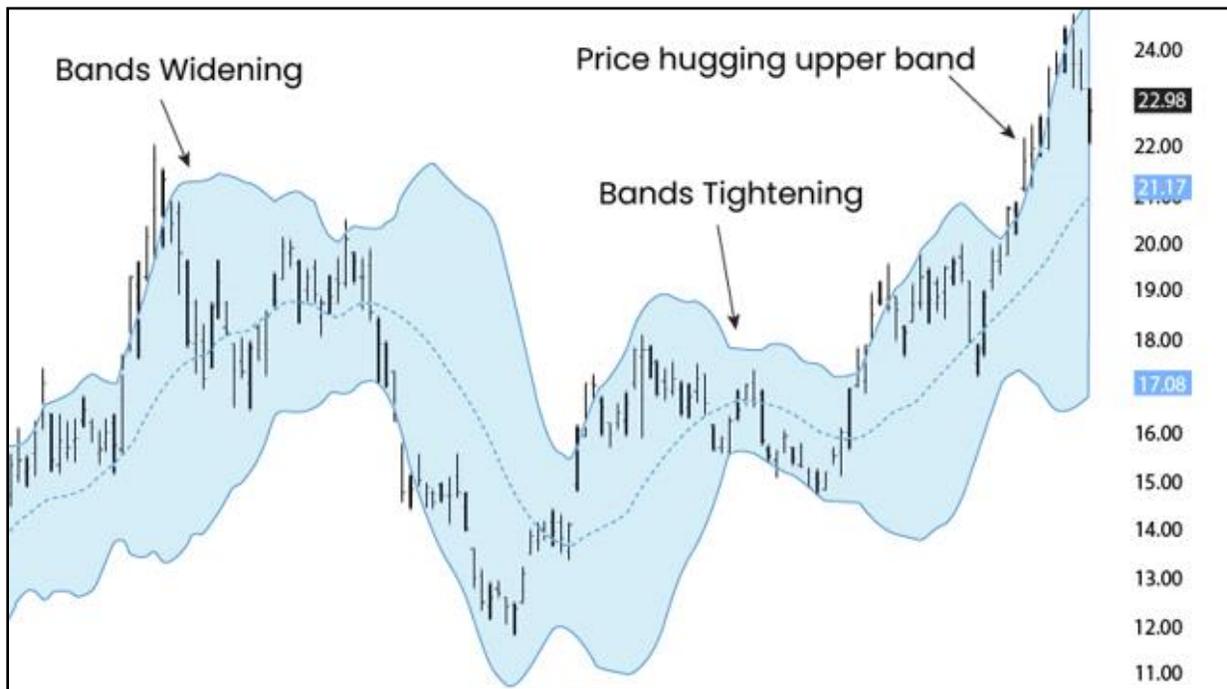
The most basic reading considers the **upper band** as a **resistance** line and the lower bank as a support line.



Here, you can see that the price goes down as soon as the price breaches the **upper band**. (see the red arrow).

