LEX VAN DAM
Trading Academy

Lex's Favourite Technical Trading Strategies For FX

APPLICABLE TO COMMODITIES AND EQUITY INDEXES AS WELL

online course

WORKBOOK
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LEX'S FAVOURITE TECHNICAL TRADING STRATEGIES FOR FX - WORKBOOK

This workbook is intended to accompany the ***Lex's*** *Favourite Technical Trading Strategies for FX - Applicable to Commodities and Equity Indexes as well* online module.

WORKBOOK QUESTION: Why do you think technical indicators make trading less emotional and more objective?

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Types of traders

WORKBOOK EXERCISE: Complete the following table:

	Scalpers	Day traders	Swing traders	Position traders
Time horizon				
Trade frequency				
What kind of set-ups do they trade and what do they aim for?				
How often do they need to check and monitor the market?				
What kind of charts do they look at?				
Additional comments:				

WORKBOOK EXERCISE: Describe in your own words what the 4PM London fix is. You may use appendix A for more information on the fix.

Types of traders

WORKBOOK QUESTION: Should a swing trader allow larger adverse price movements than a position trader?

WORKBOOK QUESTION: For which type of trader(s) are technical trading set-ups especially useful?

Technical indicators: Introduction

WORKBOOK QUESTION: What are technical indicators used for?

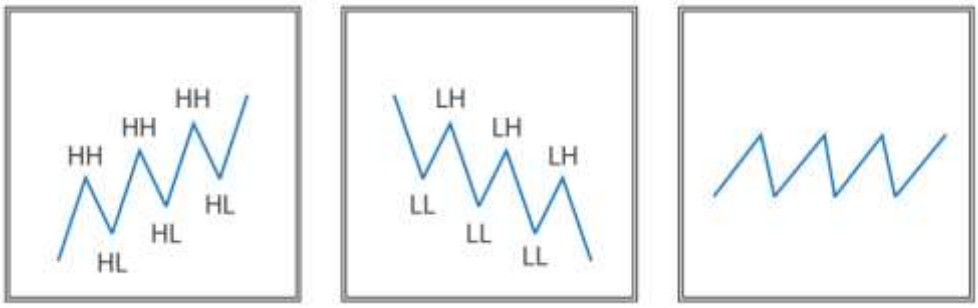
WORKBOOK QUESTION: What are the differences between leading and lagging indicators?

WORKBOOK QUESTION: How can informational indicators help you with the decision-making process involved in trading?

WORKBOOK QUESTION: Can an informational indicator be a leading or a lagging indicator at the same time?

Technical indicators: Introduction

GFX3: Market Environments



WORKBOOK QUESTION: What market environment does each box from above represent?

Box 1:		Box 2:		Box 3:	

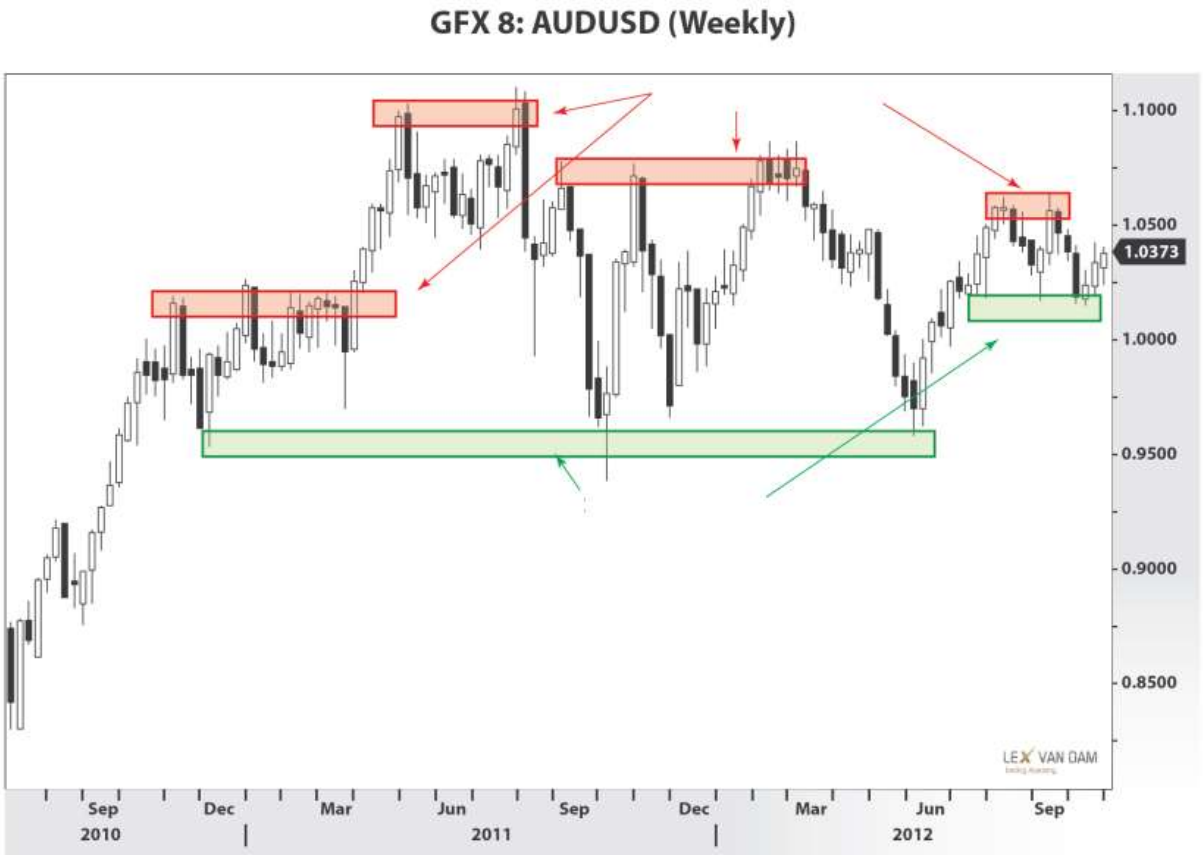
GFX 4: AUDUSD (Weekly)

WORKBOOK EXERCISE: Describe the price action from the previous chart.

For information on Japanese candlesticks and price patterns seen in 5-Step-Trading Stocks®, please refer to Appendix B.

Technical indicators: Leading Indicators

a) Support & Resistance, Fibonacci retracement levels and Floor Pivot points



WORKBOOK QUESTION: What do the red and green boxes represent in the previous chart?

WORKBOOK QUESTION: What is a support level?

WORKBOOK QUESTION: Are support and resistance exact levels?

Technical indicators: Leading Indicators

Explanation of a short position & the basic mechanics of the FX market:

In the FX market, currencies are traded in pairs. This is because when you buy a currency you need to pay for it using another currency. A typical quote could be for example:

EURUSD = 1.30

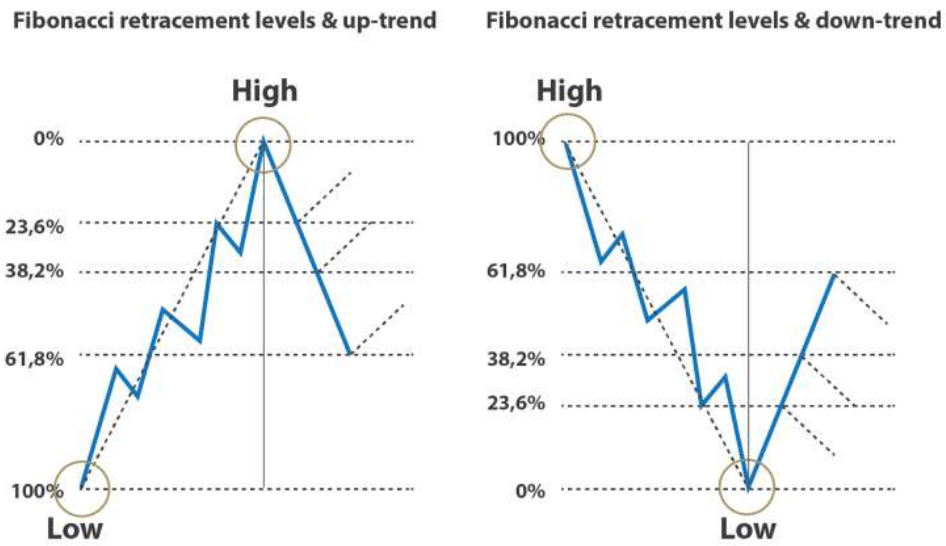
The currency on the left (EUR in this case) is called the base currency and the price of a currency pair always tells you how much 1 unit of this base currency is worth in terms of the other currency in the pair. This means that 1 euro equals 1.30 US dollars. When you expect the euro to be worth more US dollars, you can buy euros and sell US dollars and this is done by going long the currency pair (you would be long euros and short US dollars). In the opposite scenario where you would expect the euro to fall in value against the US dollar, you could sell euros and buy US dollars and you would be short EURUSD.

Long EURUSD:	buy euros (long EUR)	&	sell US dollars (short USD)
Short EURUSD:	sell euros (short EUR)	&	buy US dollars (long USD)

WORKBOOK QUESTION: Is resistance meant to be broken in an uptrend?

WORKBOOK QUESTION: Do prices move in straight lines in uptrends? Which technical indicator can be used to identify potential support areas for retracements within an uptrend?

GFX 10: Fibonacci Retracement Indicator

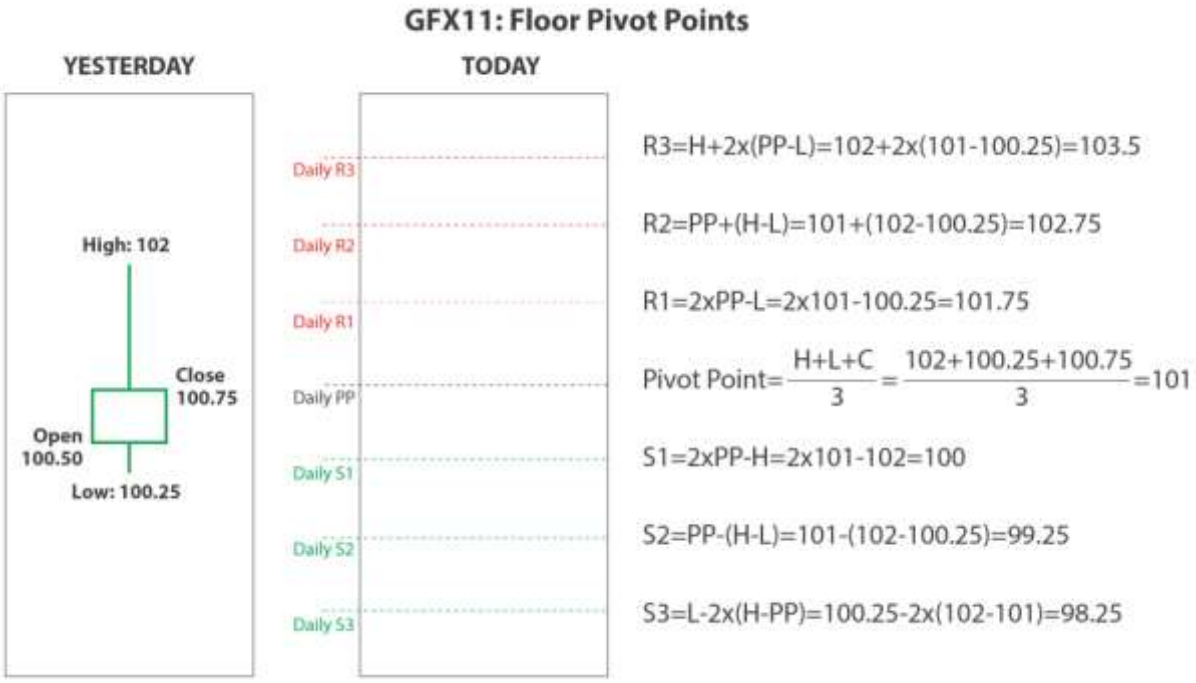


WORKBOOK QUESTION: What are Fibonacci retracement levels based on?

WORKBOOK QUESTION: Why does a certain discretionary and subjective element come into play when using Fibonacci retracement levels?

WORKBOOK QUESTION: Which technical indicator shows objective support and resistance levels?

For more information on Fibonacci retracement levels, please refer to Appendix C.



WORKBOOK EXERCISE: Calculate floor pivot points using the price data shown in the following table:

Open	1.6094
High	1.6127
Low	1.6038
Close	1.6045

→

R3	
R2	
R1	
PP	
S1	
S2	
S3	

b) Relative Strength Index (RSI)

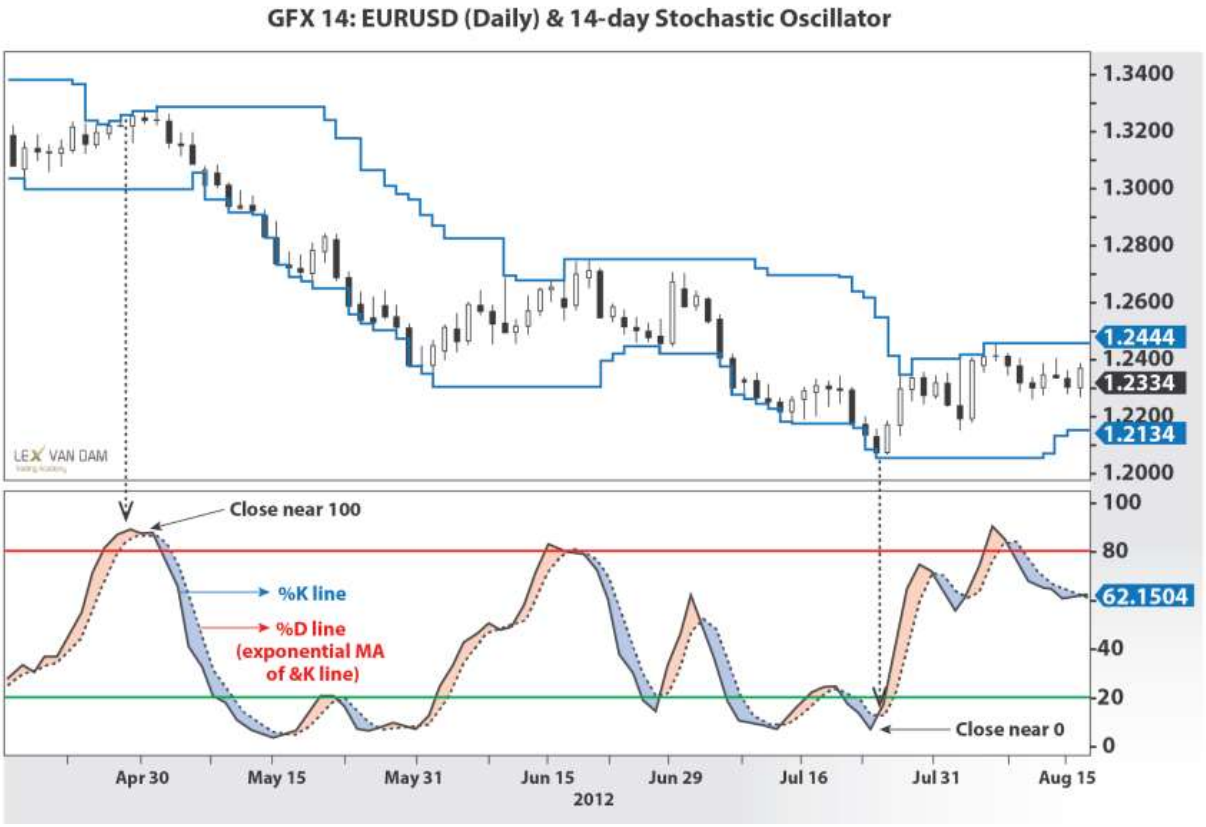
WORKBOOK QUESTION: What does a low reading of the RSI Indicator tell you?

WORKBOOK QUESTION: When is a currency pair considered oversold and when is it overbought according to the RSI indicator?

WORKBOOK QUESTION: If a currency pair is oversold or overbought does that mean the price should immediately reverse?

For more information on the RSI indicator, please refer to Appendix D.

c) Stochastic Oscillator



WORKBOOK QUESTION: To which two factors does the Stochastic oscillator compare a candle's closing price to?

WORKBOOK QUESTION: When is a currency pair considered oversold and when is it overbought according to the Stochastic oscillator?

WORKBOOK QUESTION: Under which circumstances is the Stochastic oscillator close to zero? Does that mean the price should reverse?

WORKBOOK QUESTION: What does the %D line indicate and what is it used for?

For more information on the Stochastic oscillator, please refer to Appendix E.

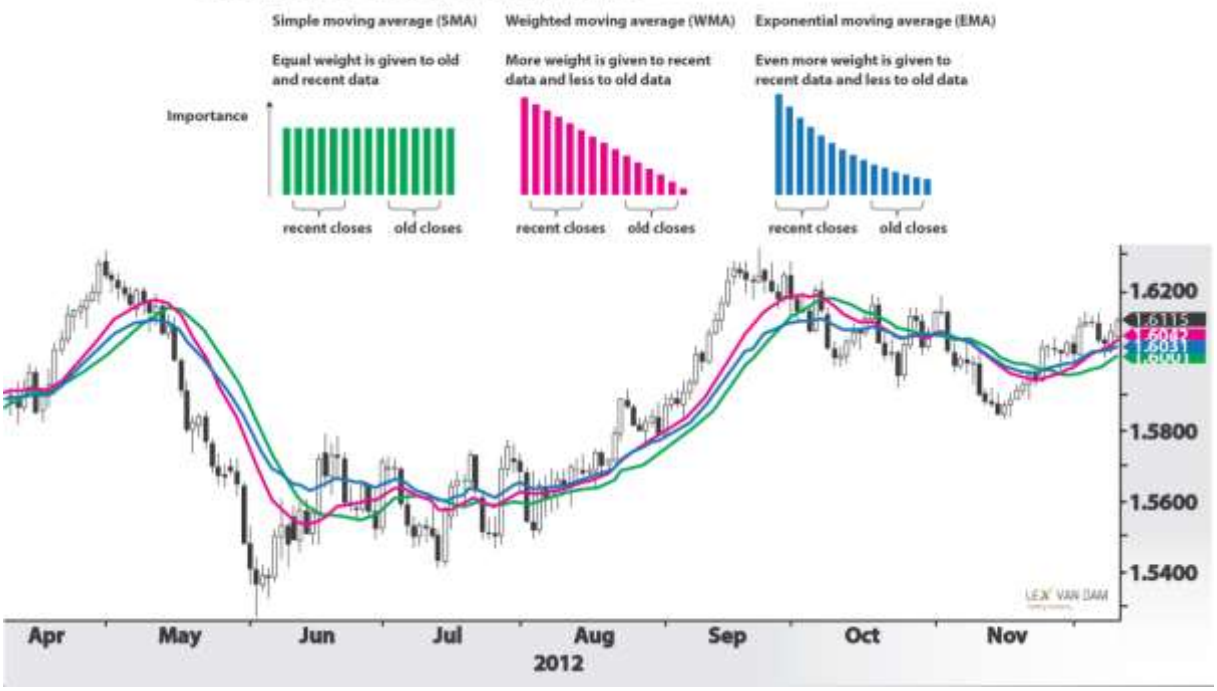
Technical indicators: Lagging Indicators

a) Moving Averages

GFX 16: Simple Moving Average (SMA): Computation

$$\text{3 day SMA} = \frac{1.01 + 1.02 + 1.06}{3} = 1.03$$

GFX 17: GBPUSD (Daily) & Moving Averages



WORKBOOK QUESTION: Why is a moving average considered a lagging indicator?

WORKBOOK QUESTION: Which type of moving average is the most sensitive to recent price action?

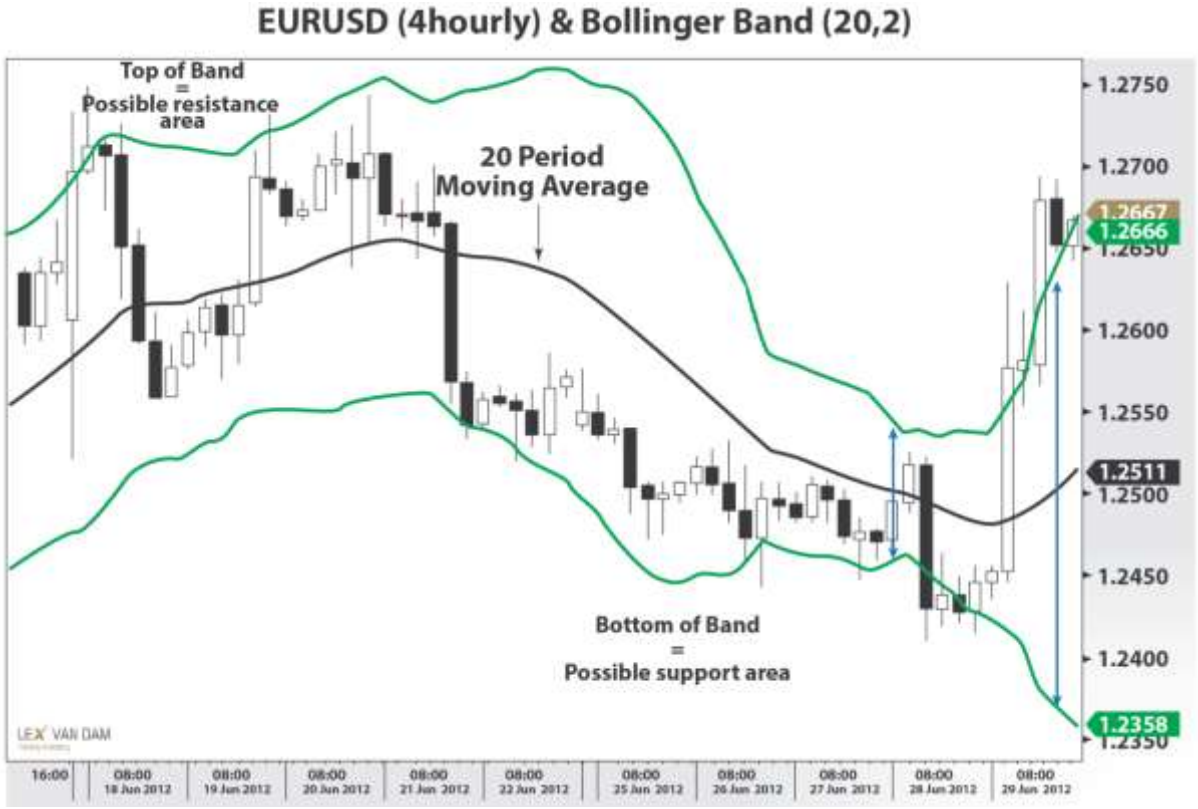
WORKBOOK QUESTION: What information can the slope of a moving average give to you?

