

# Quantifycrypto.net Momentum Algorithm (QMA)

## Exponential Moving Average (EMA) usage in the QMA

The QMA is a superset of multiple EMA crossover signals. Understanding of how EMA and the EMA crossovers work is required before learning about the QMA.

The EMA is a moving average that puts a greater weight on the most recent price points compared to the simple moving average which puts equal weight on all price points. For stock market analysis different daily periods are used for the EMA, for example the 12, 26, 100 and 200 days are commonly used.

The following link can be referenced for more information on the EMA.

<https://www.investopedia.com/terms/e/ema.asp>

## Importance of EMA Crossovers

A crossover represents an upward or downward change in a market trend. A crossover, on a chart, occurs when the price line of an EMA intersects (crosses over) the price line of a different EMA. It is considered a bullish (stronger) indicator when the EMA price line of a shorter time period crosses above over the EMA price of a longer time period (ie the shorter time period EMA price is greater than the longer time period EMA price). It's considered a bearish (weaker) indicator when the shorter time period price is less than the longer time period price.

For more information the following video can be accessed “EMA Crossover Strategy”

<https://www.youtube.com/watch?v=ICwIDKNeftQ>

## How the QMA Works

The QMA determines the momentum strength rating by evaluating 11 individual EMA indicators, each of which represents a period of time (in this example 1 hour, but it can be for any time period ). The indicator with the greatest weight has the longest time period, as the following table shows:

*Table 1 – Summary of QMA Indicators*

Indicator	Time Period*	Adjusted Weight** (percentage)
A	2	
B	3	1
C	5	3
D	8	5
E	13	7
F	21	9
G	34	11
H	55	13
I	89	15
J	144	17
K	233	19
Sum		100

\*The number of price points used to calculate the exponential moving average. For example if the time period was one-hour, Indicator “A” price is the EMA price for 2 hours .

\*\*The percentage of the total amount of funds that an indicator can apply toward a long or short position.

Each indicator provides a snapshot of the exponential moving average (EMA) price for the time period that the indicator represents. For example, indicator “A” represents the average price for the last two time periods, while indicator “K” represents the average price for the last 233 time periods. The sum of all the indicators determines whether the price momentum is increasing in strength (adding to long) or decreasing in strength (adding to short).

The Quantifycrypto.net website can (via user configuration) display up to 10 different QMA time periods (1 second, 3 seconds, 10 seconds, 30 seconds, 1 minute, 3 minutes, 5 minutes, 15 minutes, 30 minutes, 1 hour and 2 hours)

Longer time periods provide indications for long term positions. A value of 100 indicates the highest strength calculated by the QMA algorithm. A value of 0 indicates the weakest value calculated by the QMA algorithm.

Shorter time periods provide better indicators for short term positions. Additionally, shorter periods can be used to determine exit points from long term positions.

## Price Chart Representation of the QMA

The 11 indicators of the QMA can be shown in a price chart as EMA price lines:

Figure 1



When all price lines align in order from top to bottom with the shortest time period on top, the market is considered fully (100%) bullish (see Figure 1). When all price lines align in order with the shortest time period on the bottom, the market is considered fully (100%) bearish. The example above is for a 1 hour time period. The same calculation is performed and displayed for multiple time periods on the [www.QuantifyCrypto.net](http://www.QuantifyCrypto.net) website.

## Understanding QMA Crossovers

A crossover represents a noteworthy upward or downward change in a market trend. The QMA detects crossovers by comparing adjacent EMA indicators: indicator “B” compares itself with indicator “A”, indicator “C” compares itself with indicator “B”, and so on. When, for example, the indicator “A” price line appears above the indicator “B” price line, indicator “A” has a higher price than indicator “B”. However, when the indicator “A” price line appears below the indicator “B” price line, indicator “A” has a lower price than indicator “B”. The point at which this occurs on the graph is called a crossover.

In the following figure, data point A shows where the 144-hour EMA price line (indicator “J”) crosses above the 233-hour EMA price line (indicator “K”). The crossover at this point (in figure 2) indicates the reversal of a downward trend.

Figure 2



## Understanding the Sum of Indicators

Since the global cryptocurrency market is open 24 hours a day for 7 days a week, using a “daily” EMA value does not provide as much value. However, “daily” can be replaced with different time periods that work well for cryptocurrency assets. Our tested research we have performed shows that the 1-hour time period QMA is a leading indicator of important long term moves in the cryptocurrency market.

The QMA uses the results of 10 comparisons between adjacent indicators to determine whether a position is increasing (adding to long) or decreasing (adding to short). Each comparison results in a positive number if the shorter-term indicator price is greater than the longer-term indicator price. Adding the results of these 10 comparisons together provides a strong indicator of whether the coin price is in a positive trend or a negative trend.

QMA Strength Results (posted on quantifycrypto.net website)

0 - 5	Exceptionally Weak – Potential for a significant price drop
6 - 25	Weak
26 - 74	Neutral
75 - 94	Strong
95 - 100	Exceptionally Strong – Potential for a significant price increase



Indicator	Period	Price	Weight
A	2	6336.6	
B	3	6316.8	1
C	5	6306.5	3
D	8	6305.5	5
E	13	6309.1	7
F	21	6313.7	9
G	34	6320.3	11
H	55	6335.6	13
I	89	6335.5	15
J	144	6383.3	17
K	233	6423.5	19
Sum			24

In the example above, comparisons of adjacent indicators show that 4 indicators are in positive relationships to each other:  $A > B$ ,  $B > C$ ,  $C > D$  and  $H > I$ . The sum of the comparisons yields a value of 24 out of 100.

## The importance of longer and shorter time periods on the quantifcrypto.net website

Historically, Bitcoin price movements tend to have periods of abrupt upturns and downturns. An important goal of the shorter-term time periods is to anticipate the change of the longer-term market trend.

Figure 4



In the Figure 4 example, the 5-minute QMA gives a significant strength indication for BTC at a price of \$9650. The same 5-minute QMA indicator significantly weakens for BTC at a price of \$9725 (after reaching a short-term peak of ~\$9800)