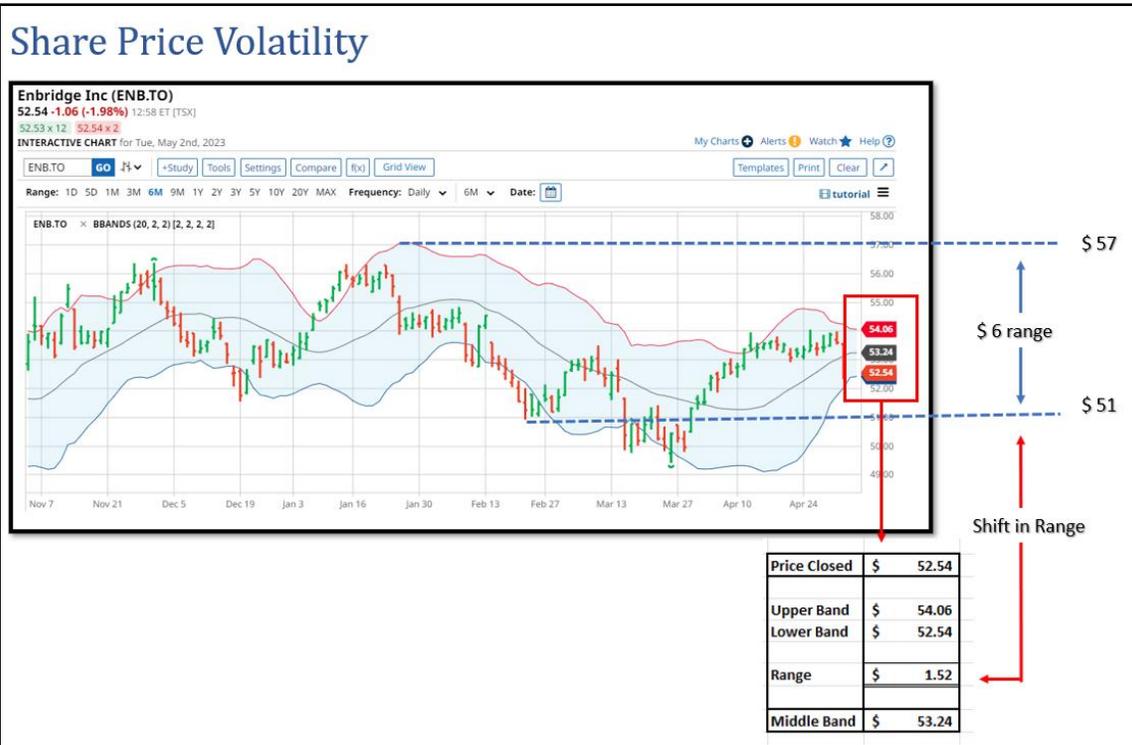
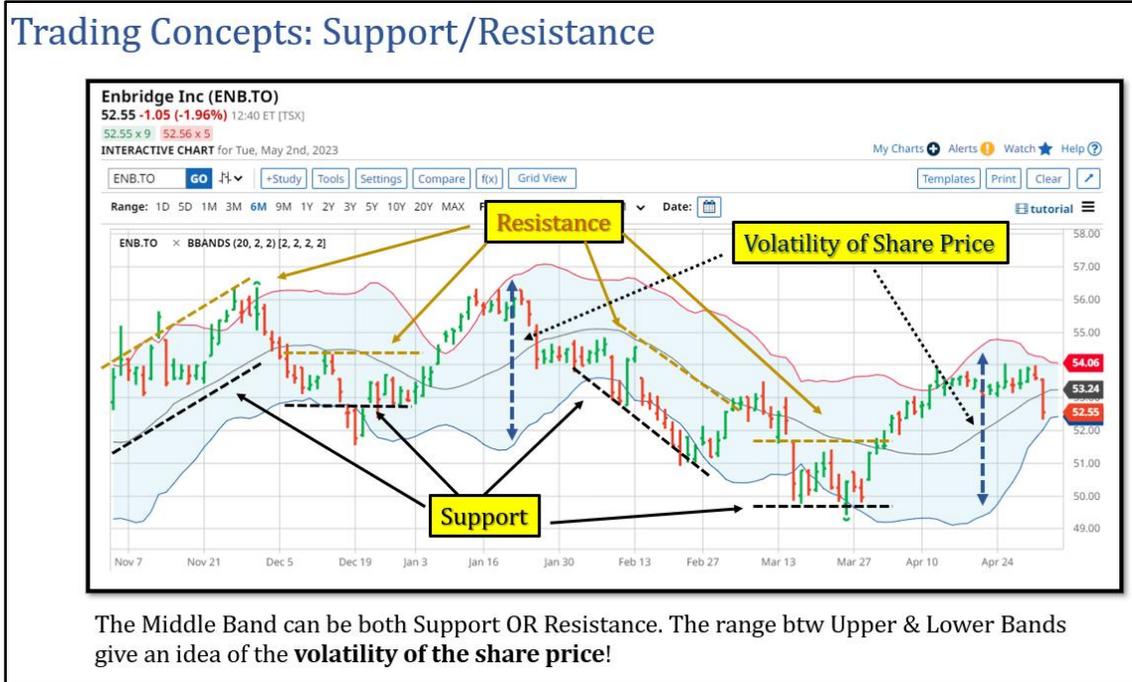
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The following is the opposite scenario. Here, you can see (red arrow) that the price tends to go up after hitting the **lower band**.



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Trend Reversal: The distance between the lines is also crucial. Narrowing lines means that there is less volatility, and the current trend could reverse. Similarly, the bands expand when there is higher volatility, also showing a possible trend reversal.



Bollinger Bands “Squeeze”.

The "squeeze" is the central concept of Bollinger Bands. When the bands come close together, constricting the moving average, it is called a squeeze. A squeeze signals a period of low volatility and is considered by traders to be a potential sign of future increased volatility and possible trading opportunities.