WORKBOOK QUESTION: How can moving averages be used in trading?

GFX 18: Confluence: New Zealand dollar (daily) & 100-day Simple Moving Average and Fibonacci Retracement levels

WORKBOOK QUESTION: What is "confluence"?

b) Bollinger Band



WORKBOOK QUESTION: What does the line in the centre of the Bollinger band show you?

WORKBOOK QUESTION: What determines the width of the Bollinger band?

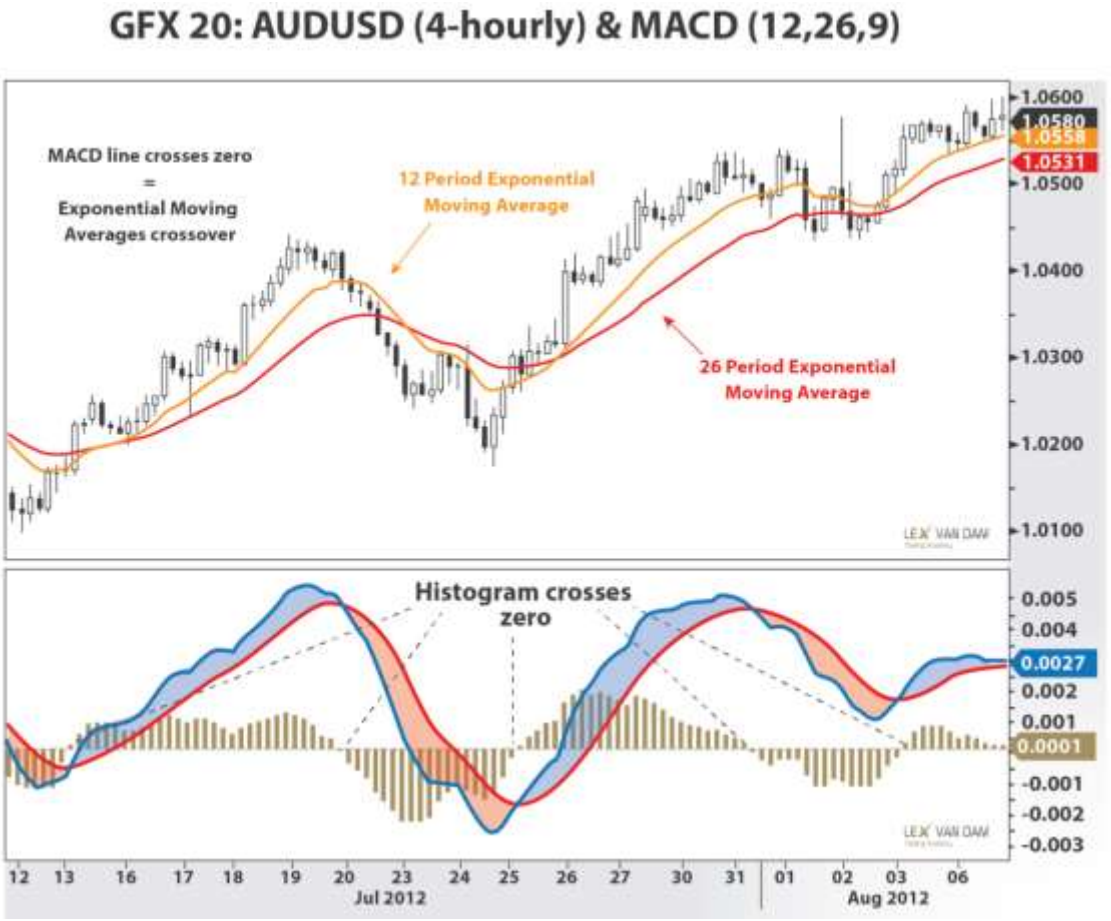
WORKBOOK QUESTION: How many times out of 100 "should" the price close within the band?

WORKBOOK QUESTION: Does the band show potential support and resistance areas?

WORKBOOK QUESTION: If the band narrows, would you increasingly expect an explosive move?

For more information on the Bollinger band, please refer to Appendix F.

c) Moving Average Convergence Divergence (MACD)



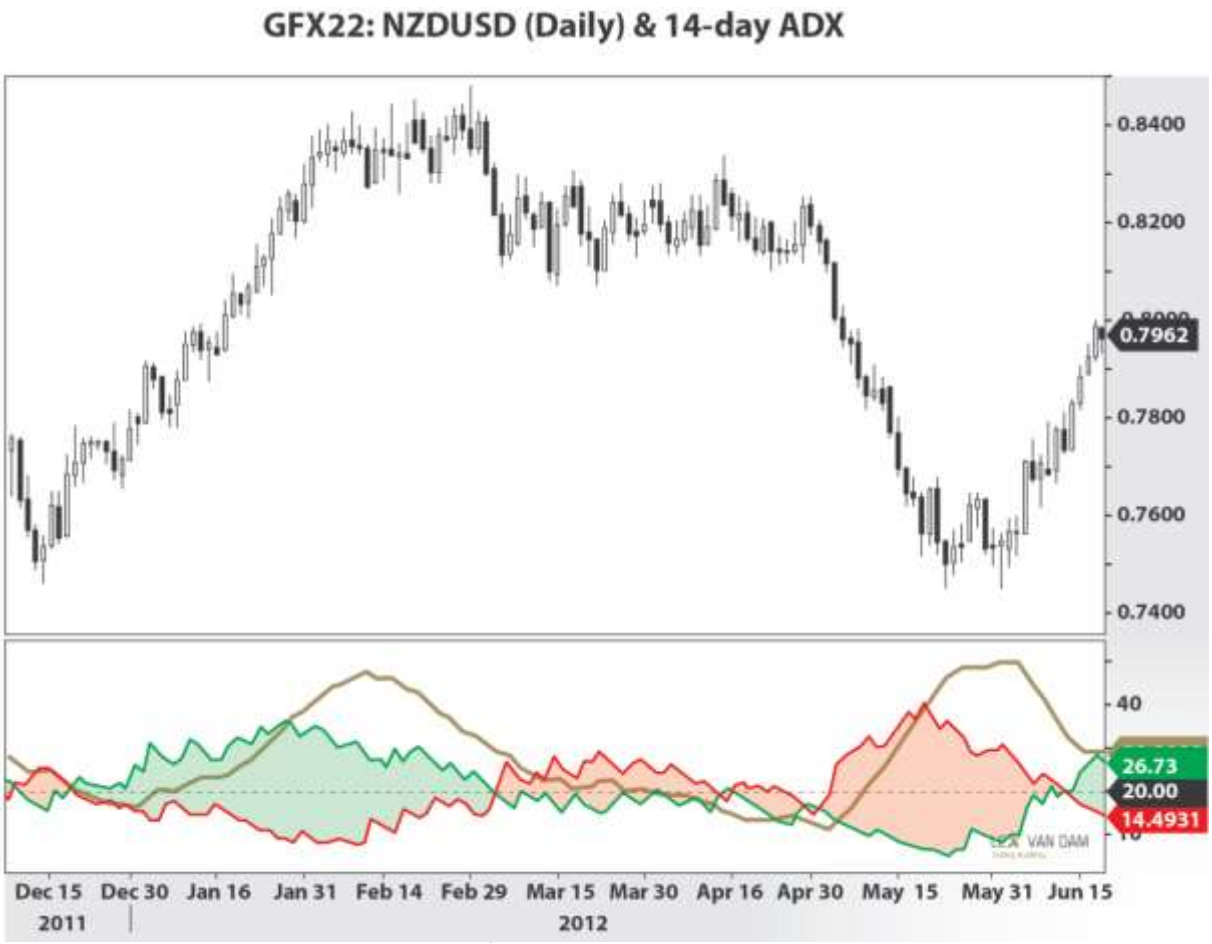
WORKBOOK QUESTION: What does the MACD line show you?

WORKBOOK QUESTION: What does the signal line and the histogram show you?

WORKBOOK EXERCISE: Explain what convergence and divergence is and identify areas where this happens in the previous chart.

Technical indicators: Informational Indicators

a) Average Directional Index (ADX)



WORKBOOK QUESTION: What information does the ADX indicator give you?

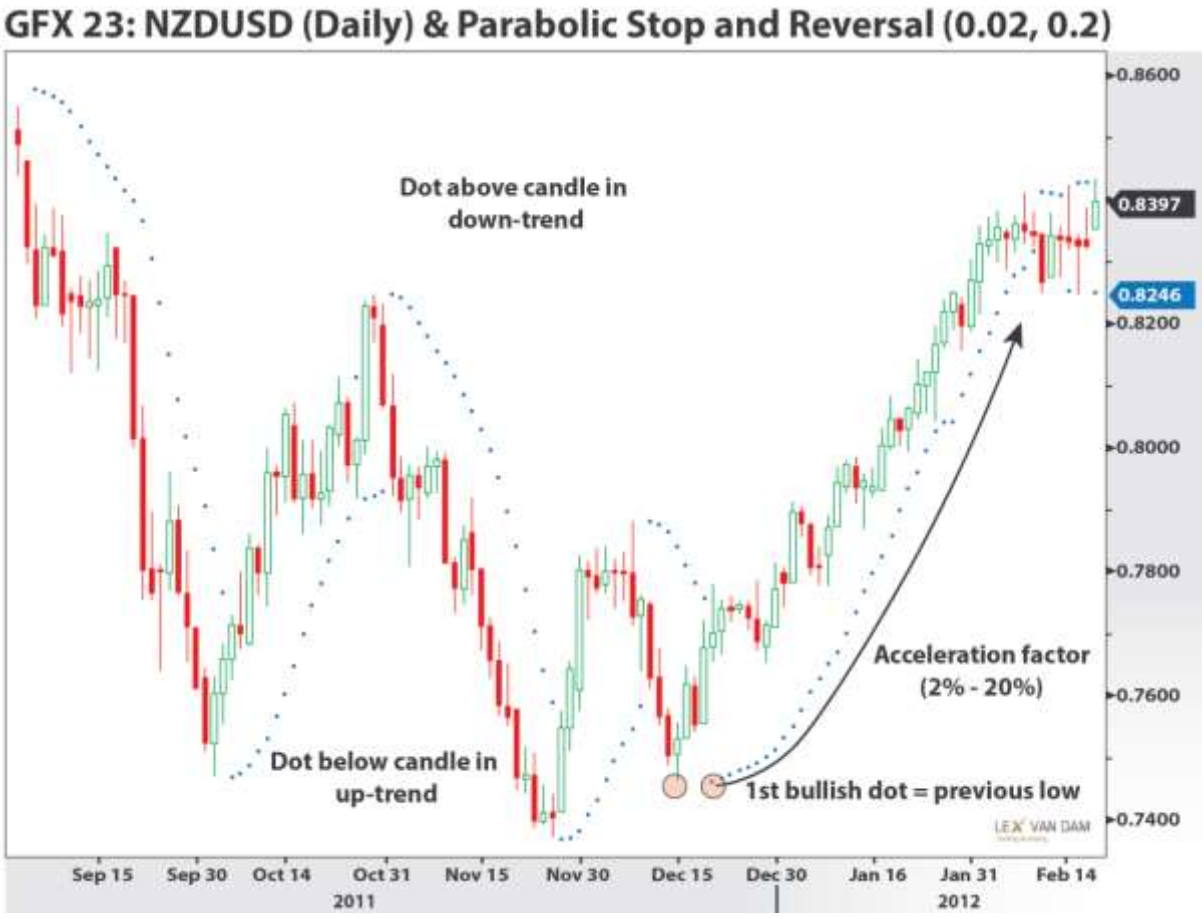
WORKBOOK QUESTION: Why is the 20 level watched closely?

WORKBOOK QUESTION: Can the ADX line enter negative territory? Does it distinguish between up and down-moves?

WORKBOOK QUESTION: In the previous chart, what does it mean when the green line is above the red line?

For more information on the Average Directional Index indicator, please refer to Appendix G.

b) Parabolic Stop and Reversal (PSAR)



Technical indicators: Informational Indicators

WORKBOOK QUESTION: What information does the PSAR indicator give you?

WORKBOOK QUESTION: When PSAR dots suddenly change from being above a candle to being below it, how is this new dot's value obtained?

WORKBOOK QUESTION: What does the acceleration factor do?

For more information on the Parabolic Stop and Reversal indicator, please refer to Appendix H.

c) Average True Range (ATR)

WORKBOOK QUESTION: What information does the ATR indicator give you?

WORKBOOK QUESTION: Why is the ATR indicator useful for setting stop-losses and profit targets?

For more information on the Average True Range indicator, please refer to Appendix I.

Trading Plan

GFX 26: Trading Plan

1. Reasons for trade
2. Target and stop-loss
3. Self-check
4. Risk management & portfolio analysis
5. After-trade analysis

For more information on back-testing please refer to Appendix J.

WORKBOOK QUESTION: Is having a good trading plan all you need to be a successful trader? Which other skills are desirable?

WORKBOOK QUESTION: If you have traded before, did you follow a trading plan? If so, did you use stop-losses and how did you come up with the levels? Have you ever experienced a trade running out of control? What did you learn from that?

WORKBOOK QUESTION: Why is it important not to risk too much on any single trade?

WORKBOOK QUESTION: Which two factors play a big role in determining trading size?

Trading Plan

WORKBOOK EXERCISE: Calculate the trading size for each of the following two scenarios:

	Scenario 1	Scenario 2
Account Size	$10,000	$10,000
Prepared to lose (% of account size)	1%	1%
Prepared to lose ($)	$100	$100
Stop-loss from entry	20 pips	40 pips
Trade Size?		

For more information on trading sizes and pip values, please refer to Appendix K.

GFX 28: Volatility Adjusted Stop-Loss

WORKBOOK QUESTION: If a trader uses a 20 pip stop which of the two currency pairs shown above is more likely to withstand a natural retracement? Why?

GFX 28: Volatility Adjusted Stop-Loss

STOP = 2 x Average True Range (ATR)

Long position stop → entry price - 2 x ATR
Short position stop → entry price + 2 x ATR

Long@ 1.50 ATR = 0.01 → Stop: 1.50 - 2 x ATR = 1.50 - 2 x 0.01 = 1.48

Short@ 1.50 ATR =0.01 → Stop: 1.50 + 2 x ATR = 1.50 + 2 x 0.01 = 1.52

WORKBOOK QUESTION: What is the advantage of using an ATR stop versus a fixed amount of pips stop for all currency pairs?

Trading Plan

WORKBOOK EXERCISE: Assume you have gone long the NZDUSD at the green arrow in the charts below, where would you have been stopped out if you had used each of the following trailing stops:

10 day lowest low trailing stop, Swing low trailing stop, Moving average trailing stop
Bollinger band trailing stop, PSAR trailing stop

Trading Plan

WORKBOOK QUESTION: Have you ever used a trailing stop? If so, which one?

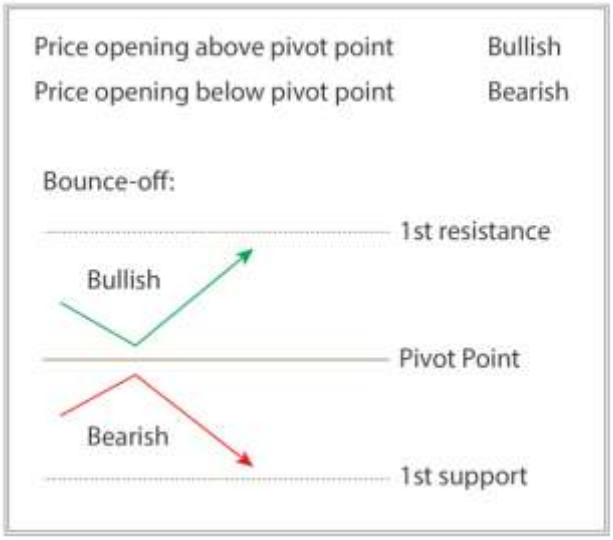
WORKBOOK QUESTION: What is the main aim of using a trailing stop?

WORKBOOK QUESTION: Why are profit targets normally not used together with trailing stops?

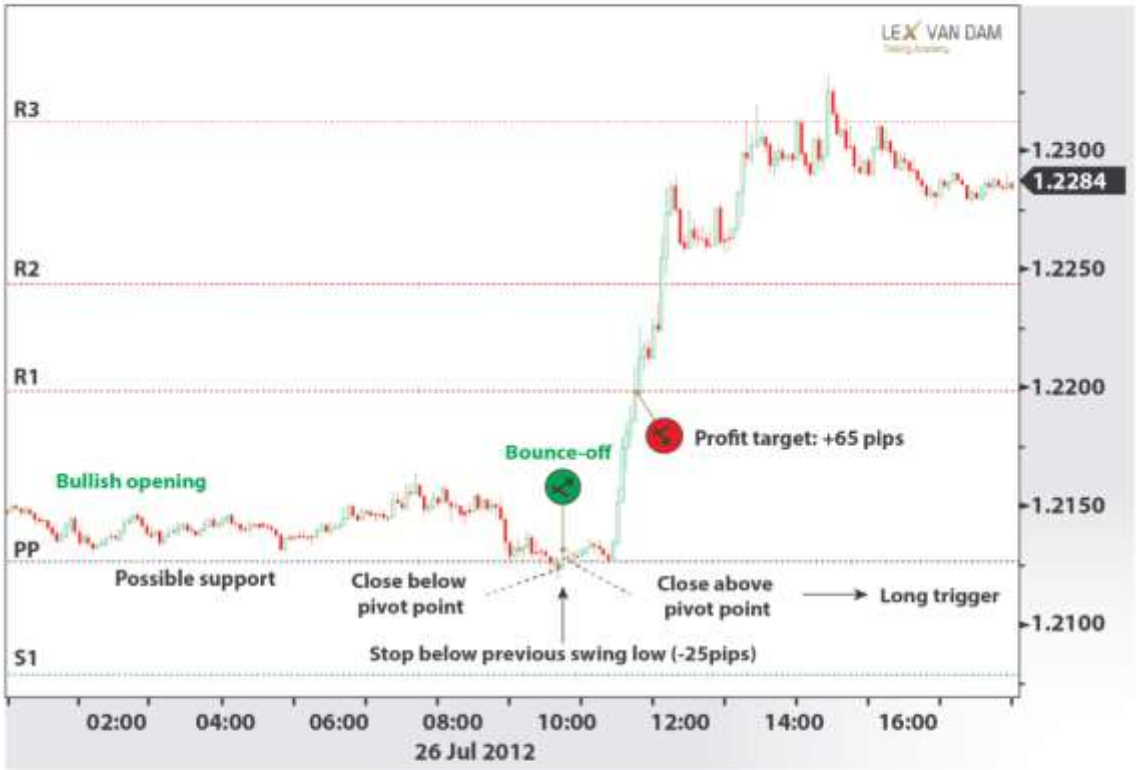
Day-trade set-ups

a) Trading set-up 1: Pivot point bounce-off

GFX32: Pivot Points

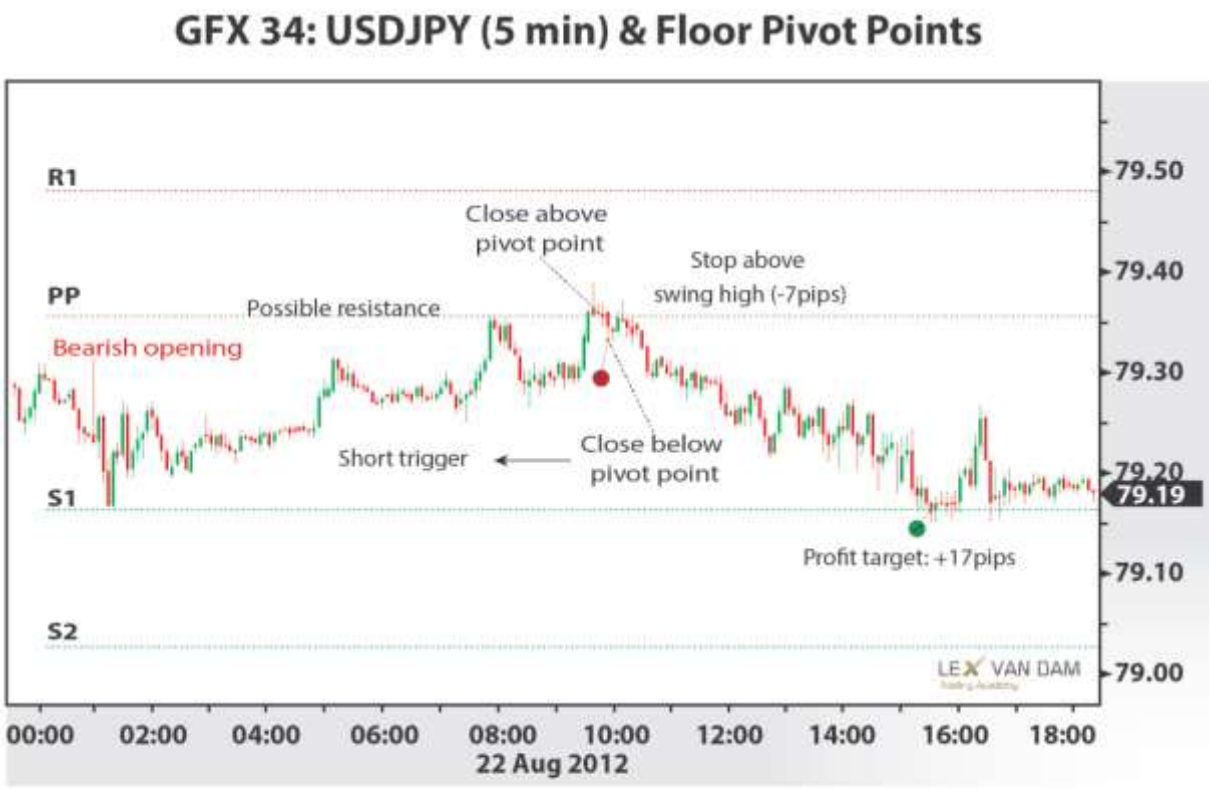


GFX 33: EURUSD (5 min) & Floor Pivot Points



Entry (long)	1.2125
Target	1.2190 (+65 pips)
Stop-loss	1.2100 (-25 pips)
Risk reward	25/65 → 1 : 2.6

Day-trade set-ups

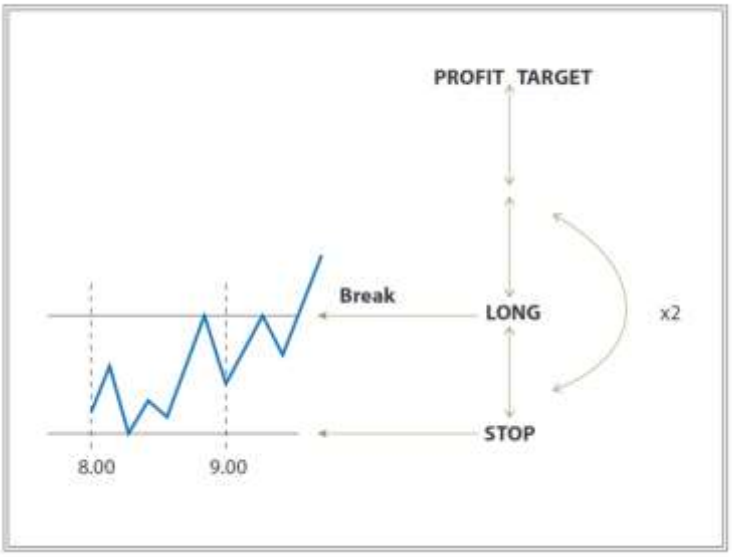


Entry (short)	79.33
Target	79.16 (+17 pips)
Stop-loss	79.40 (-7 pips)
Risk reward	7/17 → 1:2.4

WORKBOOK EXERCISE: Explain this trading set-up.

b) Trading set-up 2: Opening range break-out

GFX 37: Trading the Opening Range



GFX 38: EURUSD (5 min) & Opening Range Break-out

Lower Range	1.2501
Higher Range	1.2523
Opening Range	22 pips
Entry (long)	1.2524
Target	1.2567 (+43 pips)
Stop-loss	1.2499 (-25 pips)
Risk reward	25/43 ⟶ 1:1.72

WORKBOOK EXERCISE: Explain this trading set-up (GFX 38).