Conversely, the wider apart the bands move, the more likely the chance of a decrease in volatility and the greater the possibility of exiting a trade. These conditions are not trading signals. The bands do not indicate when the change may take place or in which direction the price could move.

When the width between bands is low, especially on historical levels, there is always a chance for the price trend to reverse. Lower band width usually means low volatility, and hence, a volatility **breakout** is usually the trigger for the movement.

The following is a representation of such a breakdown. Here you can see the bands tightening and the price and volatility breaking out after a certain point.



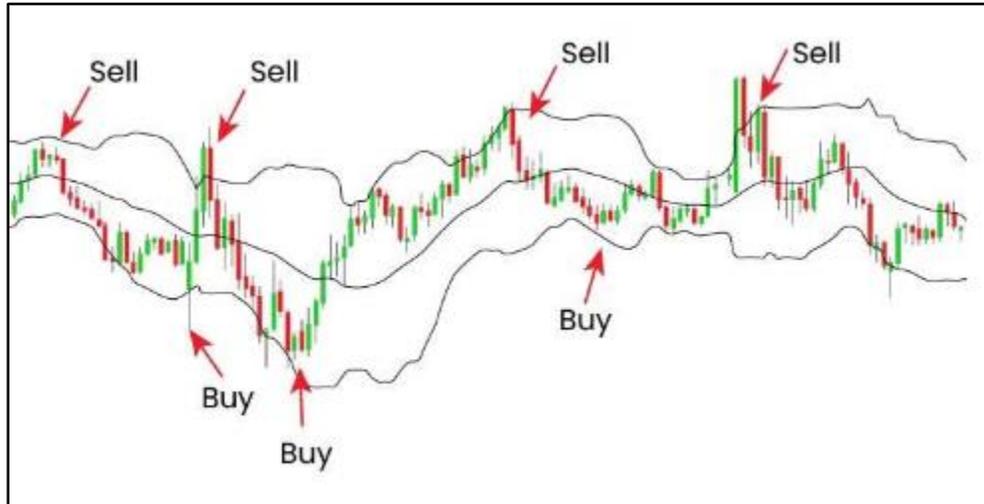
Trading within the bands

The lower and upper bands act as support and resistance lines, respectively. This means the price tends to stay within the bands. This gives you a chance to use the same to formulate a minimal risk strategy. Sell when the price touches the upper band and buy when the price touches the lower band.

When using Bollinger Bands, designate the upper and lower bands as price targets. If the price deflects off the lower band and crosses above the 20-day average (the middle line), the upper band comes to represent the upper price target.

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However, in a strong uptrend, prices usually fluctuate between the upper band and the 20-day moving average. When that happens, a crossing below the 20-day moving average WARNS of a trend reversal to the downside.



In order to avoid false signals and whipsaws, you can use other indicators to filter Bollinger band signals.

For example, the Moving Average Convergence Divergence (**MACD**) indicator is a momentum indicator that shows the relationship between two moving averages of the price. You can use MACD to confirm Bollinger band breakouts or reversals, as well as to identify divergences or convergences between price and MACD.

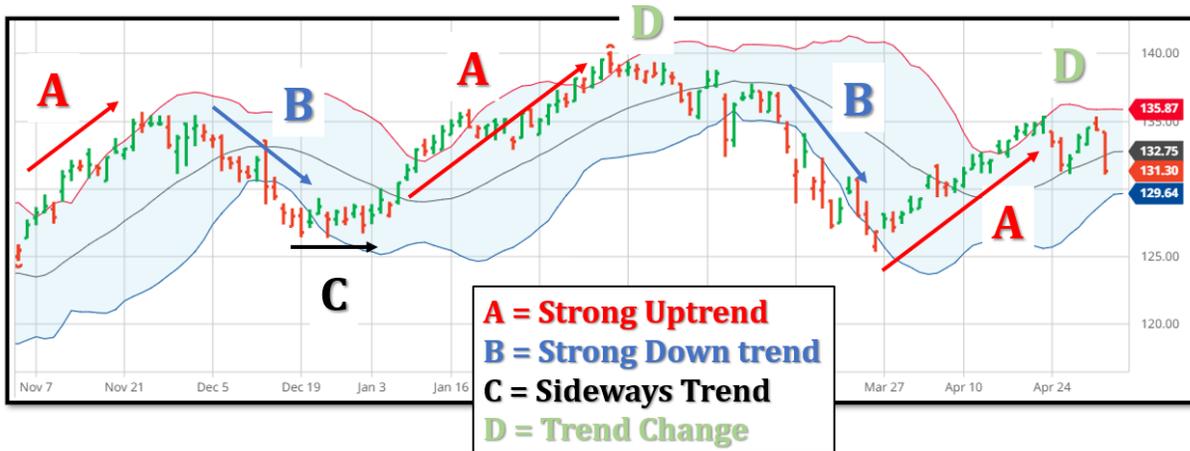
Additionally, the Relative Strength Index (**RSI**) measures the speed and magnitude of price movements, allowing you to confirm Bollinger band breakouts or reversals, as well as identify overbought or oversold conditions or divergences between price and RSI.

The following are some common Bollinger Band trading rules that traders may use:

Identify the trend: Bollinger Bands can be used to identify the direction of the trend. If the price is above the upper band, it is considered overbought, and if the price is below the lower band, it is considered oversold. Traders may look for price reversals when the price reaches either band.

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Identify Trends



Wait for a breakout: Another way to use Bollinger Bands is to wait for a breakout from the bands. When the price breaks through the upper or lower band, it could be an indication of a trend reversal or continuation. Traders may wait for confirmation of the breakout before entering a trade.

Look for a squeeze: When the bands come closer together, it is known as a squeeze. This indicates that the market is experiencing low volatility and could be due for a breakout. Traders may look for a break in either direction when the bands start to expand again.

Combine with other indicators: Bollinger Bands are often used in combination with other indicators to confirm potential trades. For example, traders may use Bollinger Bands with the Relative Strength Index (RSI) to identify potential buy or sell signals.

It's important to note that Bollinger Bands should not be used in isolation to make trading decisions. Traders should always use additional analysis and risk management strategies to ensure they are making informed and calculated trades.

SUMMARY:

The overbought and oversold strategy

A typical methodology while utilizing Bollinger bands is recognizing overbought or oversold economic situations. Costs may have fallen excessively due to bounce when the price breaks underneath the lower band of the Bollinger bands. Then again, the market might have been overbought and due for a pullback when the cost breaks over the upper band.

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Involving the bands as overbought/oversold markers depends on the idea of mean reversion of the price: when the price strays considerably from the mean or normal, it returns to the mean in the long run.

In range-bound markets, mean inversion techniques can function as price travel between the two bands. In any case, Bollinger bands don't necessarily give precise trade signals. During a solid trend, for instance, the trader risks putting exchanges on some unacceptable side of the move if the pointer can streak overbought or oversold flags too early.

To assist with curing this, a trader can take a gander at the general course of price and afterward take exchange flags that adjust the investor to the trend. For instance, if the trend is down, possibly take short positions when the upper band is labeled. The lower band can, in any case, be utilized as an exit; however, another long position isn't opened since that would mean conflicting with the trend.

Bollinger bands squeeze strategy

Recall that the squeeze occurs when the volatility reaches a relatively low value compared to the recent price action. The squeeze may suggest several other things aside from low volatility. For example, increased volatility often follows a squeeze. Upside or downside stock may be coming in the nearest future if this happens. Thus, the squeeze tells more than just volatility; it predicts stock behavior.