WORKBOOK EXERCISE: Why was the break-out in the previous chart initially ignored when the price traded above the opening range?

GFX 39: EURUSD (5 min) & Opening Range Break-out

Lower Range	1.2607
Higher Range	1.2622
Opening Range	15
Entry (short)	1.2603
Stop-loss	1.2624 (-21 pips)
Target	1.2577 (+26 pips)
Risk reward	21:26 = 1.24

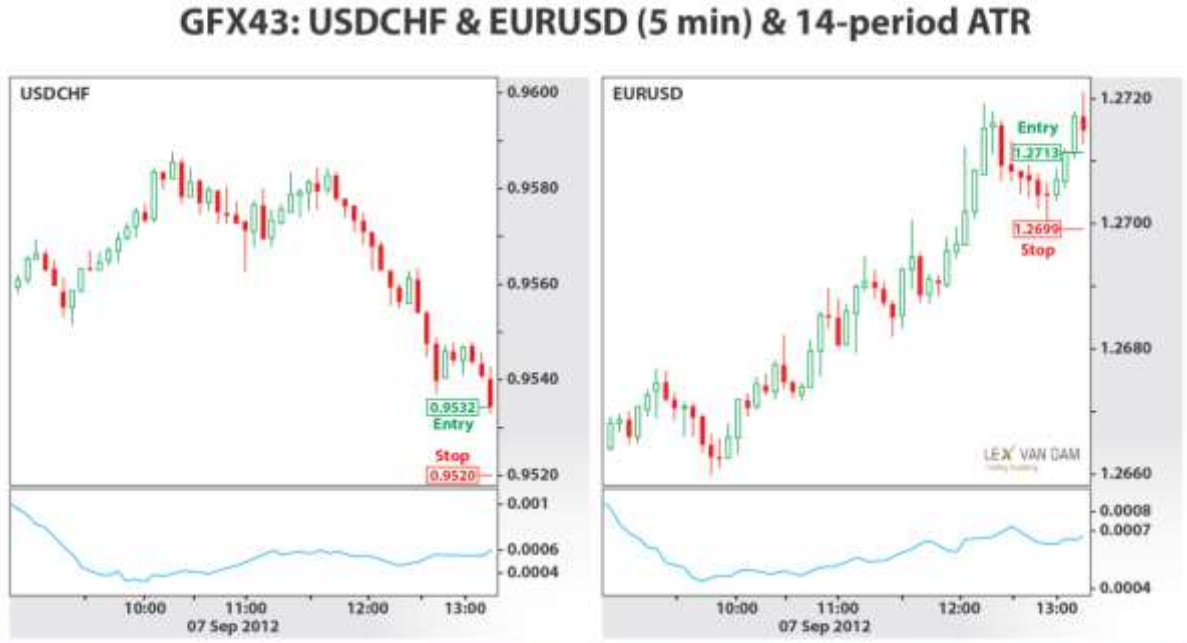
Day-trade set-ups

WORKBOOK QUESTION: Why was the previous trade set-up not initiated?

Please refer to Appendix L to for information on the minimum risk reward ratio.

c) Trading set-up 3: Post-data knock-out

BUY EURUSD	LONG EUR	~~SHORT USD~~
BUY USD CHF	~~LONG USD~~	SHORT CHF
REAL POSITION	LONG EUR	SHORT CHF



Pair	Entry	ATR (5 min)	Stop (2 x ATR)	Profit Target (6 x ATR)
USDCHF	0.9532	0.0006	0.9520	0.9568
EURUSD	1.2713	0.0007	1.2699	1.2755

Outcome		USDCHF	EURUSD	Result
1	Dollar goes up a lot	Make 6 ATR	Lose 2 ATR	Make 4 ATR
2	Dollar goes down a lot	Lose 2 ATR	Make 6 ATR	Make 4 ATR
3	Dollar does nothing	Lose spread	Lose spread	Lose spread
4	Dollar goes up and down Dollar goes down and up	Lose 2 ATR	Lose 2 ATR	Lose 4 ATR

GFX 44: Trading News Events

Non-Farm Employment Change:
Forecast: 123,000
Actual number: 96,000 → Worse than expected

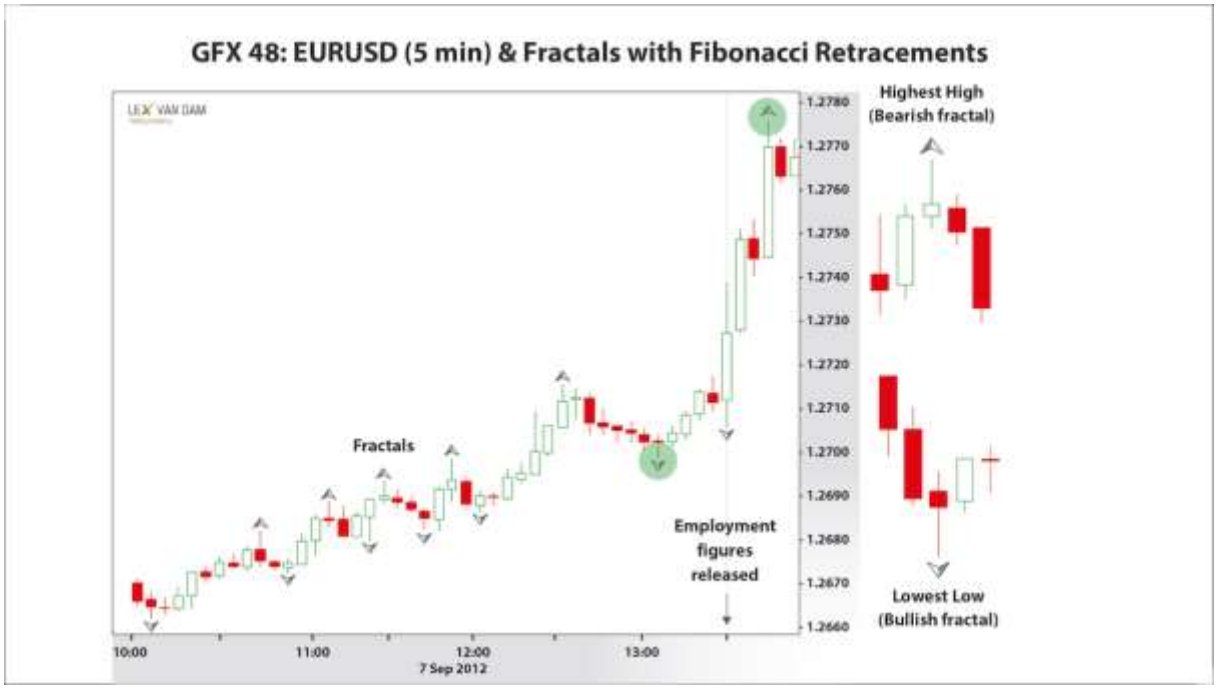
Dollar should sell off:
USDCHF → Move down
EURUSD → Move up

GFX 45: USDCHF & EURUSD (5 min) & 14-period ATR

d) Trading set-up 4: Post-data retracement

GFX 47: Trading news events

GFX 48: EURUSD (5 min) & Fractals with Fibonacci Retracements

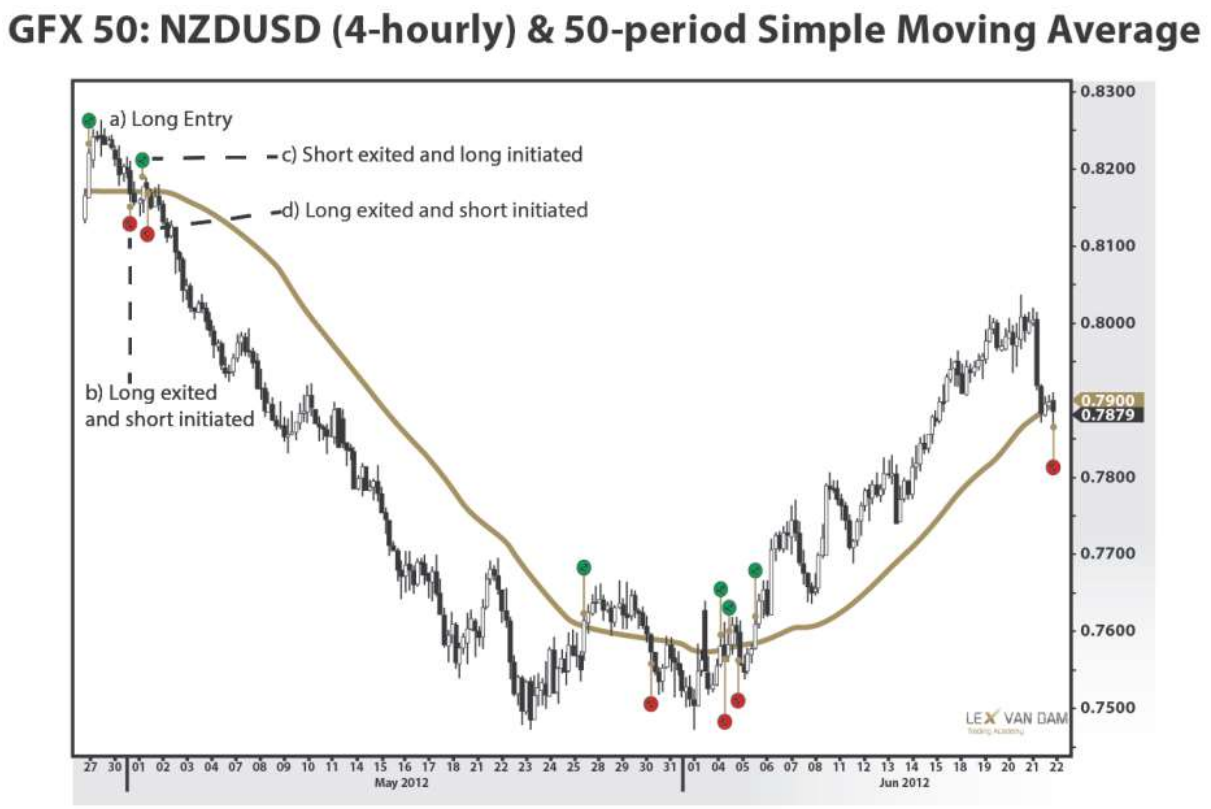


WORKBOOK EXERCISE: Explain this trading set-up.

WORKBOOK QUESTION: Should inexperienced traders trade news events? Why?

Trend-following trade set-ups

a) Trading set-up 5: Moving average crossover



Assuming +2 pip spread/slippage

NZDUSD	Bias	Date	Entry	Date	Exit	Pips
Trade 1	Long	27 April	0.8194	01 May	0.8145	-49
Trade 2	Short	01 May	0.8145	01 May	0.8157	-12
Trade 3	Long	01 May	0.8157	02 May	0.8128	-29
Trade 4	Short	02 May	0.8128	28 May	0.7606	522
Trade 5	Long	28 May	0.7606	30 May	0.7551	-55
Trade 6	Short	30 May	0.7551	04 June	0.7564	-13
Trade 7	Long	04 June	0.7564	04 June	0.7547	-17
Trade 8	Short	04 June	0.7547	05 June	0.7564	-17
Trade 9	Long	05 June	0.7564	05 June	0.7535	-29
Trade 10	Short	05 June	0.7535	06 June	0.7590	-55
Trade 11	Long	06 June	0.7590	22 June	0.7869	279
						525

WORKBOOK QUESTION: Explain this trading set-up.

GFX 51: ADX FILTER

Assuming +2 pip spread/slippage

NZDUSD	Bias	Date	Entry	Date	Exit	Pips	ADX
~~Trade 1~~	~~Long~~	~~27 April~~	~~0.8194~~	~~01 May~~	~~0.8145~~	~~49~~	~~15~~
Trade 2	Short	01 May	0.8145	01 May	0.8157	-12	27
Trade 3	Long	01 May	0.8157	02 May	0.8128	-29	32
Trade 4	Short	02 May	0.8128	28 May	0.7606	522	31
Trade 5	Long	28 May	0.7606	30 May	0.7551	-55	22
Trade 6	Short	30 May	0.7551	04 June	0.7564	-13	21
Trade 7	Long	04 June	0.7564	04 June	0.7547	-17	31
Trade 8	Short	04 June	0.7547	05 June	0.7564	-17	30
Trade 9	Long	05 June	0.7564	05 June	0.7535	-29	29
Trade 10	Short	05 June	0.7535	06 June	0.7590	-55	28
Trade 11	Long	06 June	0.7590	22 June	0.7869	279	22
						574	

WORKBOOK QUESTION: What is the purpose of applying the ADX filter?

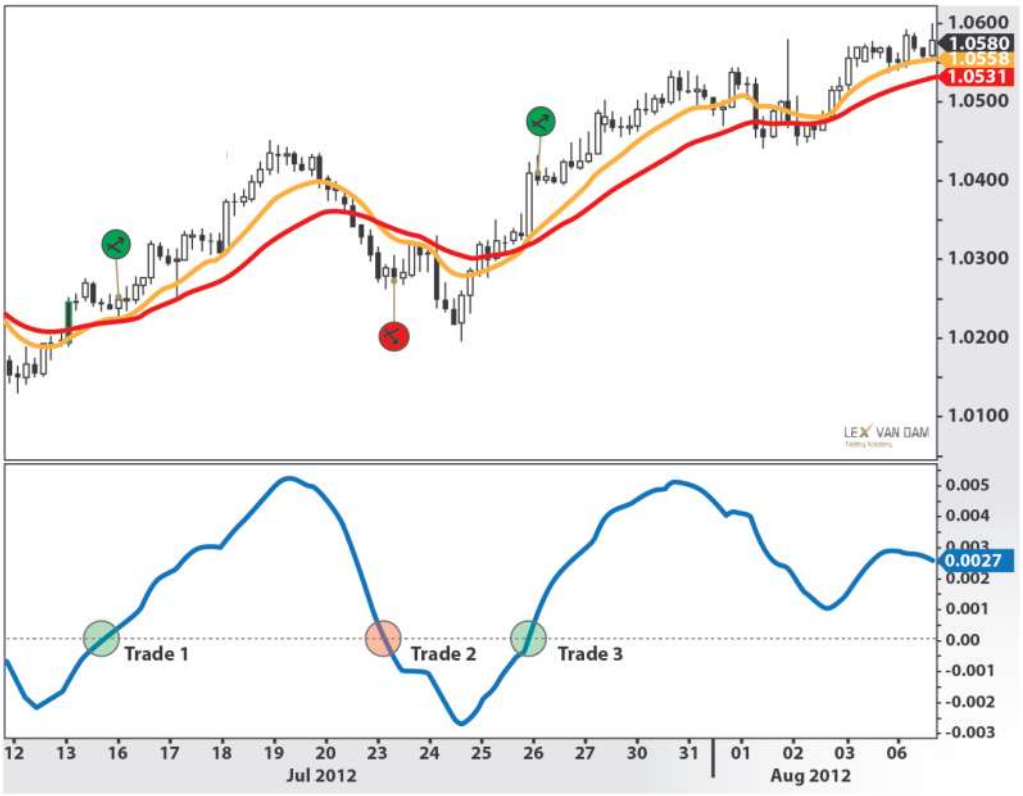
WORKBOOK QUESTION: Should you use an initial hard stop for the previous trade set-up?

WORKBOOK QUESTION: If a short trigger was given, when should you exit and reverse your trade? (hint: distinguish between closing and intra-day trading below the moving average)

b) Trading set-up 6: Moving average convergence divergence

	Description	Triggers
MACD Line (Blue)	Plots the difference between the two exponential moving averages (12 & 26)	Bullish above zero Bearish below zero
Signal Line (Red)	9 EMA of the MACD line	Bullish below the MACD line Bearish above the MACD line
Histogram	MACD line – Signal line	Bullish above zero Bearish below zero

GFX 56: AUDUSD (4-hourly) & MACD (12,26,9): MACD & Zero line Cross-over

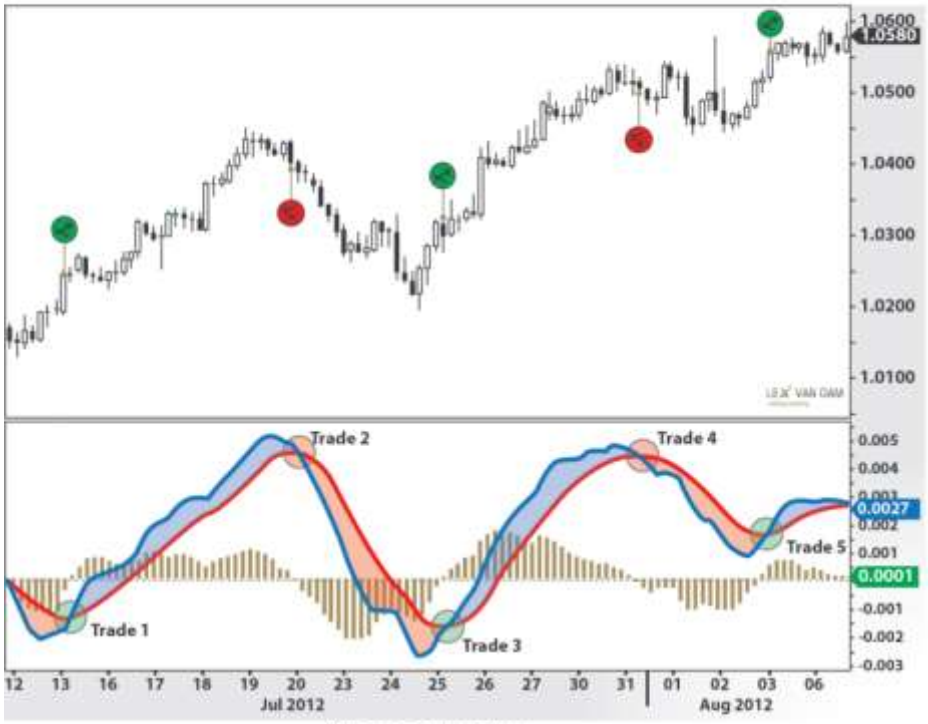


Assuming +2 pip spread/slippage

AUDUSD	Bias	Date	Entry	Date	Exit	Pips
Trade 1	Long	16 July	1.0216	23 July	1.0267	51
Trade 2	Short	23 July	1.0267	26 July	1.0396	-129
Trade 3	Long	26 July	1.0396	-	-	-
						-78+181=103

WORKBOOK EXERCISE: Explain this trading set-up (GFX 56).