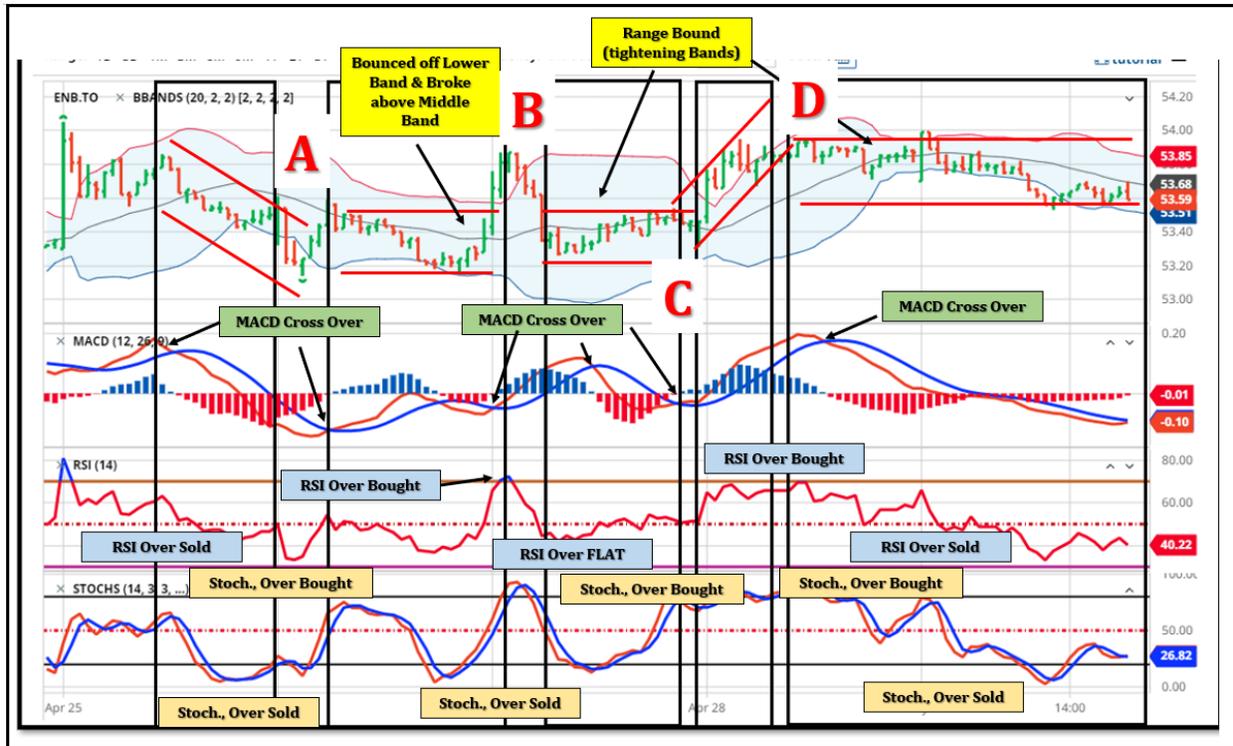
A squeeze strategy is another procedure to use with Bollinger bands. A squeeze happens when the cost has been moving forcefully and begins moving sideways in a tight consolidation.

A trader can outwardly distinguish when the cost of a resource is combined because the upper and lower bands draw nearer together. This implies the unpredictability of the resource has diminished. After consolidation, the cost frequently takes a bigger action in one or the other heading, preferably on high volume. Extending volume on a breakout indicates that traders decide with their cash that the price will keep moving in the breakout heading.

The trader trades the resource separately when the cost gets through the upper or lower band. A stop-loss request is generally put external the consolidation on the contrary side of the breakout

Putting All the 5 Indicators Together:

Example: ENB



Example:

A & C = BUY: BB bouncing off lower band; Hist Bars – Up trending; MACD Crossover; RSI – Over Sold & Stochastics – Over Sold

B = SELL: BB over bought position; MACD crossover; Hist. Bars – declining; RSI – Over bought & Stochastics – over bought