GFX57: AUDUSD (4-hourly) & MACD (12,26,9): MACD & Signal Cross-over



Assuming +2 pip spread/slippage

AUDUSD	Bias	Date	Entry	Date	Exit	Pips
Trade 1	Long	13 July	1.0224	20 July	1.039	166
Trade 2	Short	20 July	1.039	25 July	1.0284	106
Trade 3	Long	25 July	1.0284	01 August	1.05	216
Trade 4	Short	01 August	1.05	03 August	1.0555	-55
Trade 5	Long	03 August	1.0555			
						433

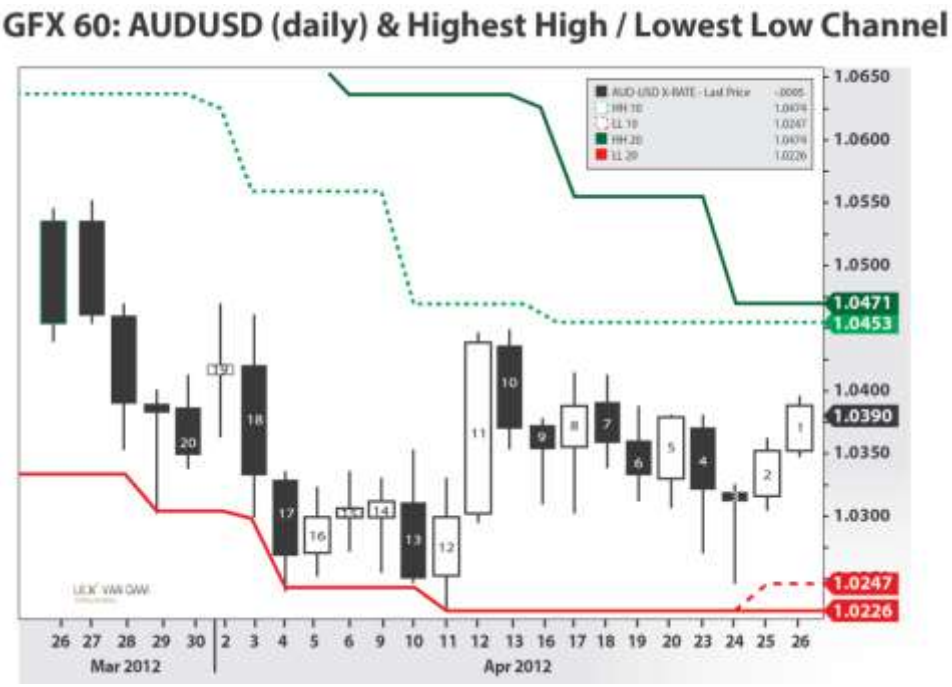
WORKBOOK EXERCISE: Explain the previous trading set-up.

c) Trading set-up 7: Turtle break-out system

WORKBOOK EXERCISE: Complete the following table:

	Entry	Initial stop	Trailing stop
Long trade			
Short trade			

WORKBOOK EXERCISE: Identify the 20 day high and the 20 day low in the following chart:

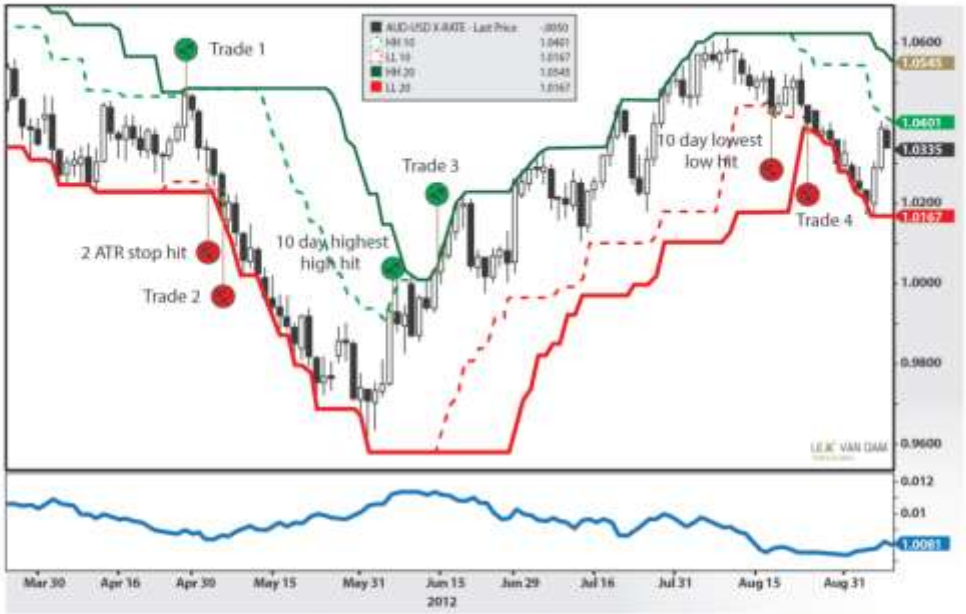


WORKBOOK EXERCISE: Calculate the stop-loss for the following long entry assuming 1 ATR equals 92 pips.

LONG	1.0471
2xATR	
Stop-loss	

WORKBOOK QUESTION: Should you exit a long trade that hits the 2 ATR stop before it hits the 10 day low?

GFX 60: AUDUSD (daily) & Highest High / Lowest Low Channel



AUDUSD	Bias	Date	Entry	ATR	ATR STOP	Date	Exit	Pips
Trade 1	Long	24 Apr	1.0471	0.0092	1.0287	03 May	1.0287	-184
Trade 2	Short	04 May	1.0226	0.0091	1.0408	06 Jun	0.9898	328
Trade 3	Long	14 Jun	1.0009	0.0118	0.9773	17 Aug	1.0442	433
Trade 4	Short	24 Aug	1.0381	0.0160	1.0701			
								577

WORKBOOK QUESTION: What did one of the people behind the turtle trading system say about publishing the rules in a newspaper?

For more information on the turtle trading system, please refer to Appendix M.

d) Trading set-up 8: Ichimoku cloud

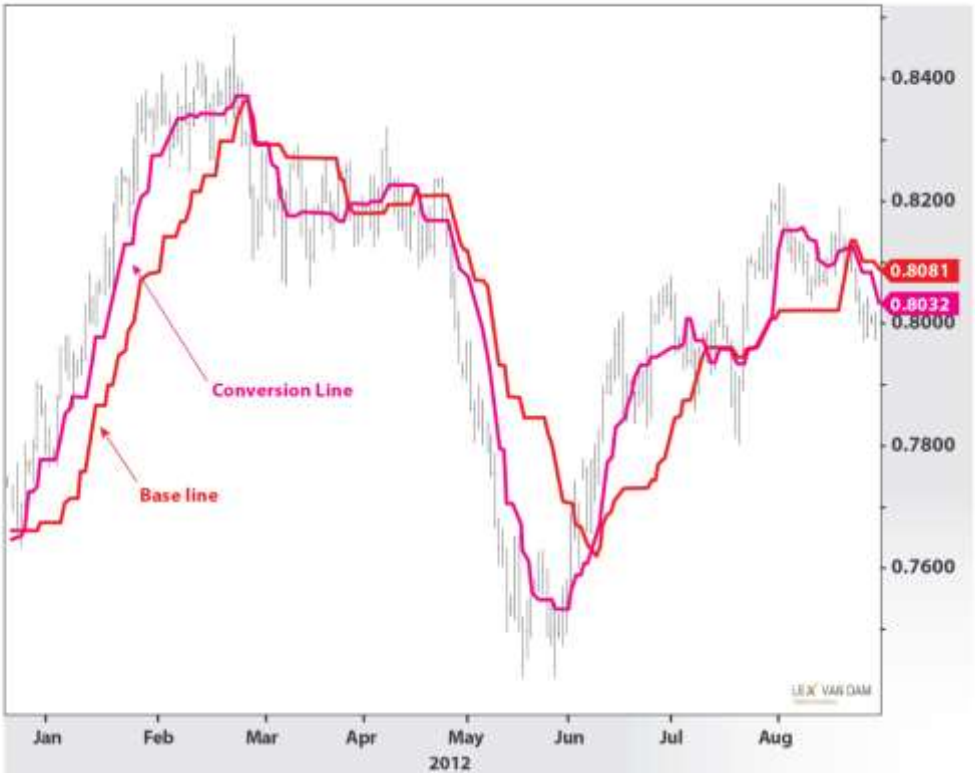
Base & Conversion Lines:

GFX 63: The Ichimoku Cloud indicator – Base & Conversion Lines

$$\text{Base line} = \frac{\text{highest high}_{\text{previous 26 periods}} + \text{lowest low}_{\text{previous 26 periods}}}{2} = \text{26 - period midpoint}$$

$$\text{Conversion line} = \frac{\text{highest high}_{\text{previous 9 periods}} + \text{lowest low}_{\text{previous 9 periods}}}{2} = \text{9 - period midpoint}$$

GFX 64: NZDUSD (daily) & Ichimoku Cloud Indicator – Base & Conversion Lines



WORKBOOK QUESTION: Does a bar chart give less information than a candlestick chart?

WORKBOOK QUESTION: Does the base line follow the current price action better than the conversion line? Why / why not?

Explanation of GFX 65:

When the conversion line is above the base line, the sum of the highest high and the lowest low of the previous 9 periods must be greater than the sum of the highest high and lowest low of the previous 26 periods:

$$\text{Conversion line} = \frac{\text{Highest high (9 periods)} + \text{Lowest low (9 periods)}}{2}$$

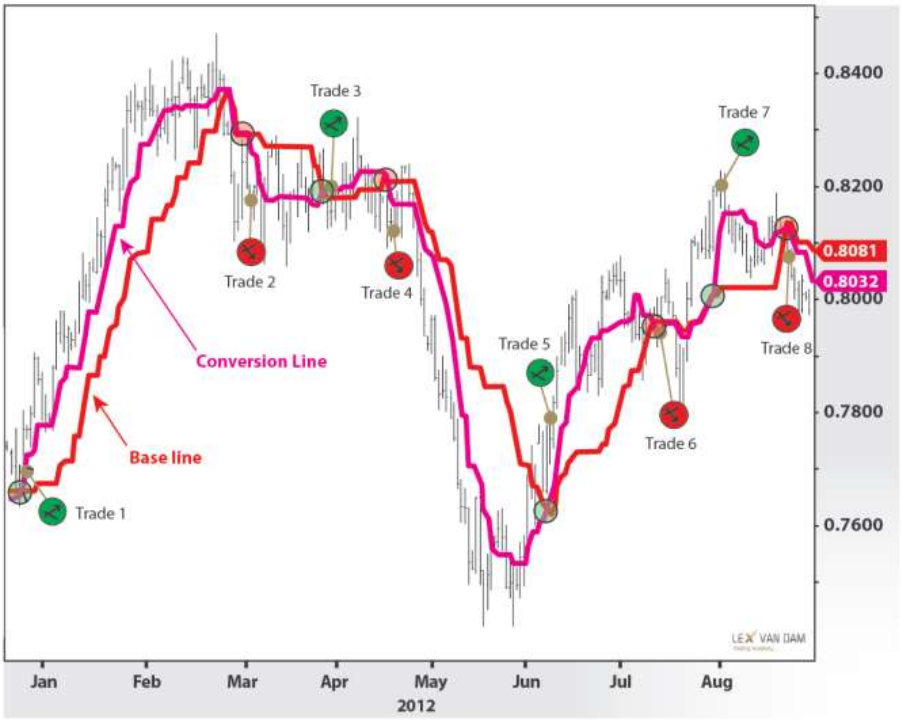
Greater than

$$\text{Base line} = \frac{\text{Highest high (26 periods)} + \text{Lowest low (26 periods)}}{2}$$

This can only happen when the lowest low of the previous 9 periods is at a higher level than the lowest low of the previous 26 periods. You cannot obtain a 9 period high that is greater than the 26 period high because the first 9 periods are per definition included in the longer time frame of 26 periods. Therefore, when the conversion line is above the base line, it is considered bullish- the price made a higher low during the last 9 periods compared to the low made during the last 26 periods.

WORKBOOK QUESTION: When the base line is above the conversion line, is it bullish or bearish? Why? What must the price do to obtain a greater value for the base line than the conversion line?

GFX 66: NZDUSD (daily) & Ichimoku Cloud Indicator – Base & Conversion Lines



Assuming +2 pip spread/slippage

NZDUSD	Bias	Date	Entry	Date	Exit	Pips
Trade 1	Long	30 Dec	0.7719	12 Mar	0.8186	467
Trade 2	Short	12 Mar	0.8186	04 Apr	0.8182	4
Trade 3	Long	04 Apr	0.8182	24 Apr	0.8133	-49
Trade 4	Short	24 Apr	0.8133	13 Jun	0.7789	344
Trade 5	Long	13 Jun	0.7789	17 Jul	0.7963	174
Trade 6	Short	17 Jul	0.7963	05 Aug	0.8191	-228
Trade 7	Long	05 Aug	0.8191	28 Aug	0.8083	-108
Trade 8	Short	28 Aug	0.8083			
						604

WORKBOOK EXERCISE: Explain the previous trading set-up.

Leading Spans:

GFX 67: The Ichimoku Cloud indicator – Leading Spans

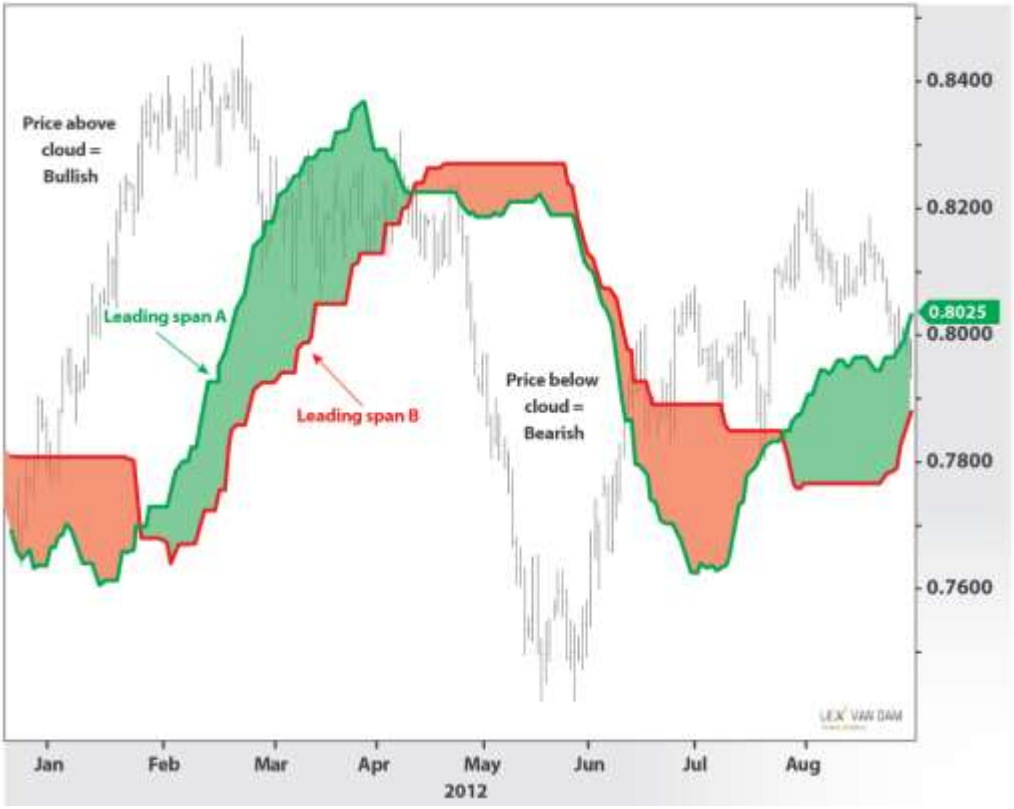
Both historic values are plotted 26 days in the future and from the cloud:

$$\text{Leading Span A} = \frac{\text{conversion line} + \text{base line}}{2}$$ (FAST: average of 9 and 26 day midpoint)

$$\text{Leading Span B} = \frac{\text{highest high}_{\text{previous 52 days}} + \text{lowest low}_{\text{previous 52 days}}}{2}$$ (SLOW: 52 day midpoint)

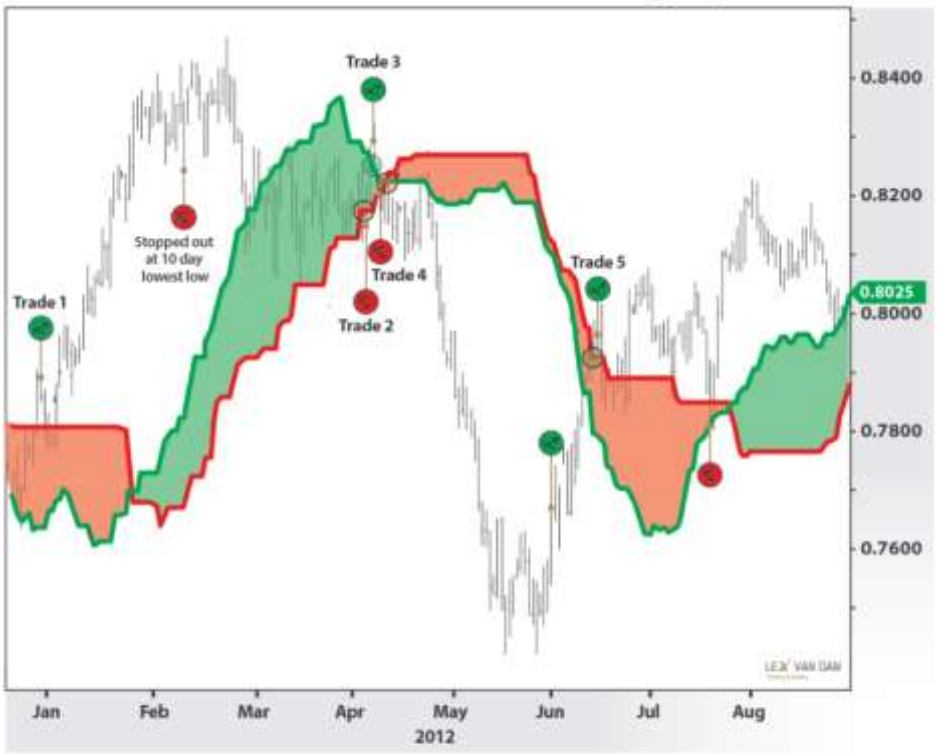
If Leading Span A > Leading Span B ⟶ Bullish
If Leading Span A < Leading Span B ⟶ Bearish

GFX 68: NZDSUSD (daily) & Ichimoku Cloud Indicator – Leading Spans



WORKBOOK QUESTION: Why are these two lines called "leading" spans?

GFX 68: NZDSUSD (daily) & Ichimoku Cloud Indicator – Leading Spans



Assuming +2 pip spread/slippage each side

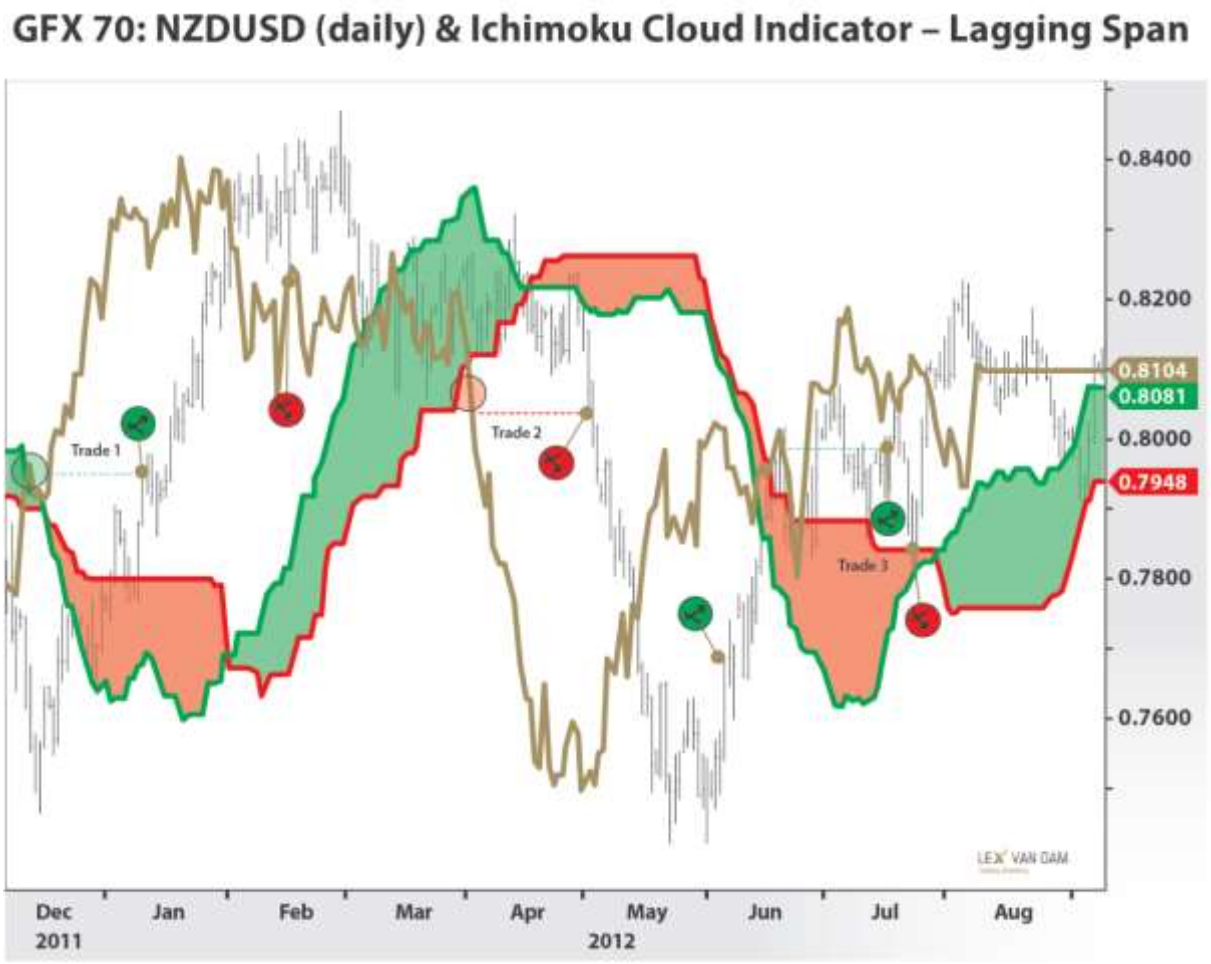
NZDUSD	Bias	Date	Entry	Date	Exit	Pips
Trade 1	Long	4 Jan	0.7897	16 Feb	0.8248	351
Trade 2	Short	11 Apr	0.8155	12 Apr	0.8266	-111
Trade 3	Long	13 Apr	0.8278	17 Apr	0.8198	-80
Trade 4	Short	17 Apr	0.8198	06 Jun	0.7650	548
Trade 5	Long	19 Jun	0.7924	24 Jul	0.7860	-64
						644

WORKBOOK EXERCISE: Explain the previous trading set-up.

WORKBOOK QUESTION: How is the Ichimoku cloud formed?

Lagging Span:

WORKBOOK QUESTION: What does the lagging span plot and where does it displays this information?

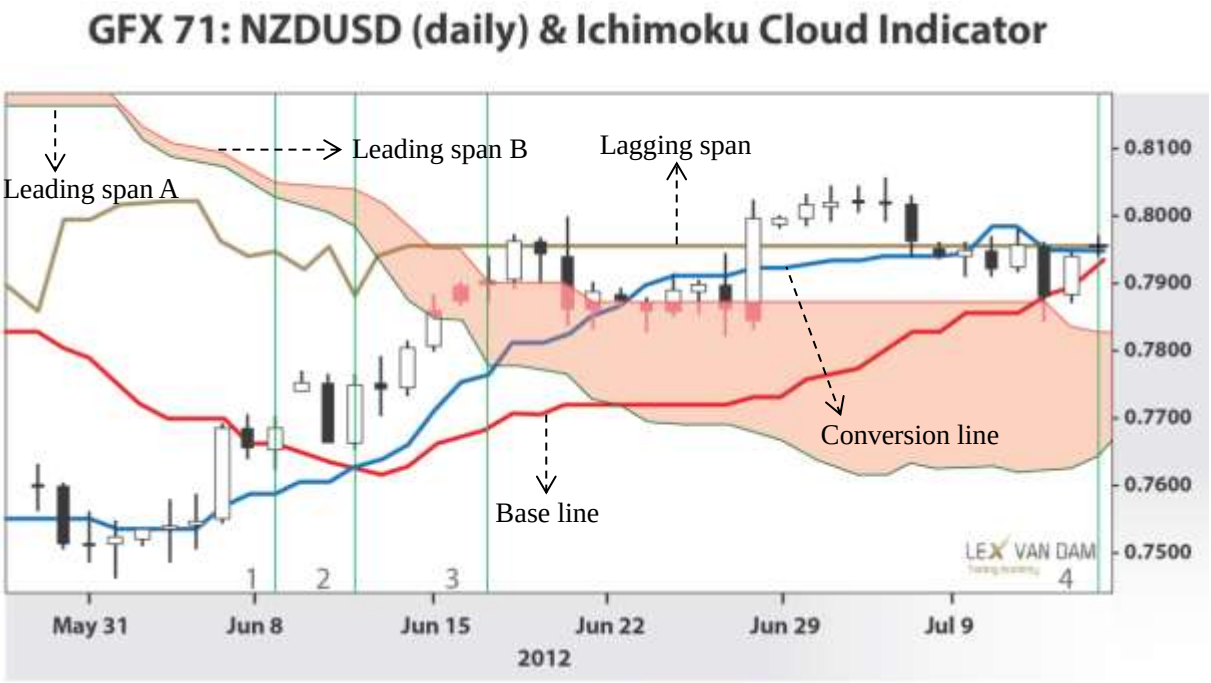


NZDUSD	Bias	Date	Entry	Date	Exit	Pips
Trade 1	Long	11 Jan	0.7942	16 Feb	0.8248	306
Trade 2	Short	03 May	0.8070	06 Jun	0.7650	420
Trade 3	Long	19 Jul	0.8002	24 Jul	0.7860	-142
						584

Trend-following trade set-ups

WORKBOOK EXERCISE: Explain the previous trading set-up.

Summary:

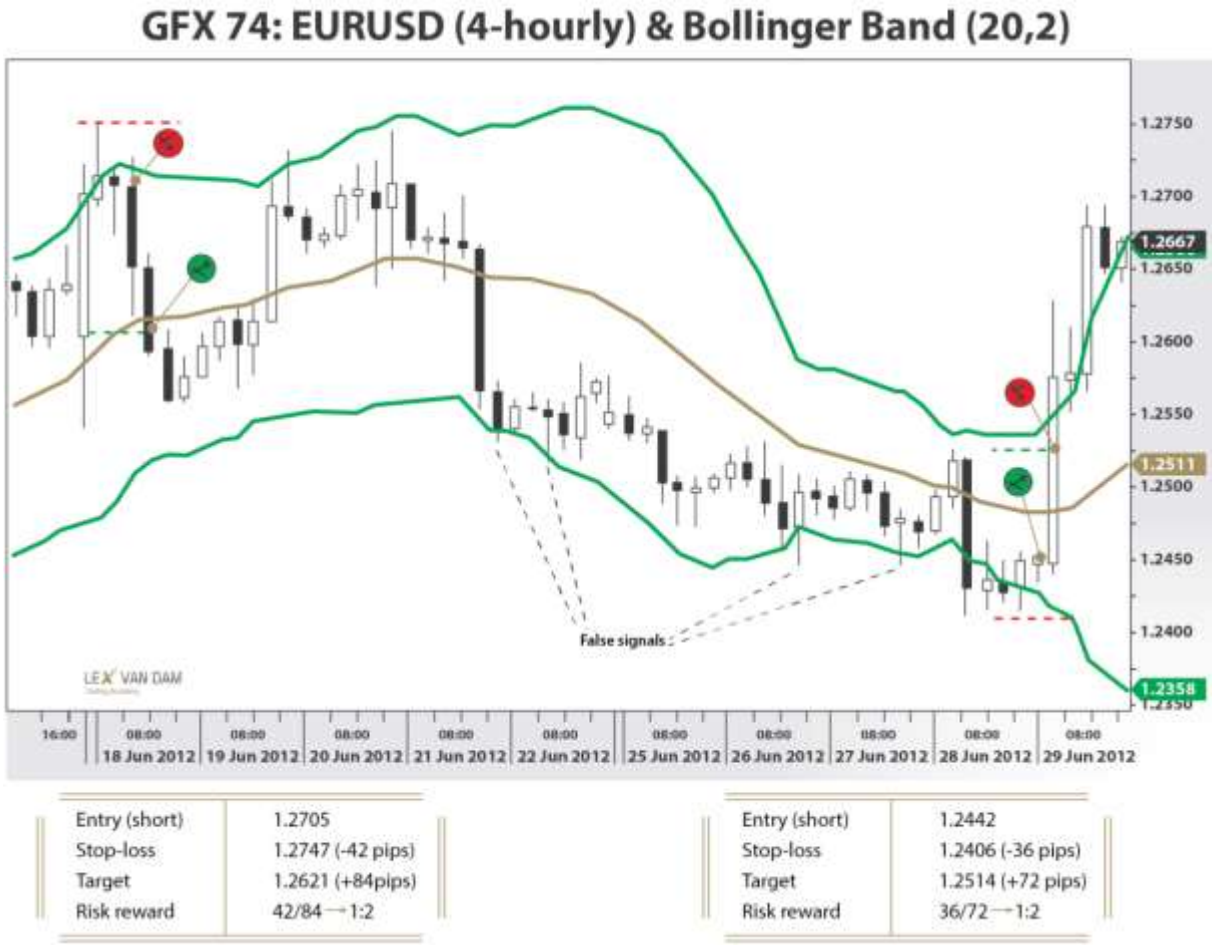


Signal	Timing	Reliability
1.- Price moves above base line	++++	+
2.- Conversion line crosses above base line	+++	++
3.- Price breaks above the cloud	++	+++
4.- Lagging span breaks above the cloud	+	++++

Bullish	Bearish
Price crosses above base line	Price crosses below base line
Conversion line crosses above base line	Conversion line crosses below base line
Price crosses above cloud	Price crosses below cloud
Fast leading span (A) crosses above slow leading	Fast leading span (A) crosses below slow leading
Lagging span closes higher than the close of 26 days ago	Lagging span closes lower than the close of 26 days ago
Lagging span crosses above cloud	Lagging span crosses below cloud

Range trade set-ups

a) Trading set-up 9: Bollinger band



Entry (short)	1.2705
Stop-loss	1.2747 (-42 pips)
Target	1.2621 (+84pips)
Risk reward	42/84 → 1:2

Entry (short)	1.2442
Stop-loss	1.2406 (-36 pips)
Target	1.2514 (+72 pips)
Risk reward	36/72 → 1:2

WORKBOOK EXERCISE: Explain the previous trading set-up.

WORKBOOK QUESTION: Why are some potential triggers (where the price trades outside the band) ignored in the previous chart?

b) Trading set-up 10: RSI divergence

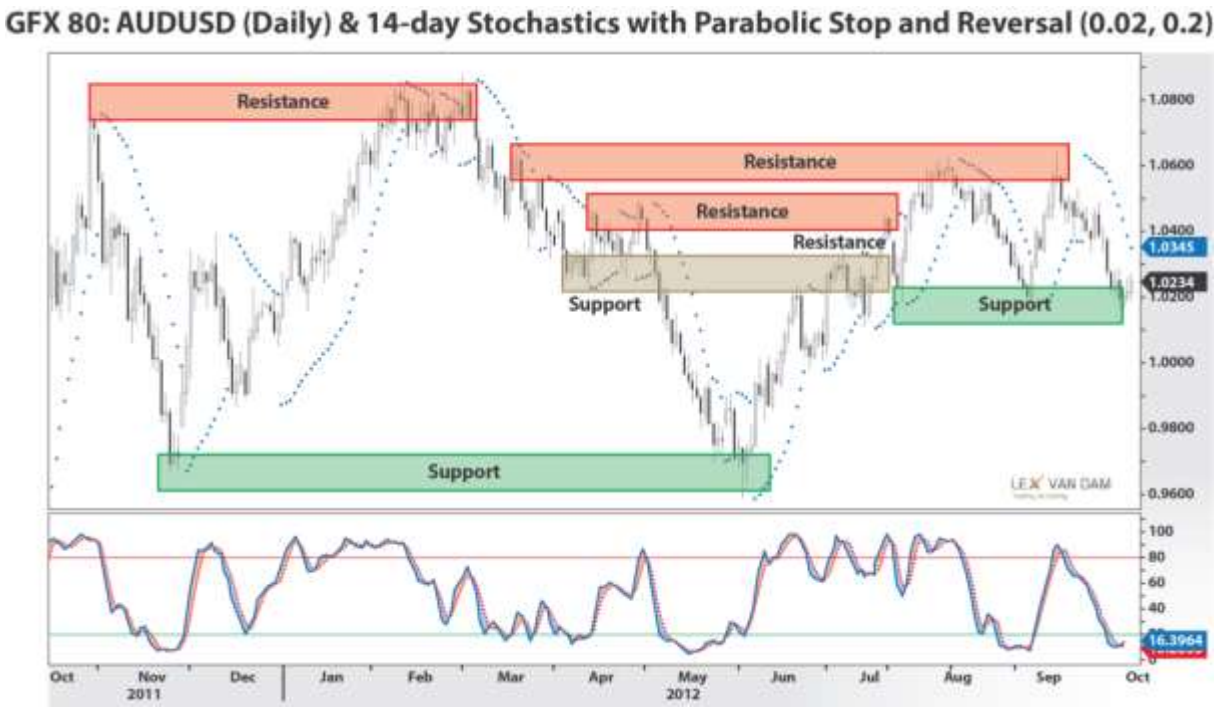
Entry (short)	1.2290
Stop-loss	1.2040 (-250 pips)
Target	1.2790 (+500 pips)
Risk reward	1:2

Entry (Long)	1.2290
Stop-loss	1.2040 (- 250 pips)
Target	1.2790 (+ 500 pips)
Risk reward	1 : 2

WORKBOOK EXERCISE: Explain the previous trading set-up.

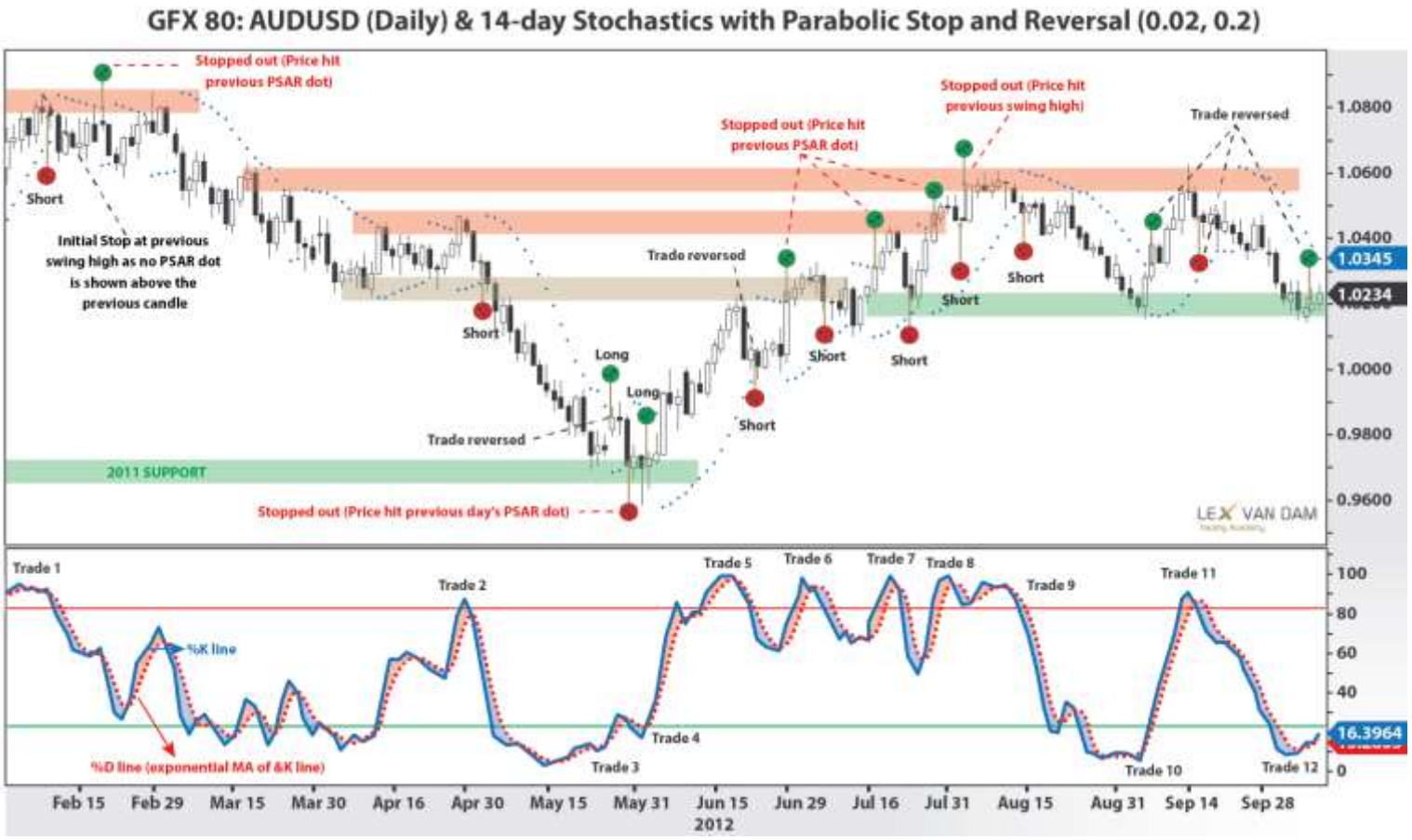
c) Trading set-up 11: Support and resistance with the stochastic oscillator & PSAR

WORKBOOK QUESTION: Why can trading support and resistance areas be ambiguous?



WORKBOOK QUESTION: Are support and resistance areas subjective?

Range trade set-ups



Assuming +2 pip spread/slippage

AUDUSD	Bias	Date	Entry	Date	Exit	Pips
Trade 1	Short	09-Feb	1.0783	20-Feb	1.0813	-30
Trade 2	Short	02-May	1.0330	28-May	0.9817	513
Trade 3	Long	28-May	0.9817	31-May	0.9698	-119
Trade 4	Long	05-Jun	0.9728	21-Jun	1.0190	462
Trade 5	Short	21-Jun	1.0190	29-Jun	1.0225	-35
Trade 6	Short	06-Jul	1.0284	18-Jul	1.0329	-45
Trade 7	Short	23-Jul	1.0354	27-Jul	1.0439	-85
Trade 8	Short	02-Aug	1.0459	02-Aug	1.0541	-82
Trade 9	Short	14-Aug	1.0516	07-Sep	1.0284	232
Trade 10	Long	07-Sep	1.0284	18-Sep	1.0473	189
Trade 11	Short	18-Sep	1.0473	10-Oct	1.0155	318
Trade 12	Long	11-Oct	1.0155			

WORKBOOK EXERCISE: Explain the previous trading set-up.

d) Trading set-up 12: False break-outs and the Turtle Soup

GFX 82: Trading near resistance

WORKBOOK QUESTION: When do trend-following strategies work well? What about reversal strategies?

WORKBOOK QUESTION: How can looking at a wider timescale help you understanding the market environment better and distinguishing between genuine and false break-outs?

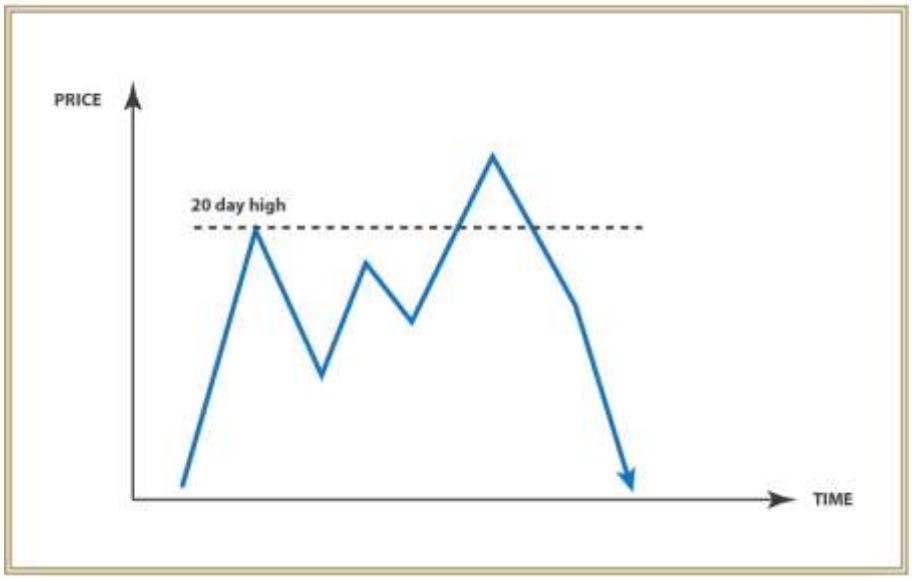
WORKBOOK QUESTION: Is it important to know if the level that is being tested or that is about to be broken stands out to other traders?

Range trade set-ups

WORKBOOK QUESTION: Can looking at other indicators help you distinguishing between genuine and false break-outs?

WORKBOOK QUESTION: Why would large players trick smaller traders into buying whilst they are selling?

GFX 84: Turtle Soup Set-up



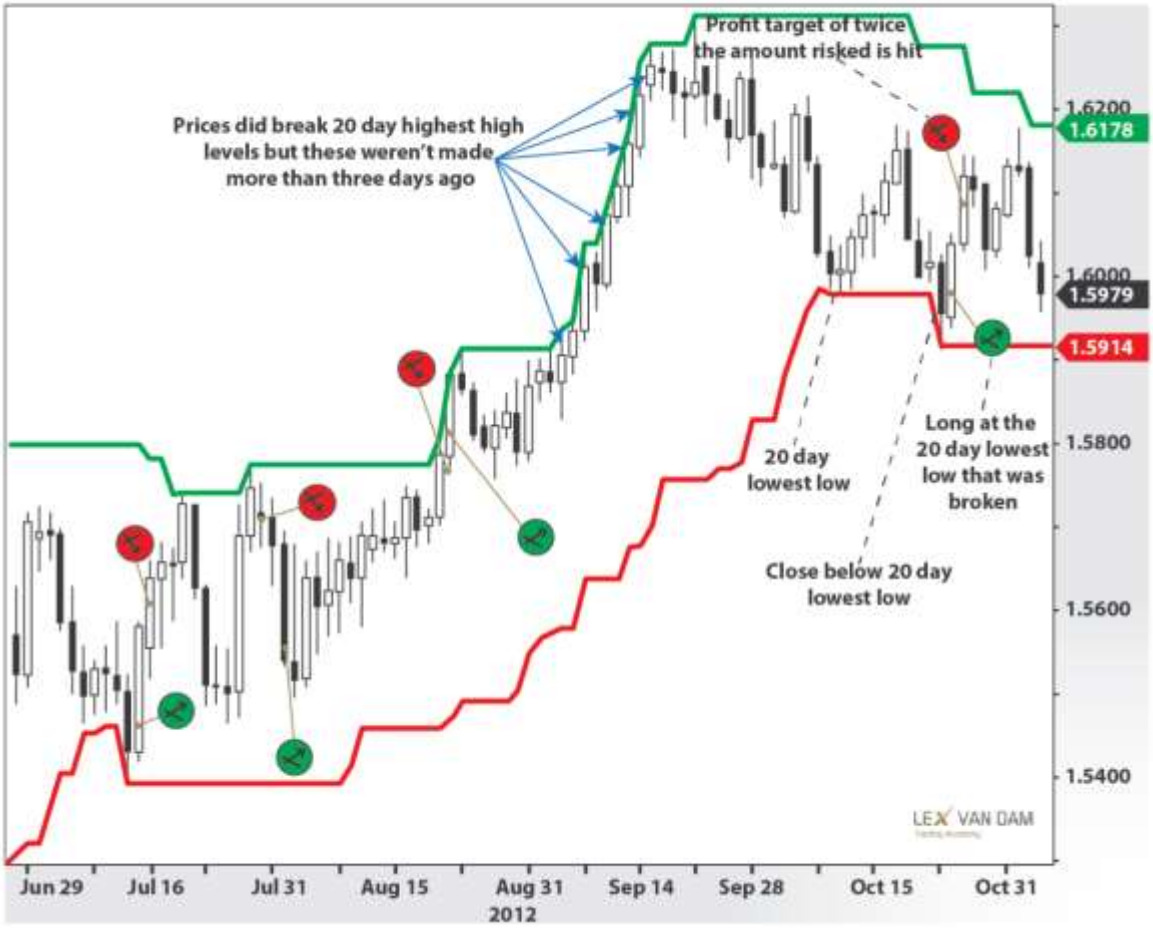
WORKBOOK EXERCISE: What happens in the previous chart?

WORKBOOK EERCISE: Complete the following table:

GFX 84: Turtle Soup Set-up

	Turtle soup long trigger	Turtle soup short trigger
Requirement 1	Price breaks below the 20 day low and closes below it	
Requirement 2		The 20 day high must have been made at least three days earlier
Entry:	On the day following the breakout, an order is placed to go long at the 20-day low level that was broken	
Stop:		Yesterday's high

GFX 85: GBPUSD (Daily) & 20 day high-low channel (Turtle Soup)



Assuming +2 pip spread/slippage

GBPUSD	Bias	Date	Entry	Stop	Date	Exit	Pips
Trade 1	Long	13 July	1.5455	1.5392	16 July	1.5581	126
Trade 2	Short	30 July	1.57305	1.57669	31 July	1.56577	73
Trade 3	Short	22 Aug	1.57649	1.58037	22 Aug	1.58037	-39
Trade 4	Long	24 Oct	1.59776	1.59127	25 Oct	1.61074	130

WORKBOOK QUESTION: During September no turtle soup trade is given even though 20 day high levels are broken. Why?