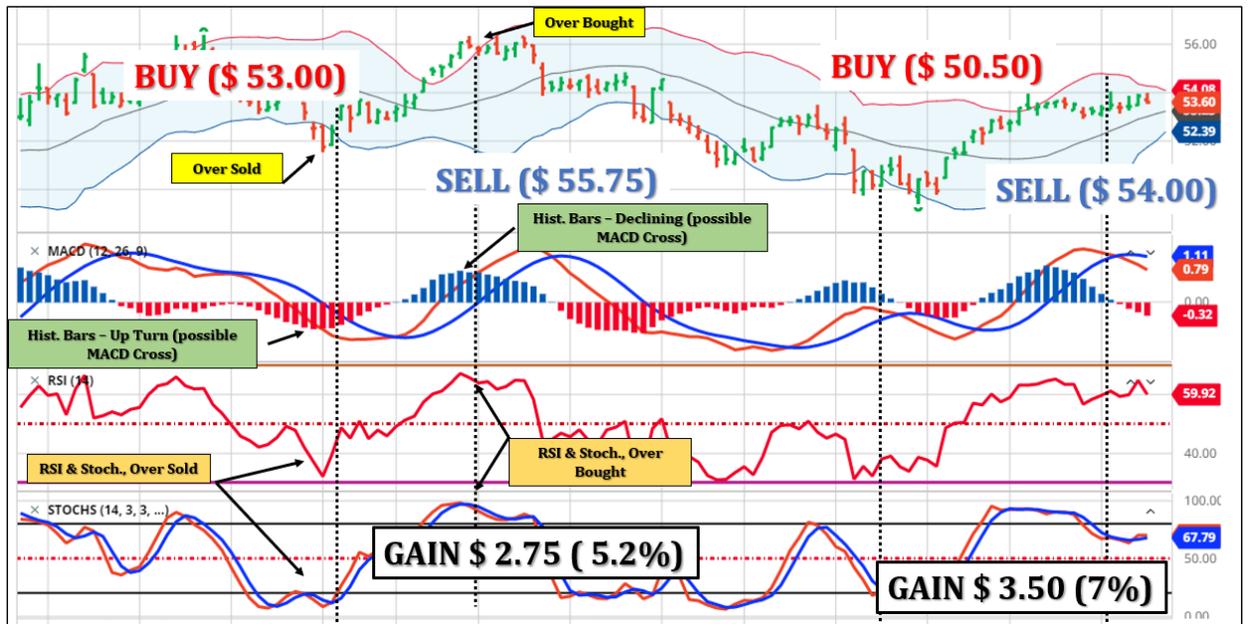
D = No Trade

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What will you do on the following Chart?



Suggested Answer:



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APPENDIX:

Standard Deviation and Variance

Deviation just means how far from the normal

Standard Deviation

- The Standard Deviation is a measure of how spread out numbers are.
- Its symbol is σ (the Greek letter sigma)
- The formula is easy: it is the **square root** of the **Variance**.

But "What is the Variance?"

Variance

The Variance is defined as: the average of the squared differences of the MEAN

Mean

The mathematical average of a set of two or more numbers.

Standard Deviation vs. Variance: An Overview

Standard deviation and variance are two basic mathematical concepts that have an important place in various parts of the financial sector, from accounting to economics to investing. Both measure the variability of figures within a data set using the mean of a certain group of numbers. They are important to help determine volatility and the distribution of returns. But there are inherent differences between the two. While standard deviation measures the square root of the variance, the variance is the average of each point from the mean.

Here's a simple example:

Suppose you have a dataset of **three** numbers: 2, 4, and 6. To calculate the variance, first find the mean by adding up the numbers and dividing by the total number of observations:

$$\text{mean} = (2 + 4 + 6) / 3 = 4$$

Next, subtract the mean from each observation and square the result:

$$(2 - 4)^2 = 4$$

$$(4 - 4)^2 = 0$$

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$$(6 - 4)^2 = 4$$

Add up the squared differences:

$$4 + 0 + 4 = 8$$

Finally, divide the sum by the total number of observations minus one:

$$8 / (3 - 1) = 4$$

So, the variance of this dataset is 4.

To calculate the standard deviation, you take the square root of the variance. Using the same example as before, where the variance was calculated to be 4, the standard deviation would be:

$$\text{standard deviation} = \text{square root of variance} = \text{square root of } 4 = 2$$

So, the standard deviation of this dataset is 2.

The standard deviation provides a measure of how spread out the data is from the mean, with a larger standard deviation indicating a more spread out data set.

Bollinger Bands are a technical analysis tool that uses a moving average and two standard deviations to create a range around the moving average. The upper and lower bands are calculated as:

Upper Band = Moving Average **PLUS** (Number of Standard Deviations * Standard Deviation)

Lower Band = Moving Average **MINUS** (Number of Standard Deviations * Standard Deviation)

The standard deviation used in the Bollinger Bands calculation is typically based on a rolling window of historical data. The moving average is also based on this same window of data.

Bollinger Bands are often used in financial markets to identify potential breakouts or reversals in price trends. When prices move outside the upper or lower bands, it can indicate that the current trend may be ending or that a new trend is beginning.

Here's an example of how Bollinger Bands might be used:

Suppose you are analyzing the stock price of a company over the past 20 trading days.

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- Assuming the 20-day moving average of the stock price = 50.
- Assuming the 20-day standard deviation of the stock price = 2.

To create Bollinger Bands around the moving average, you might decide to use two standard deviations.