Range trade set-ups

WORKBOOK QUESTION: Does the turtle soup set-up restrict you from trading a normal trend-following strategy?

WORKBOOK QUESTION: If the trade does not get triggered on the day after the 20 day extreme level was broken, should you cancel the working order?

Conclusion

WORKBOOK QUESTION: What are the main things you look for in a plain price chart?

WORKBOOK QUESTION: Should you be careful with triggers given in the opposite direction of a strong trend?

WORKBOOK QUESTION: Should you expect volatility around large psychological levels?

WORKBOOK QUESTION: Is the complexity of a technical indicator correlated with its success rate?

WORKBOOK QUESTION: Should you always trade with a stop?

Appendix A: The Fix

Let me explain what the fix means. Because currencies trade 24 hours a day there is never a real closing price like there is with equities. However, companies and financial institutions want one single price at which they can value their currency holdings and at which they can trade or swap currencies at.

That is why there is a company that calculates a standardized rate every day creating a global benchmark to value currencies at. It is derived from what is called the 4pm London fix and the rates obtained are the ones you can see for example in the Financial Times.

A fix rate is simply a price which serves as a reference rate. So the 4pm London fix is just the price at which a currency pair trades at 4pm UK time. As you might know, most of FX trading happens during the London session. This could be explained due to its strategic location as it links Asia with America whilst markets in Europe, Middle East and Africa are open at the same time as well.

So, if a large Japanese company wants to buy 100 million euros it might instruct their broker to do it at the 4pm fix rate. The company promises to use the euro-yen rate at 4PM to pay for their euros. If the Japanese company places this order at 1pm UK time, their broker could actually buy the euros before the fix time if they expect the euro to trade higher at 4PM- they could buy them cheap and sell them at a higher price to the Japanese company.

However this does normally not happen. It would involve too much risk exposure for the broker because the euro-yen could also trade lower at 4PM and the broker would have to absorb the losses. So normally these orders are executed at or very close to the fixing time which of course could potentially create additional volatility. Especially if large orders unknown to other market participants are placed.

The coverage of this closing rate benchmark includes 159 currencies and for some currencies such as the euro, pound sterling or the Australian dollar, intra-day fix rates are also calculated every 30 minutes. For other currencies for which offshore trading is not permitted such as the Chinese yuan or the Indonesian rupiah, intra-day rates are published in line with their local market levels. So if the market does not trade, no changes in fix rates are given.

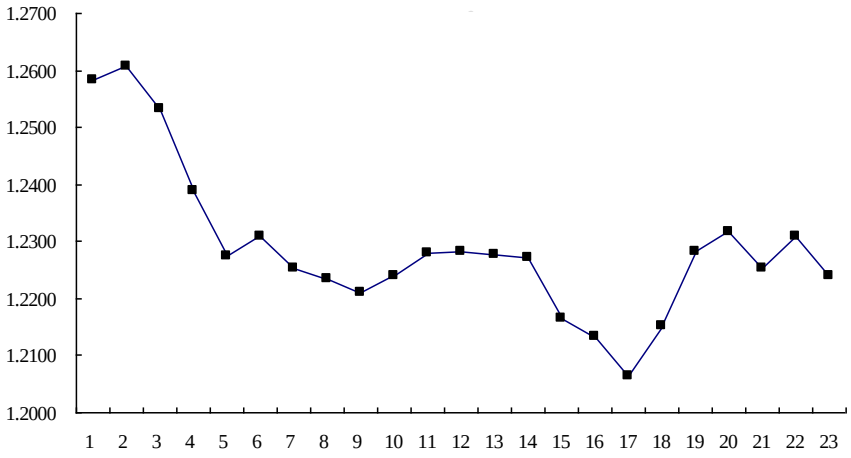
Although the 4pm London closing fix rate is a globally accepted benchmark, other institutions might also have their own fixing rates. For example the ECB uses FX rates as of 2.15 PM CET as their reference rate. This is because European central banks normally do their daily "concertation" procedures between other central banks across Europe and worldwide at that time. There is also another London fix rate at 11.00 AM which might be a bit more convenient for Asian corporations. So as you see, it is important to be aware of these different fixing times as it could potentially cause significant intra-day movements.

Appendix B: Japanese candlesticks and technical terms as seen in 5-Step-**Trading® Stocks**

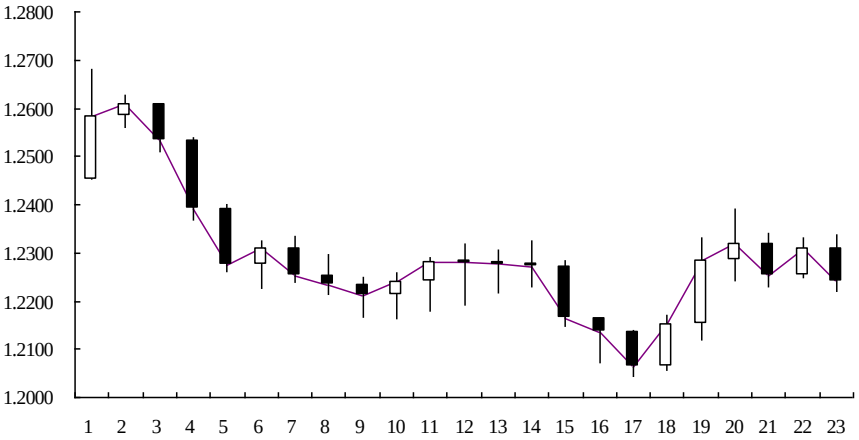
- Daily line charts only plot the closing price of each day without showing where the price has been trading during the day.

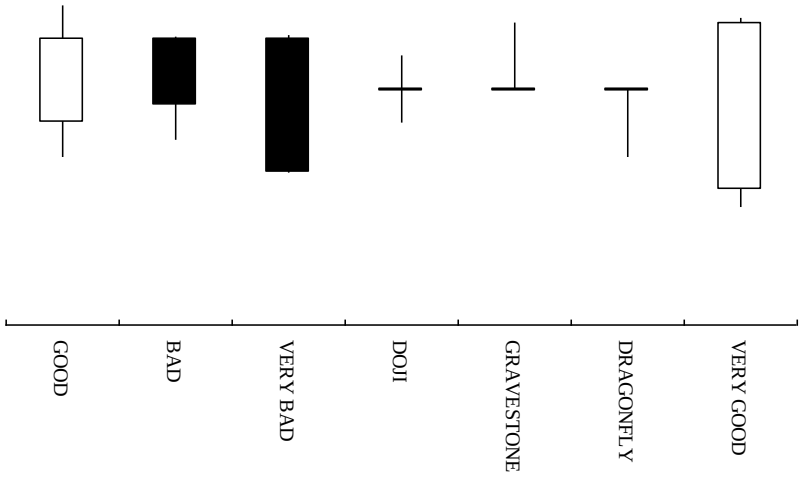
- Candlesticks do plot this additional information by showing the highest and lowest level at which the price has traded at and as well the opening and closing prices.

EURUSD - Line Chart



EURUSD - Candlestick & Line chart



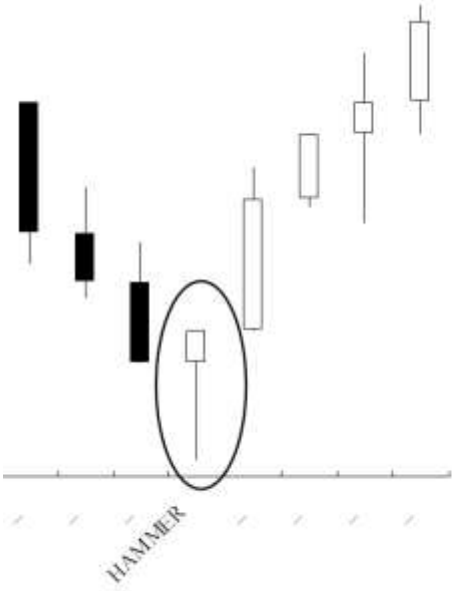


- Candle 1, good: the price closed higher than where it opened.
- Candle 2, bad: the price closed lower than where it opened.
- Candle 3, very bad: the price barely traded above the opening price and closed pretty much at the low.
- Candle 4, doji: the price opened and closed at the same level but traded above and below it. This normally indicates indecision as neither sellers or buyers have been able to dominate the price action.
- Candle 5, gravestone doji: this is a negative candle because the price traded above the open but sellers stepped in and pushed the price back down.
- Candle 6, dragonfly doji: this is a positive candle because the price traded below the open but buyers stepped in pushing the price back up.
- Candle 7, very good: the price barely traded below the open and closed pretty much at the high.

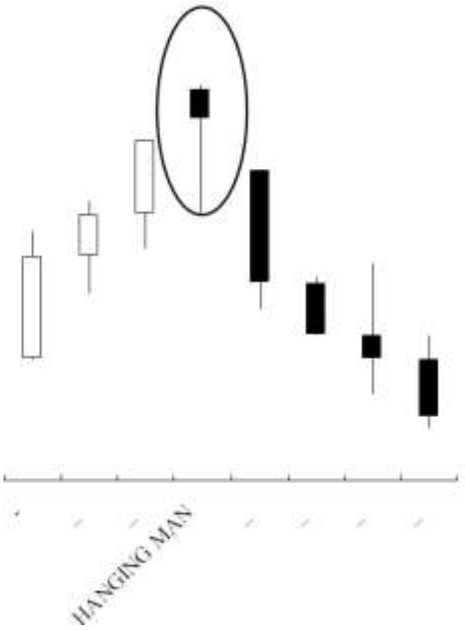
- Most of the candlestick patterns seen in 5-Step-Trading® Stocks are not really applicable to the FX markets. This is because in FX, the open of a candle is almost always the same as the close of the previous candle since the market only closes over the weekend.

- These two patterns from 5-Step-Trading® Stocks are probably the only ones worth mentioning here:

The Hammer (bullish)



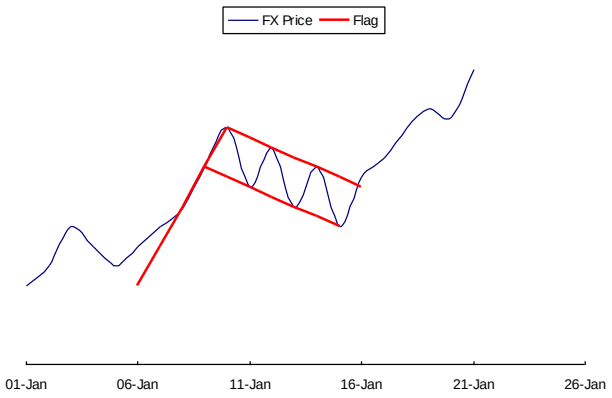
The Hanging Man (bearish)

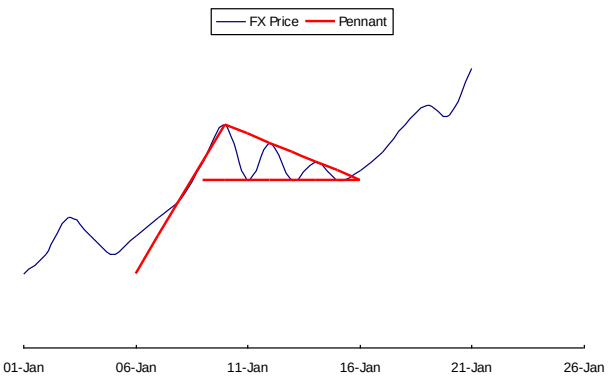


- Continuation price patterns: These patterns are usually followed by a break-out into the direction of the previous trend.

    - The flag resembles a downward sloping rectangle marked by two parallel trend lines.

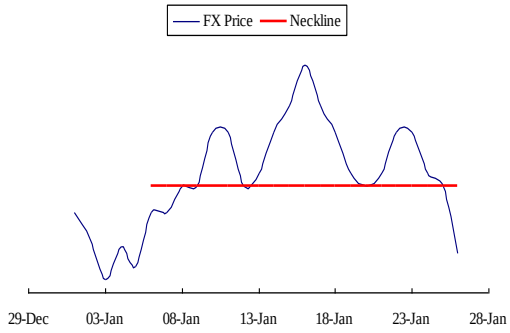
    - The pennant is a downward sloping pattern but instead of a rectangle it looks like a vertical triangle.

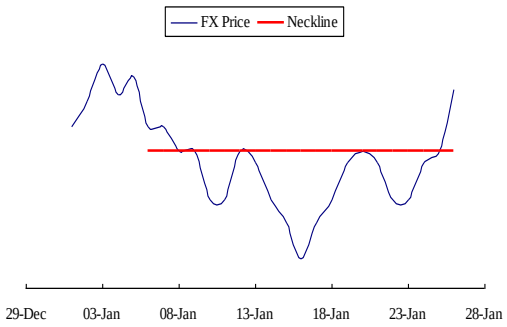




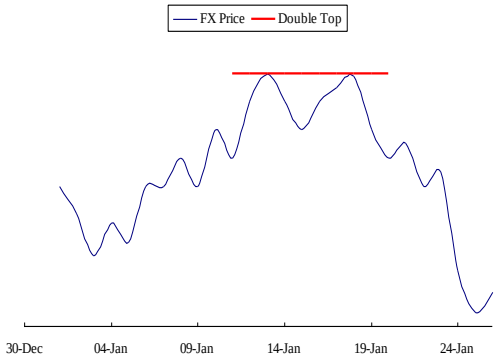
- Reversal price patterns: These patterns often indicate the end of a trend and signal to a potential reversal.

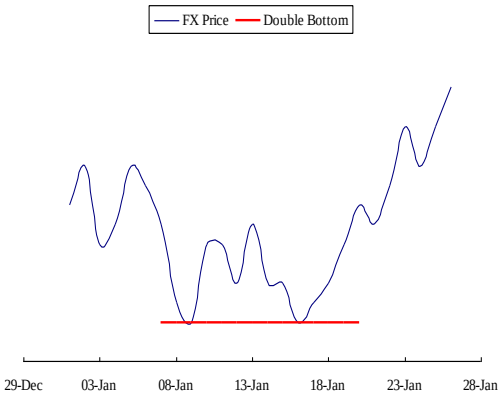
    - Head and shoulders / inverted head and shoulders



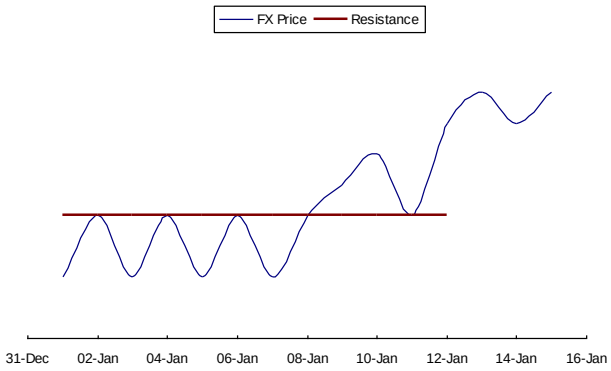


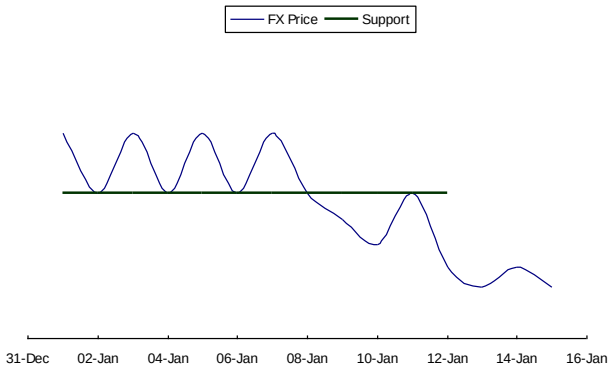
    - Double top /double bottom





- When a resistance level is broken, buyers overwhelm sellers and normally an explosive move is observed. If the price retraces back to this level, traders who have missed the initial break-out might step in as it constitutes a good buying opportunity thus establishing a support level from what was initially a resistance level. The exact same opposite would apply for a broken support level that becomes resistance as sellers dominate buyers and sell at the broken support level.





Appendix C: Fibonacci retracement levels

The Fibonacci sequence starts with the sum of 0 and 1 and each subsequent number is the sum of the previous two:

0
1
1(0+1)
2 (1+1)
3 (1+2)
5 (2+3)
8 (3+5)
13 (5+8)
21 (8+13)
34 (13+21)
55 (21+34)
89 (34+55)
144 (55+89)
233 (89+144)
377 (144+233)
etc.

When a Fibonacci number is divided by the previous number, the golden ratio is obtained which is 1.618 (this does not happen at the beginning of the sequence as the Fibonacci numbers are very small but as they become larger they converge towards this golden ratio).

377/233 = 1.618
233/144 = 1.618
144/89 = 1.618

This golden ratio is reflected in the dimensions of many objects such as credit cards, paper sheets, playing cards and televisions. But it is also present in our DNA and human proportions and also rules architecture, music, nature and even the financial markets. It clearly is a very important number in nature and in our daily lives and potentially in the life of a trader as well.

The Fibonacci retracement levels are obtained by connecting a swing low with a swing high in an uptrend or a swing high with a swing low in a downtrend. This distance then is standardized and the 100% is successively divided by the golden ratio obtaining the following three Fibonacci retracement levels. These are the levels to which the price potentially could retrace to before resuming the original trend.

100/1.618 = 61.8%
61.8/1.618 = 38.2%
38.2/1.618 = 23.6%

Fibonacci retracement levels often include the 50% as well which is the midpoint between the swing low and high. Also, some trading platforms include one of the following two levels:

- The 76.4% retracement level which is the mirror level of the 23.6% retracement level (100-23.6).
- The 76.8% retracement level which is the square root of 61.8%.

The choice really depends on the trader and the platform. However since these last two levels are pretty close to each other some traders might use both levels to determine an area instead of using the exact numbers.

Appendix D: Relative Strength Index

The RSI indicator compares average gains to average losses and is obtained in the following way.

Let's assume for illustrative reasons, that the period for our RSI indicator is 4 days. In the table below day 2 had an up-close because it closed 4 points higher than the previous day's close and day 5 was also an up-day because it closed two points higher than the previous day's close. So in total, during this 4 day period there were 2 up-days with an up-move of 6 points in total. Day 3 and 4 were both down days as they both closed a point lower respective to their previous close.

	Close	UP	DOWN
Day 1	99	NA	NA
Day 2	103	4	
Day 3	102		1
Day 4	101		1
Day 5	103	2	

The average gain in this example would be 1.5 points whereas the average loss would be 0.5 points. These figures are obtained by dividing the total up-movements (6points) and the total down-movements (2points) by 4 (and not 2!) which was the specified period for our four day RSI indicator.

$$\text{Total gains} = 6 \rightarrow \text{Average} = \frac{6}{4} = 1.5$$

$$\text{Total losses} = 2 \rightarrow \text{Average} = \frac{2}{4} = 0.5$$

If we had been interested in the 14 day RSI, which is the most common default setting for the RSI, we would have to calculate the total up and down-movements during the last 14 days and divide the two sums by 14.

The ratio between the average gain and the average loss is called the Relative Strength. Following our 4-day RSI example, it would be 1.5 divided by 0.5 which equals 3:

$$RS = \frac{\text{Average gains}}{\text{Average losses}} = \frac{1.5}{0.5} = 3$$

To transform the Relative Strength into the Relative Strength Indicator the following formula is applied:

$$\boxed{\text{RSI} = 100 - \frac{100}{1 + \text{RS}}}$$

When average gains are larger than average losses, the RS will be larger than 1 and the divisor in the RSI formula will be larger which of course gives a smaller quotient. Since the quotient is small, the amount deducted from 100 is also small giving a high RSI number. If we use the RS from our example, the RSI would equal 75:

Average gains > Average losses	RS > 1	i.e. $\text{RSI} = 100 - \frac{100}{1+3} = 100 - 25 = 75$

If average gains are smaller than average losses, then the amount added to the divisor will be smaller than 1 giving a larger quotient. As a result, the amount deducted from 100 will be larger. Assume for example that average losses were 4 points and average gains only 1. This would give a Relative Strength of 0.25. When this is substituted into the RSI formula, we would obtain a value of 20 for the RSI.

$$\text{RS} = \frac{\text{Average gains}}{\text{Average losses}} = \frac{1}{4} = 0.25$$

Average gains < Average losses	RS < 1	i.e. $\text{RSI} = 100 - \frac{100}{1+0.25} = 100 - 80 = 20$

So low values of the RSI indicator ultimately mean that average losses have outweighed average gains and that the price has been declining more than it has gone up. High values indicate the exact opposite: average gains have been larger than average losses and the price has been moving up more than it has been going down.

Appendix E: Stochastic Oscillator

The Stochastic oscillator shows where a price has closed compared to its most recent high and low over a specific period of time (a commonly used default setting is 14 periods or days). The formula is the following:

$$\%K = \frac{\text{current close} - \text{lowest low}}{\text{highest high} - \text{lowest low}} \times 100$$

If the current close is equal to the lowest low you would obtain a result of 0 because the numerator would be null and null divided by any number is null. If the current close would be equal to the highest high, the numerator and the divisor would match giving a result of 100.

So as you can see, the stochastic oscillator fluctuates between 0 and 100. Low values indicate that the current close is nearer to the lowest low than it is to the highest high made during the specific period and high values indicate the exact opposite and signal that the current close is nearer to the highest high as opposed to the lowest low.

Low values	Current close is near the lowest low made during the specified period.
High values	Current close is near the highest high made during the specified period.

The stochastic oscillator is often accompanied by an exponential moving average to spot sudden changes in direction and generate triggers as you will see or might have seen already in the actual trading set-ups bit of this module. The exponential moving average is normally a three day period and follows the %K line closely.