Upper Band

Upper Band = Moving Average + (Number of Standard Deviations * Standard Deviation)
Upper Band = $50 + (2 * 2)$ Upper Band = \$54

Lower Band

Lower Band = Moving Average - (Number of Standard Deviations * Standard Deviation)
Lower Band = $50 - 2 * 2$ Lower Band = \$46

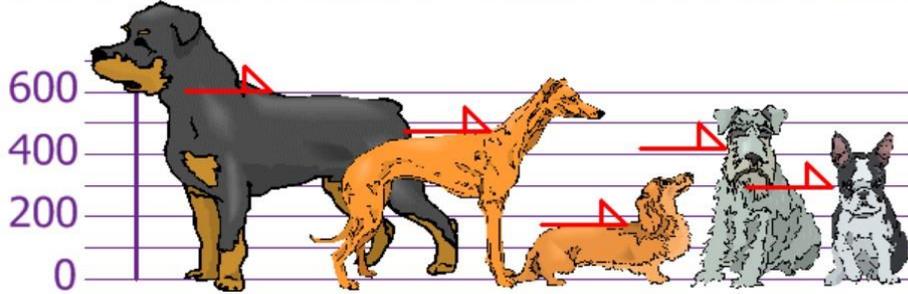
So, in this example, the upper Bollinger Band is at 54 and the lower Bollinger Band is 46. If the stock price were to move outside this range, it could indicate a potential change in the trend.

For example, if the stock price were to rise above 54, it might suggest that the stock is becoming overbought and due for a correction. Conversely, if the stock price were to drop below 46, it might suggest that the stock is oversold and due for a rebound

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Example

You and your friends have just measured the heights of your dogs (in millimeters):



The heights (at the shoulders) are: 600mm, 470mm, 170mm, 430mm and 300mm.

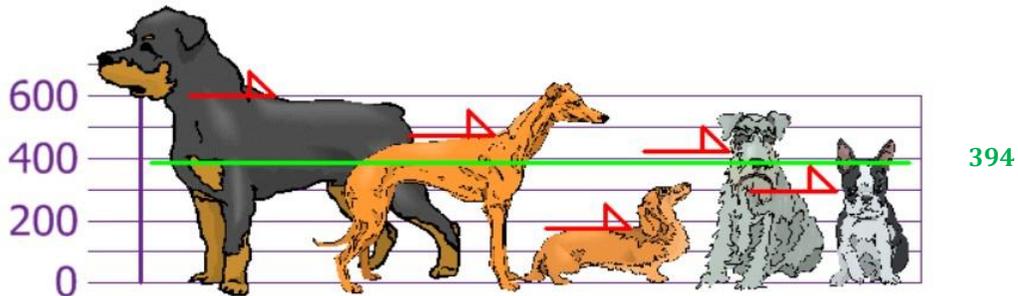
Find out the Mean, the Variance, and the Standard Deviation.

Your first step is to find the Mean:

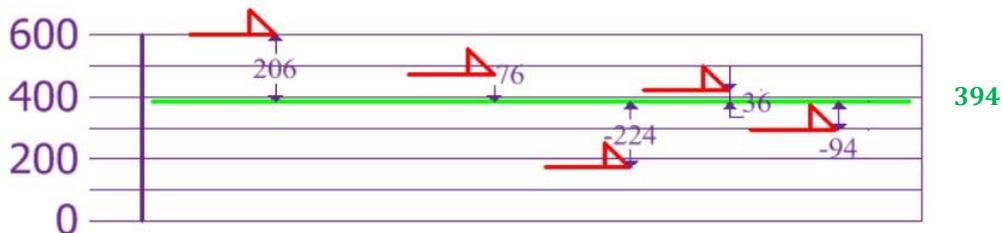
Answer:

$$\text{Mean} = \frac{600 + 470 + 170 + 430 + 300}{5} = \frac{1970}{5} = 394$$

so the mean (average) height is 394 mm. Let's plot this on the chart:



Now we calculate each dog's difference from the Mean:



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Mean:

Dog 1	600
Dog 2	470
Dog 3	170
Dog 4	430
Dog 5	300
Total	1,970

Mean = $\frac{600 + 470 + 170 + 430 + 300}{5} = \frac{1970}{5} = 394$

i.e. 394 mm is the average height of all dogs

Variance

Dog	Height	Mean	Variance
		<i>Average (1970 / 5 dogs)</i>	<i>Difference (Height - Mean)</i>
1	600	394	206
2	470	394	76
3	170	394	-224
4	430	394	36
5	300	394	-94
	1,970		

$$600 - 394 = 206$$

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To calculate the Variance, take each difference, square it, and then average the result:

$$\begin{aligned}\text{Variance: } \sigma^2 &= \frac{206^2 + 76^2 + (-224)^2 + 36^2 + (-94)^2}{5} \\ &= \frac{42,436 + 5,776 + 50,176 + 1,296 + 8,836}{5} \\ &= \frac{108,520}{5} = 21,704\end{aligned}$$

So the Variance is **21,704**

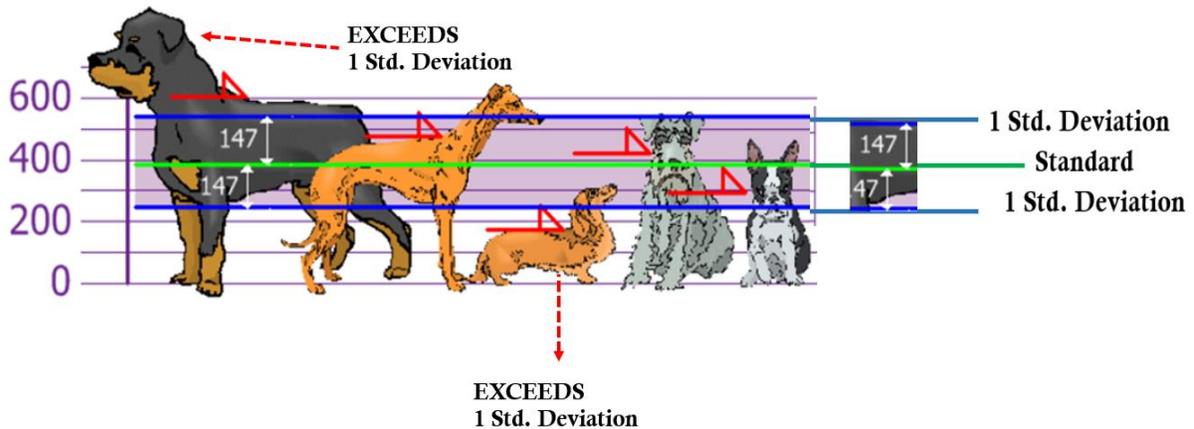
And the Standard Deviation is just the square root of Variance, so:

Standard Deviation

$$\begin{aligned}\sigma &= \sqrt{21,704} \\ &= 147.32... \\ &= \mathbf{147} \text{ (to the nearest mm)}\end{aligned}$$

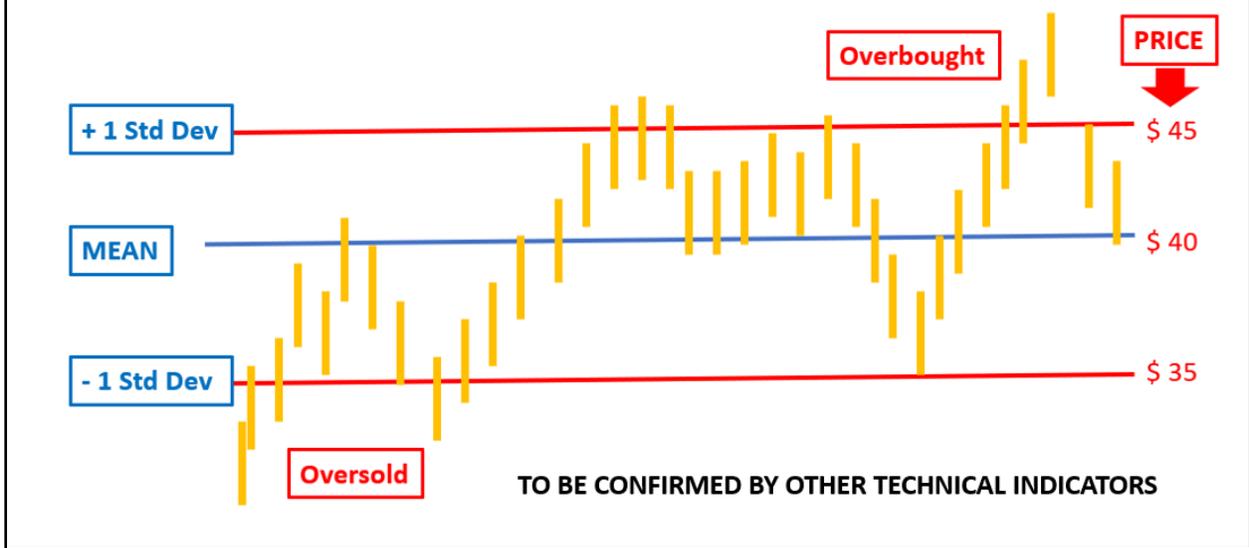
Standard Deviation: 147 mm

So, using the Standard Deviation we have a "standard" way of knowing what is normal, and what is extra large or extra small.



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Standard Deviation: Stocks



Bar Chart