Appendix F: Bollinger Band

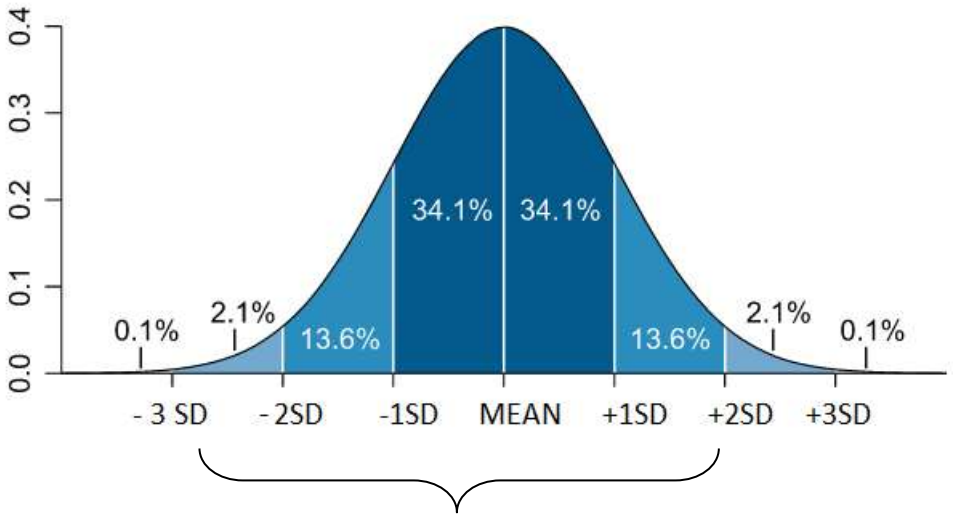
The default setting for the Bollinger band is a 20 period moving average with a band around it. This band is based on a measure of dispersion called the standard deviation which shows how far values deviate on average from their mean (in our case how far prices closed on average from their 20 period average closing price).

The upper line of the band is the moving average plus two standard deviations and the lower line shows the moving average minus two standard deviations.

Bollinger Band	=	20 day MA + Band
Width of the band	=	+/- two standard deviations
Standard deviation	=	a measure of dispersion (how far values lie from the mean) (how far prices closed from the moving average)

According to probability theory about 95% of the times a price would close within the band that is if price returns are normally distributed. Even if we can not make these assumptions, we can still conclude that 75% of the times prices should close within the band (using the so-called Chebyshev's inequality) which is still a pretty significant amount.

Assuming price returns follow a normal distribution:



$13.6+34.1+34.1+13.6 \approx 95\%$

Therefore, closing outside the band would be considered a fairly rare event and as a result, the two lines that constitute the actual band are seen as important support and resistance areas.

Finally, if prices remain near their moving average, the standard deviation will become smaller and consequently the band will become narrower. So when prices are consolidating you will see a very tight band whereas when prices are moving with a lot of momentum and are closing far from their 20 day moving average, the band will get wider.

Appendix G: Average Directional Index (ADX)

The average directional index (ADX) is an indicator created by J. Welles Wilder. This indicator can be used to distinguish trending markets from ranging markets. Normally higher values than 20 indicate a trending market whereas values below it signal to directionless market.

In order to calculate it, you need to obtain the true range and two directional movement indicators first.

The True Range (TR) for any given day is the largest of the:

- distance between today's high and today's low
- distance between today's high and yesterdays close, or
- distance between today's low and yesterday's close

The directional movement is the largest part of today's range that is outside yesterday's range. If this largest part is above yesterday's range then the directional movement has been positive (Plus Directional Movement, +DM) and if it is below, it has been negative (Minus Directional Movement, -DM).

In order to obtain these directional movements, you need to know by how much today's range is above and below yesterday's range by calculating the up and down-movement respectively and comparing these with each other:

Up-move = today's high – yesterday's high
Down-move= yesterday's low -today's low

If the up-move is greater than zero and larger than the down-move, the plus directional movement (+DM) equals the up move, otherwise it is zero:

- If up-move>down-move then +DM=up-move otherwise +DM=0.

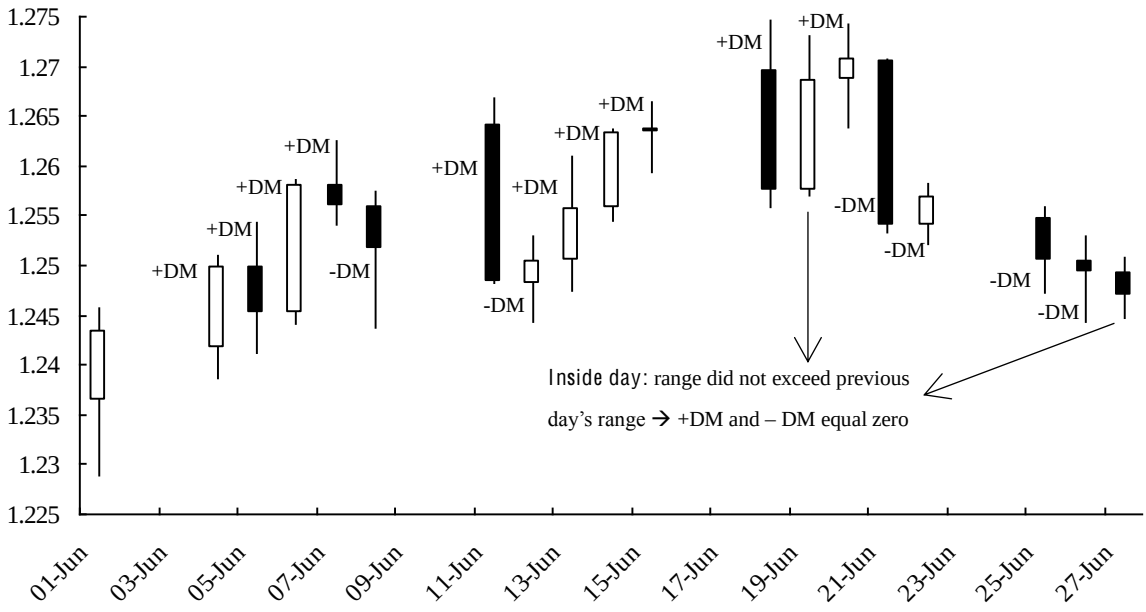
If the down move is greater than zero and larger than the up-move, the minus directional movement (-DM) equals the down-move, otherwise it is zero:

- If down-move>up-move then –DM=down-move otherwise –DM=0

The following table and chart might help you understand these concepts and calculations a bit better:

EURUSD	HIGH	LOW	CLOSE	TR_1	Up-Move	Down-move	$+DM_1$	$-DM_1$
2012.06.01	1.2457	1.2288	1.2434					
2012.06.04	1.2509	1.2385	1.2498	0.0124	0.0052	-0.0097	0.0052	0
2012.06.05	1.2542	1.241	1.2452	0.0132	0.0033	-0.0025	0.0033	0
2012.06.06	1.2585	1.244	1.2581	0.0145	0.0043	-0.003	0.0043	0
2012.06.07	1.2625	1.2539	1.2559	0.0086	0.004	-0.0099	0.004	0
2012.06.08	1.2574	1.2435	1.2516	0.0139	-0.0051	0.0104	0	0.0104
2012.06.11	1.2668	1.248	1.2482	0.0188	0.0094	-0.0045	0.0094	0
2012.06.12	1.2529	1.2442	1.2503	0.0087	-0.0139	0.0038	0	0.0038
2012.06.13	1.261	1.2473	1.2556	0.0137	0.0081	-0.0031	0.0081	0
2012.06.14	1.2636	1.2542	1.2632	0.0094	0.0026	-0.0069	0.0026	0
2012.06.15	1.2664	1.2591	1.2637	0.0073	0.0028	-0.0049	0.0028	0
2012.06.18	1.2747	1.2556	1.2575	0.0191	0.0083	0.0035	0.0083	0
2012.06.19	1.273	1.2568	1.2685	0.0162	-0.0017	-0.0012	0	0
2012.06.20	1.2743	1.2637	1.2707	0.0106	0.0013	-0.0069	0.0013	0
2012.06.21	1.2707	1.2531	1.254	0.0176	-0.0036	0.0106	0	0.0106
2012.06.22	1.2583	1.2519	1.2568	0.0064	-0.0124	0.0012	0	0.0012
2012.06.25	1.2558	1.2471	1.2503	0.0097	-0.0025	0.0048	0	0.0048
2012.06.26	1.253	1.2441	1.2492	0.0089	-0.0028	0.003	0	0.003
2012.06.27	1.2508	1.2445	1.2468	0.0063	-0.0022	-0.0004	0	0

EURUSD



The next step is to add together 14 days of the true range and the directional movements:

EURUSD	TR_1	$+DM_1$	$-DM_1$
2012.06.01			
2012.06.04	0.0124	0.0052	0
2012.06.05	0.0132	0.0033	0
2012.06.06	0.0145	0.0043	0
2012.06.07	0.0086	0.004	0
2012.06.08	0.0139	0	0.0104
2012.06.11	0.0188	0.0094	0
2012.06.12	0.0087	0	0.0038
2012.06.13	0.0137	0.0081	0
2012.06.14	0.0094	0.0026	0
2012.06.15	0.0073	0.0028	0
2012.06.18	0.0191	0.0083	0
2012.06.19	0.0162	0	0
2012.06.20	0.0106	0.0013	0
2012.06.21	0.0176	0	0.0106

TR_{14}	$+DM_{14}$	$-DM_{14}$	
0.184	0.0493	0.0248	← Sum of 14 days

Once the first row of TR_{14}, $+DM_{14}$ and $-DM_{14}$ is calculated, an accumulation technique is used for the following rows of data. This technique has a smoothening effect and made the computation much easier when these were done manually because it eliminated the need of keeping a record of the previous 14 day's of data. The accumulation technique takes the previous day's data, deducts a 14^{th} part of it which and replaces that with today's value.

$$\text{Today's}_{TR_{14}} = \text{Previous}_{TR_{14}} - \frac{\text{Previous}_{TR_{14}}}{14} + \text{Today's}_{TR_1}$$

$$\text{Today's}_{+DM_{14}} = \text{Previous}_{+DM_{14}} - \frac{\text{Previous}_{+DM_{14}}}{14} + \text{Today's}_{+DM_1}$$

$$\text{Today's}_{-DM_{14}} = \text{Previous}_{-DM_{14}} - \frac{\text{Previous}_{-DM_{14}}}{14} + \text{Today's}_{-DM_1}$$

EURUSD	TR_1	$+DM_1$	$-DM_1$	TR_{14}	$+DM_{14}$	$-DM_{14}$	
2012.06.21	0.0176	0	0.0106	0.1840	0.0493	0.0248	← Sum of 14 days
2012.06.22	0.0064	0	0.0012	0.1773	0.0458	0.0242	
2012.06.25	0.0097	0	0.0048	0.1743	0.0425	0.0273	
2012.06.26	0.0089	0	0.003	0.1707	0.0395	0.0283	
2012.06.27	0.0063	0	0	0.1649	0.0367	0.0263	
2012.06.28	0.0117	0	0.0038	0.1648	0.0340	0.0282	
2012.06.29	0.026	0.0168	0	0.1790	0.0484	0.0262	
2012.07.02	0.0112	0	0	0.1774	0.0449	0.0244	
2012.07.03	0.0067	0	0.0009	0.1714	0.0417	0.0235	

Smoothening effect

The next step is to construct the Directional Index (DI): the +DM14 and –DM14 are divided by the true range and multiplied by 100. This is to express the directional movement as a percentage of the true range and to standardize the variables.

$$+\mathrm{DI} = \frac{+\mathrm{DM}_{14}}{\mathrm{TR}_{14}} \times 100 \quad ; \quad -\mathrm{DI} = \frac{-\mathrm{DM}_{14}}{\mathrm{TR}_{14}} \times 100$$

+ DI = percentage of the total true range of the previous 14 days which was up.

- DI = percentage of the total true range of the previous 14 days which was down.

EURUSD	TR_{14}	$+DM_{14}$	$-DM_{14}$	+DI	-DI
2012.06.21	0.1840	0.0493	0.0248	26.8	13.5
2012.06.22	0.1773	0.0458	0.0242	25.8	13.7
2012.06.25	0.1743	0.0425	0.0273	24.4	15.7
2012.06.26	0.1707	0.0395	0.0283	23.1	16.6
2012.06.27	0.1649	0.0367	0.0263	22.2	16.0
2012.06.28	0.1648	0.0340	0.0282	20.7	17.1
2012.06.29	0.1790	0.0484	0.0262	27.0	14.7
2012.07.02	0.1774	0.0449	0.0244	25.3	13.7
2012.07.03	0.1714	0.0417	0.0235	24.3	13.7

So the +DI of the first row tells us that 26.8% of the true range for the past 14 days was up and 13.5% of the true range was down. So in total, 40.3% (26.8+13.5) of the true range was either up or down and 59.7% (100 - 40.3) of it was non directional.

In order to calculate the Directional Movement Index (DX) the difference between these two directional indexes is calculated and divided by the sum of the directional indexes. As a result, the DX shows if there is a large distance between the two directional indexes or not. A large difference would indicate that prices have been moving more towards one particular direction whereas a small difference would indicate a ranging market.

$$\text{Directional Movement Index}(\mathrm{DX}) = \frac{\text{absolute difference between the two directional indexes}}{\text{sum of the two directional indexes}} \times 100 =$$

$$= \frac{|\text{plusDI} - \text{minusDI}|}{\text{plusDI} + \text{minusDI}} \times 100$$

Finally, the Average Directional Index (ADX) can be otabined. As the name indicates is an average of the DX. The first value for the ADX would be a 14 day average of the DX and the following values would be calculated with the following smoothening technique which also made computation easier when it was done manually:

$$\text{Today's ADX} = \frac{\text{Previous ADX} \times 13 + \text{Today's DX}}{14}$$

EURUSD	+DI	-DI	DX	ADX
2012.06.21	26.8	13.5	33.1	
2012.06.22	25.8	13.7	30.8	
2012.06.25	24.4	15.7	21.8	
2012.06.26	23.1	16.6	16.4	
2012.06.27	22.2	16.0	16.4	
2012.06.28	20.7	17.1	9.3	
2012.06.29	27.0	14.7	29.7	
2012.07.02	25.3	13.7	29.7	
2012.07.03	24.3	13.7	27.9	
2012.07.04	22.9	15.9	18.0	
2012.07.05	20.6	22.6	4.7	
2012.07.06	19.0	26.7	16.9	
2012.07.09	18.2	25.8	17.3	
2012.07.10	17.2	25.6	19.7	20.84
2012.07.11	16.3	25.7	22.4	20.95
2012.07.12	15.4	27.2	27.6	21.43
2012.07.13	15.0	25.6	26.0	21.75
2012.07.16	16.0	23.8	19.5	21.59
2012.07.17	16.4	21.9	14.2	21.06
2012.07.18	15.5	20.6	14.2	20.57
2012.07.19	15.7	19.4	10.5	19.85

Average of 14 days

Smoothening technique

So to summarise, the first step involves calculating the true range (TR) and selecting the largest part of each day's range that is outside the previous day's range obtaining the plus and minus directional movements (+DM and -DM).

Then, the first 14 values of the true range and the directional movements (TR, +DM and –DM) are summed up for each group of data and a smoothening accumulation technique is used for the successive values (TR_{14} $+DM_{14}$ and $-DM_{14}$).

The following step involves standardizing these directional movements so that they only can move between 0 and 100 percent because they are in absolute terms and will vary from instrument to instrument. This is done by dividing each directional movement by the true range which gives the plus and minus directional indexes (+DI and -DI).

The +DI and –DI tell what percentage of the true range was up and down for the previous 14 days respectively. These two directional indexes are often plotted together with the ADX indicator and can be used to generate buy and sell signals when they cross over.

Finally, the directional movement index (DX) measures the gap between the positive and negative directional index as a percentage of the total directional move. So if the +DI is very large and the –DI small or the –DI is very large and the +DI small, the DX will give a large value indicating that there has been a directional movement. The higher this value, the stronger this directional movement. Note that it does not distinguish between a large up or down directional move. It simply tells if a market has been trending or not. If the +DI and –DI are similar, than the DX will have a low value which means that prices have been moving sideways and no clear direction of movement was defined.

The ADX is an average of the DX and therefore smoothens the volatility which could be observed in the value of the DX however the interpretation remains the same.

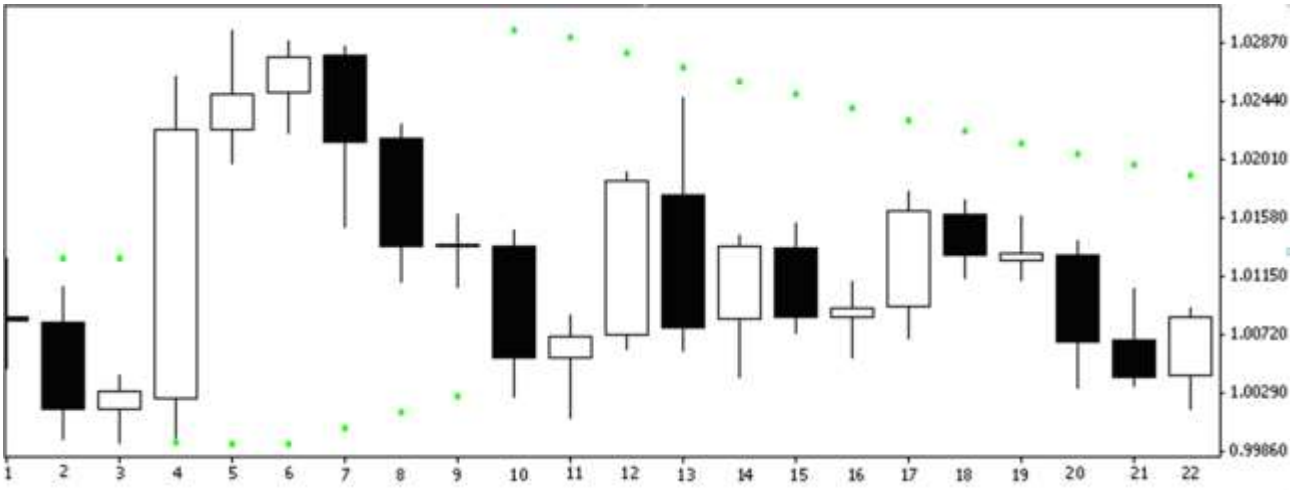
EURUSD	HIGH	LOW	CLOSE	TR	Up- move	Down-move	+DM	-DM	TR_{14}	$+DM_{14}$	$-DM_{14}$	+DI14	-DI14	DX	ADX
2012.06.01	1.2457	1.2288	1.2434												
2012.06.04	1.2509	1.2385	1.2498	0.0124	0.0052	-0.0097	0.0052	0							
2012.06.05	1.2542	1.241	1.2452	0.0132	0.0033	-0.0025	0.0033	0							
2012.06.06	1.2585	1.244	1.2581	0.0145	0.0043	-0.003	0.0043	0							
2012.06.07	1.2625	1.2539	1.2559	0.0086	0.004	-0.0099	0.004	0							
2012.06.08	1.2574	1.2435	1.2516	0.0139	-0.0051	0.0104	0	0.0104							
2012.06.11	1.2668	1.248	1.2482	0.0188	0.0094	-0.0045	0.0094	0							
2012.06.12	1.2529	1.2442	1.2503	0.0087	-0.0139	0.0038	0	0.0038							
2012.06.13	1.261	1.2473	1.2556	0.0137	0.0081	-0.0031	0.0081	0							
2012.06.14	1.2636	1.2542	1.2632	0.0094	0.0026	-0.0069	0.0026	0							
2012.06.15	1.2664	1.2591	1.2637	0.0073	0.0028	-0.0049	0.0028	0							
2012.06.18	1.2747	1.2556	1.2575	0.0191	0.0083	0.0035	0.0083	0							
2012.06.19	1.273	1.2568	1.2685	0.0162	-0.0017	-0.0012	0	0							
2012.06.20	1.2743	1.2637	1.2707	0.0106	0.0013	-0.0069	0.0013	0							
2012.06.21	1.2707	1.2531	1.254	0.0176	-0.0036	0.0106	0	0.0106	0.1840	0.0493	0.0248	26.8	13.5	33.1	
2012.06.22	1.2583	1.2519	1.2568	0.0064	-0.0124	0.0012	0	0.0012	0.1773	0.0458	0.0242	25.8	13.7	30.8	
2012.06.25	1.2558	1.2471	1.2503	0.0097	-0.0025	0.0048	0	0.0048	0.1743	0.0425	0.0273	24.4	15.7	21.8	
2012.06.26	1.253	1.2441	1.2492	0.0089	-0.0028	0.003	0	0.003	0.1707	0.0395	0.0283	23.1	16.6	16.4	
2012.06.27	1.2508	1.2445	1.2468	0.0063	-0.0022	-0.0004	0	0	0.1649	0.0367	0.0263	22.2	16.0	16.4	
2012.06.28	1.2524	1.2407	1.2442	0.0117	0.0016	0.0038	0	0.0038	0.1648	0.0340	0.0282	20.7	17.1	9.3	
2012.06.29	1.2692	1.2432	1.2666	0.026	0.0168	-0.0025	0.0168	0	0.1790	0.0484	0.0262	27.0	14.7	29.7	
2012.07.02	1.268	1.2568	1.2576	0.0112	-0.0012	-0.0136	0	0	0.1774	0.0449	0.0244	25.3	13.7	29.7	
2012.07.03	1.2626	1.2559	1.2607	0.0067	-0.0054	0.0009	0	0.0009	0.1714	0.0417	0.0235	24.3	13.7	27.9	
2012.07.04	1.2607	1.2508	1.2527	0.0099	-0.0019	0.0051	0	0.0051	0.1691	0.0388	0.0269	22.9	15.9	18.0	
2012.07.05	1.2538	1.2363	1.2391	0.0175	-0.0069	0.0145	0	0.0145	0.1745	0.0360	0.0395	20.6	22.6	4.7	
2012.07.06	1.2401	1.226	1.2288	0.0141	-0.0137	0.0103	0	0.0103	0.1762	0.0334	0.0470	19.0	26.7	16.9	
2012.07.09	1.2324	1.2256	1.2312	0.0068	-0.0077	0.0004	0	0.0004	0.1704	0.0310	0.0440	18.2	25.8	17.3	20.84
2012.07.10	1.2333	1.2235	1.2249	0.0098	0.0009	0.0021	0	0.0021	0.1680	0.0288	0.0430	17.2	25.6	19.7	20.95
2012.07.11	1.2296	1.2212	1.2238	0.0084	-0.0037	0.0023	0	0.0023	0.1644	0.0268	0.0422	16.3	25.7	22.4	21.43
2012.07.12	1.2248	1.2166	1.2203	0.0082	-0.0048	0.0046	0	0.0046	0.1609	0.0248	0.0438	15.4	27.2	27.6	21.75
2012.07.13	1.2256	1.2162	1.2249	0.0094	0.0008	0.0004	0.0008	0	0.1588	0.0239	0.0407	15.0	25.6	26.0	21.59
2012.07.16	1.2289	1.2175	1.2272	0.0114	0.0033	-0.0013	0.0033	0	0.1588	0.0255	0.0378	16.0	23.8	19.5	21.06
2012.07.17	1.2316	1.2188	1.2294	0.0128	0.0027	-0.0013	0.0027	0	0.1603	0.0263	0.0351	16.4	21.9	14.2	20.57
2012.07.18	1.2306	1.2216	1.2283	0.009	-0.001	-0.0028	0	0	0.1578	0.0245	0.0326	15.5	20.6	14.2	19.85
2012.07.19	1.2324	1.2229	1.228	0.0095	0.0018	-0.0013	0.0018	0	0.1561	0.0245	0.0302	15.7	19.4	10.5	21.43
2012.07.12	1.2248	1.2166	1.2203	0.0082	-0.0048	0.0046	0	0.0046	0.1609	0.0248	0.0438	15.4	27.2	27.6	

Appendix H: Parabolic Stop and Reversal (PSAR)

The parabolic stop and reversal (PSAR) is another indicator created by J. Welles Wilder. The indicator was originally called the parabolic time/price system because the pattern of the indicator resembles a parabola and the stop calculated is a function of time and price as you will see.

The default settings for this indicator are 0.20 and 0.02. The first number shows the maximum value the acceleration factor can take whereas the second number shows by how much the acceleration factor is increased each time a new extreme point (higher high or lower low) is made. If you do not know what we are talking about, do not worry, it will become apparent as you will read through this appendix.

In the following chart, each green point is a PSAR point. Let's start with a few observations.



Day 1: first day the price closed down

Day 2: PSAR equals the high made on the first day. It has to start somewhere and assumes that the first position taken was a short position because the first candle was down.

Day 3: PSAR stays the same as the previous day (this is an exception which will be explained later)

Day 4: The PSAR of the previous day is hit and the position is reversed → the new PSAR value is the lowest low (extreme point) made during the previous trade → low made on day three.

Day 5-6: PSAR stays the same as the previous day (this is an exception which will be explained later)

Day 7-9: PSAR is each time higher.

Day 10: The PSAR of the previous day is hit and the position is reversed → the new PSAR value is the highest high (extreme point) made during the previous trade → high made on day 7.

Day 10-22: PSAR values are lowered each time but never hit.

As you may have noticed, the PSAR always starts at the extreme point made during the previous trade: for a short trade this would be the highest high made during the previous trade and for a long trade the lowest low. From this point on, the PSAR is catches up a bit each day with the current price action until the price hits the dot and is reversed.

So if you are long, the stop is increased every day. These increments are a function of two

components:

- Time: the stop increases every day regardless the price action.
- Price: the stop increases if new highs are being made.

The exact opposite would apply for a short position. The maths behind the PSAR indicator are quite complex and it might be useful to look at a long trade first and then at a short trade.

If long:
The first PSAR is the lowest low made during the previous trade. Then, for the following days, the following formula is applied:

$$\boxed{PSAR_{Tomorrow} = PSAR_{Today} + AF \times (EP - PSAR_{Today})}$$ where,

AF is an acceleration factor which starts at 0.02 but increases by 0.02 each time a new high is made (at the close of a candle) during the current long trade. The maximum value the AF can have is 0.20 (nine increments).
EP is the extreme point which in this case is the highest high made during the current long trade.

$AF \times (EP - PSAR_{Today})$ will always be positive and therefore the PSAR calculated for the next day will increase a certain amount even if no new high is made. This is the time component pointed out earlier.

The price component also is reflected in this formula: as higher highs are made, EP and the AF become larger (although AF is capped at 0.20): $\uparrow AF \times (\uparrow EP - PSAR_{Today})$.

The exception to this formula is when the PSAR calculated falls above the previous day's or current day's low. In this case, the lowest low between these two is used as PSAR.

If short:
The first PSAR is the highest high made during the previous trade. Then, for the following days, the following formula is applied:

$$\boxed{PSAR_{Tomorrow} = PSAR_{Today} - AF \times (PSAR_{Today} - EP)}$$ where,

AF is the acceleration factor which starts at 0.02 but increases by 0.02 each time a new low is made (at the close of a candle) during the current short trade. The maximum value the AF can have is 0.20 (nine increments).
EP is the extreme point which in this case is the lowest low made during the current short trade.

$-\text{AF}\times\left(\text{PSAR}_{\text{Today}}-\text{EP}\right)$ will always be negative and therefore the PSAR calculated for the next day will decrease a certain amount even if no new low is made.

As lower lows are made, the amount deducted from today's PSAR becomes larger:
$-\uparrow \text{AF}\times\left(\text{PSAR}_{\text{Today}}-\downarrow \text{EP}\right)$.

The exception to this formula is when the PSAR calculated falls below the previous day's or current day's high. In this case, the highest high between these two is used as PSAR.

Example of the computation of the PSAR values of the previous chart.

	HIGH	LOW	PSAR today	EP	Difference ($PSAR_{Today}$-EP)	AF	AF x difference EP and SAR	PSAR calculated for the next day	Observations
Day 1	1.0129	1.0047	-	-	-	-	-	-	
Day 2 SAR short	1.0107	0.9996	1.0129 (previous	0.9996 (lowest low)	0.0133	0.02	0.00027	1.01263	PSAR calculated would fall below yesterday's high. Must use yesterday's high as PSAR
Day 3	1.0042	0.9993	1.0129	0.9993	0.0.0136	0.04	0.00054	1.01344	Made a new low: must increase AF by 0.02
~~*Day 4*~~	~~*1.0263*~~	~~*0.9991*~~	~~*1.01344*~~	—	—	—	—	—	Stop and reversal
Day 4 SAR long	1.0263	0.9991	0.9993	1.0263 (highest high)	0.0270	0.02	0.00054	0.99984	PSAR calculated would fall above today's low, must use today's low as PSAR tomorrow
Day 5	1.0297	1.0199	0.99910	1.0297	0.0306	0.04	0.00122	1.00032	New high made: must increase AF by 0.02
Day 6	1.0289	1.0221	0.99910	1.0297	0.0306	0.04	0.00122	1.00032	
Day 7	1.0285	1.0152	1.00032	1.0297	0.0294	0.04	0.00118	1.00150	
Day 8	1.0228	1.0112	1.00150	1.0297	0.0282	0.04	0.00113	1.00263	
Day 9	1.0161	1.0107	1.00263	1.0289	0.0263	0.04	0.00105	1.00368	
~~*Day 10*~~	~~*1.0149*~~	~~*1.0027*~~	~~*1.00368*~~	—	—	—	—	—	Stop and reversal
Day 10 SAR short	1.0149	1.0027	1.02970	1.0027 (lowest low)	0.0270	0.02	0.00054	1.02916	
Day 11	1.0087	1.0011	1.02916	1.0011	0.0281	0.04	0.00112	1.02804	Made a new low: must increase AF by 0.02
Day 12	1.0192	1.0062	1.02804	1.0011	0.0269	0.04	0.00108	1.02696	
Day 13	1.0247	1.0061	1.02696	1.0011	0.0259	0.04	0.00103	1.02593	
Day 14	1.0145	1.0041	1.02593	1.0011	0.0248	0.04	0.00099	1.02493	
Day 15	1.0154	1.0073	1.02493	1.0011	0.0238	0.04	0.00095	1.02398	
Day 16	1.0111	1.0055	1.02398	1.0011	0.0229	0.04	0.00092	1.02306	
Day 17	1.0178	1.007	1.02306	1.0011	0.0220	0.04	0.00088	1.02219	
Day 18	1.0172	1.0114	1.02219	1.0011	0.0211	0.04	0.00084	1.02134	
Day 19	1.016	1.0113	1.02134	1.0011	0.0202	0.04	0.00081	1.02053	
Day 20	1.0142	1.0033	1.02053	1.0011	0.0194	0.04	0.00078	1.01976	
Day 21	1.0106	1.0035	1.01976	1.0011	0.0187	0.04	0.00075	1.01901	
Day 22	1.0092	1.0017	1.01901	1.0011	0.0179	0.04	0.00072	1.01829	

Appendix I: Average True Range (ATR)

The average true range is a measure of volatility that shows how much a currency pair is likely to move based on historical data over a specific period (i.e. a 14 day ATR will indicate how much the price could move the next day by using data from the previous 14 days).

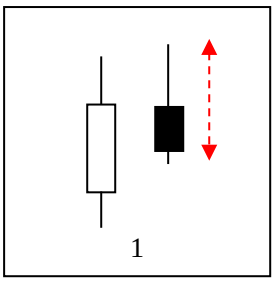
In order to obtain the average true range, the true range has to be calculated first for each price bar of the specific period. The next step would involve summing up all true ranges and dividing this sum by the number of periods used for this indicator.

The true range is the largest of:

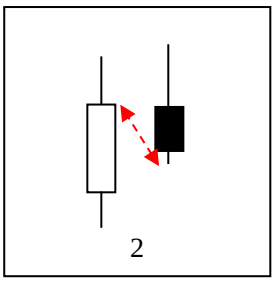
1. the difference between the current candle's high and its low
2. the difference between the previous candle's close and the current candle's low
3. the difference between the previous candle's close and the current candle's high

In this example you can see that the true range would correspond with the difference between the current candle's high and its low (1) as it is larger than the difference between the previous candle's close and the current candle's low or high (2 &3).

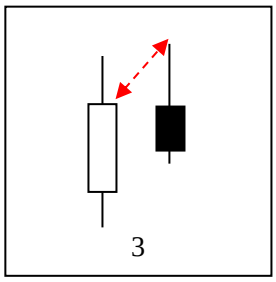
Current High – Current Low



Prev. Close – Current Low



Current High – Current Low



The only time the difference between the previous candle's close and the current candle's low or high (2 &3) could possibly be larger than the difference between the current candle's high and low (1) is when the market gaps. However, since the FX market is open 24 hours every working day this can only happen during weekends. As a result, it is fairly safe to say that the ATR value in the FX market shows the average price movement between the low and the high of a given price bar.

Appendix J: Back-testing

If you believe that markets are completely random then trading might not be the best thing do to because you simply would not stand a chance of making money. It would be worse then playing roulette in a casino because of transaction costs. However given that you are doing this course, you are more likely to believe that the market has certain patterns that tend to repeat over time and will continue to do so. In this case, exploiting these patterns can help develop an edge which could potentially help you make money trading FX. However markets do change over time and you have to evolve with them and ideally back-test your trading set-ups before actually trading them.

Back-testing is a process in which historical data is used to test a certain trading strategy. This can help you get a better understanding of the ins and outs of the strategy and give you valuable information such as the number of times triggers did and did not work, the average amount of profit and loss on winning and losing trades respectively and the worst draw-downs experienced. With draw-down I mean the biggest cumulative loss in the strategy before profits were made again.

A main requirement before back-testing a certain set-up is that you should be able to give a rational underlying explanation on why the strategy should work in first place. Otherwise you might just end up with random relationships which are not "stationary", i.e. they might work now but are unlikely to work in the future. Once you have done that, you should proceed to test the set-up to find out whether you were right or wrong.

I would recommend dividing the period subject to your back-testing into three sub-periods. You initially only test your strategy during the middle sub-period and if the results are profitable then you repeat the process with the other two sub-periods to see if the strategy stands the test of time. Because if the strategy works only during one of the sub-periods but not that well in the other two periods then this might indicate that the actual strategy only works well under a certain market environment or maybe that there were a limited amount of extremely profitable trades.

When a strategy is profitable just because of a limited number of sizeable profitable trades, then you should critically analyse the likelihood of such moves happening again. Probably every single break-out system would have been long the US dollar before the Lehman Brother crisis in 2008 which of course would have led to large gains as the US dollar was being bought as a safe haven. But assuming that such a move will happen again might not be the best idea.

Also, it is important to put into perspective the number of trading signals that are given within each sub-period. In order to make an informed decision you really need a representative amount of trades: you would want to have a sample of at least 10 trades per sub-period, ideally even as many as 20 or 30. The more the better. So if you want to back-test a long term trading strategy that only generates 1 or 2 trades during each sub-period you cannot just abandon the strategy if an overall loss is shown on these two trades. Two trades are statistically just not significant enough to draw conclusions. You probably need to use wider sub-periods or consider not using sub-periods at all if not enough historical data is available.

Remember to also investigate how you can reduce the amount of losing trades with some kind of filter. For example, you might require the price to be above a moving average before taking a long position, or require that the price must have failed to make a lower low previously. Another filter could be that the closing price must be higher than the closing price of 10 days ago or that the ADX value is above 20. As you know, there are a lot of variables to play around with.

Finally there are some common pitfalls I want to make you aware of whilst back-testing.

- *Always consider slippage and commissions:* Stop-loss orders are market orders and therefore can be filled at a significantly worse price than expected. Also, the price chart on which you base your back-testing might show the last traded price or the middle price between the bid and the ask price. So it is unrealistic to assume that you would have been able to trade at these exact same levels. Therefore you should always consider a minimum amount of 2 pips as commission or slippage per trade.

- *Always wait for a close of the candle:* It would be wrong to assume that you would be able to trade at the exact same level a trigger is given. For example if a trading strategy is based on the price crossing the moving average it would be unrealistic to assume you would have entered at the exact level where the candle's body crossed the moving average. In reality you would not do that. On an intra-day basis, the price might have crossed above and below the moving average dozens of times and you would not reverse your position every time that happens. So if the price crossed above the moving average, you would realistically wait for a close above it before initiating the trade and you should use a realistic price assumption when back-testing your strategy.

- *Another common mistake is over-optimizing variables.* Optimization is a process which allows users to test thousands of different values and combinations for the parameters of a given strategy that is being back-tested. This means that it can tell you for example, the most profitable combination of a two moving average cross-over strategy for the daily euro-dollar price chart between 2010 and 2012 for example.

  Optimization can be useful because different markets have different characteristics and personalities. Therefore, it can help finding the best values for your technical indicator for each market. However, if too many variables are optimised, it is unlikely the strategy will continue doing well when trading it in real-life. This is because the strategy has been a victim of so-called curve-fitting. To avoid this, when you optimize variables, be sure to follow the following instructions:

  1- Order the optimization test results by net profit
  2- Highlight top 10-15 % of values with the highest net profit
  3- Then re-order the results by the value of the variable to optimise
  4- Find the widest highlighted area and select the variable in the middle.

So if maximum profit happens at for example the 48 day moving average and the 45 and 50 day moving average result in big losses, you are better off forgetting about this set-up and try and find

another more stable and reliable one.

By following these instructions, you ensure that you do not end up choosing an isolated value for your indicator but that you choose a value that has been profitable even if it was changed a little bit. So when you start applying it to your real time data, you have a bigger margin for error.

- *Last but not least, always forward-test a strategy with paper money.* This is not only important to get a real feeling for the strategy and understand all the ins and outs of it but also to identify restraints or factors you did not take into account during the back-testing phase of the strategy. Finally it also tests your ability to stick with the strategy and see if it is actually fit for your trading style and personality.

  Of course testing with paper money will substantially reduce the emotions versus trading the strategy for real. However it still gives you an understanding of the amount won and lost on average on winning and losing trades, the win-loss ratio and how long it takes to recover from draw-down periods. So it should help you develop more confidence in your strategy. If you do not have this confidence, it will make it much more difficult to stick to the rules especially after a couple of losing trades and in that case you are probably better off not trading at all with real money.

Common back-testing pitfalls
Not including slippage and commissions.
Not waiting for a close of the candle before initiating a trade.
Over-optimization & curve-fitting.
Failing to forward-test a strategy.

Appendix K: FX mechanics (pip values and P&L, converting currencies and trading sizes)

Pip values and P&L

You might recall that the first currency of a currency pair is called the base currency and that the actual price of the pair shows you the value of 1 unit of the base currency in terms of the second currency in the pair. This second currency in the pair is called the quote currency.

The quote currency is the currency in which pip values and profit and losses are originally calculated before converting them into your accounts currency.

So if you look at EURUSD, the quote currency is the US dollar so pip values and profit and losses will be expressed in US dollars as well.

To obtain the pip value, you simply multiply 1 pip (0.0001*) by the trading size (except for the yen).

Pair	Trading size	1 pip	Pip value
EURGBP	100,000 (1 lot)	0.0001	100,000 x 0.0001 = £10
EURUSD	10,000 (1 mini-lot)	0.0001	10,000 x 0.0001 = $1
USDJPY	5,000 (5 micro –lots)	0.01*	5,000 x 0.01 = ¥ 50

Let's look at how to calculate profits and losses. All you do is multiply the trading size by the currency move.

Pair	Trading size	Currency move	P&L (in quote currency)
EURGBP	100,000	0.0010	100,000 x 0.0010 = £100
EURUSD	10,000	-0.0040	10,000 x (-0.0040)= -$40
USDJPY	5,000	1.50	5,000 x 1.50 = ¥ 7,500

If you know the pip value you can also obtain your P&L by multiplying the pip value by the amount of pips made or lost to:

Pair	Trading size	P&L (pips)	Pip value	P&L (in quote currency)
EURGBP	100,000	10 pips	£10	10 x £10 = £100
EURUSD	10,000	-40 pips	$1	-40 x $1 = -$40
USDJPY	5,000	150 pips*	¥ 50	150 x ¥ 50 = ¥ 7,500

* 1 pip is 0.0001 for all major currency crosses (AUD, CAD, CHF, EUR, GBP, NZD, NOK, SEK, DKK & USD) except for JPY crosses for which 1 pip equals 0.01. This is because JPY crosses have high nominal values (i.e. USDJPY=80 or EURJPY =105) as opposed to other crosses which have low nominal values (i.e. AUDUSD = 1.05 or EURGBP = 0.80).

Converting currencies

Sometimes you might need to convert one amount of a certain currency into another currency. Say for instance you want to convert 1,000€ and SFr. 1,800 into US dollars.

- EUR 1,000 → USD ???
- CHF 1,800 → USD ???

First of all, you need to find the exchange rate involving the euro and the US dollar and the exchange rate involving the Swiss franc and the US dollar. .

The exchange rate involving the EUR & USD is normally quoted as EURUSD, say it is 1.3125
The exchange rate involving the CHF & USD is normally quoted as USDCHF, say it is 0.90

As you might realise, the US dollar is quoted on the right in the euro-dollar cross but on the left in the dollar-swiss cross. This leads to two different scenarios on how to convert one amount of a currency into the other:

- In the first case where the US dollar is quoted on the right (EURUSD) we know that €1 equals $1.3125. So logically €1000 equals $1312.50. We have multiplied the amount we wanted to convert by the exchange rate.

- In the second case where the US dollar is quoted on the left (USDCHF) we know that $1 equals SFr. 0.90. So in this case we need to divide the amount we want to convert by this exchange rate: 1,800 divided by 0.90 equals $2,000.

WORKBOOK EXERCISE: Convert £1000 and ¥80,000 into US dollars and convert $5,000 into pound sterling and Japanese yen using the following exchange rates.

GBPUSD = 1.62
USDJPY = 80

WORKBOOK EXERCISE: Assume that your account's currency is the euro and that you know the quotes shown in the following table. Please convert the P&L's in the second column into euros

Quotes	P&L's	P&L's in euros
EURGBP = 0.80	£10	
EURUSD = 1.3125	-$40	
EURJPY = 105	¥ 7,500	

Calculating trading sizes

By now you hopefully have a better understanding of how to convert currencies. At the beginning it might be very confusing but as you become a more experienced trader it should become second nature.

The next thing you need to know is how to calculate your trading size once you know your entry and stop-loss level and the amount of money that you are willing to risk on a given trade set-up.

The P&L which is expressed in terms of the quote currency is always equal to the following formula:

$$\text{P\&L} = (\text{sell price} - \text{buy price}) \quad \text{x} \quad \text{trading size}$$

This formula can be rearranged as:

$$\frac{\text{P\&L}}{(\text{sell price} - \text{buy price})} = \text{trading size}$$

If you know the amount of money you are willing to risk on a trade you should put this in the P&L field. So if you have a $10,000 account and you are willing to risk 2% on a given trade this means that you are willing to lose a maximum of $200. One very important note here is that this $200 need to be converted to the quote currency of the pair traded. If you are trading for example the GBPUSD, the quote currency is the US dollar so no adjustments need to be made. However if you would trade the USDJPY you would need to convert the amount of money you are willing to risk to Japanese yen as the quote currency of the pair traded is the Japanese yen.

- Say you trade the GBPUSD and you know you will go short at 1.60 and your stop will be at 1.61 than you can put these two levels in sell buy price respectively so that you can obtain your trading size:

$$\frac{\text{P\&L}}{(\text{sell price} - \text{buy price})} = \frac{-200}{(1.60 - 1.61)} = \text{trading size} = 20{,}000$$

  Alternatively you can also think in terms of pips. If 100 pips is your maximum acceptable loss and you are willing to lose $200 which means that you can lose $2 per pip. If you know that trading 1 mini-lot gives you a pip value of $1 then this means that you can trade 2 mini-lots (20,000 currency pairs).

- If you trade the USDJPY and you identify a set-up to go long at 80 with a stop at 79, you're trading size would be obtained as follows:

$$\frac{\text{P\&L}}{(\text{sell price} - \text{buy price})} = \frac{-200 \times \text{USDJPY}}{(79 - 80)} = \frac{-200 \times 79}{-1} = 15{,}800$$

Note that we used 79 as the exchange rate for the USDJPY to convert dollars to yen because that is the rate that will apply if the trade would be stopped out.

Please take a look at the following table which contains three more examples to understand this process even better.

	Entry	Stop	Quote currency	Value of 2% of a $10,000 account in the quote currency	Trading size
Short GBPUSD	1.60	1.61	USD	200	$\frac{-200}{-0.01}$ = 20,000
Long USDJPY	80	79	JPY	200 x 79 = 15,800	$\frac{-15,800}{-1}$ = 15,800
Short AUDUSD	1.0400	1.1100	USD	200	$\frac{-200}{-0.07}$ = 2,857
Short USDCHF	0.90	0.91	CHF	200 x 0.91=182 CHF	$\frac{-182}{-0.01}$ =18,200
Short USDSGD	1.2900	1.3200	SGD	200 x 1.32 = 264 SGD	$\frac{-264}{-0.03}$ = 8,800

Appendix L: Minimum risk-reward ratio (opening range break-out set-up)

Explanation of deriving a risk reward ratio minimum 1.70:

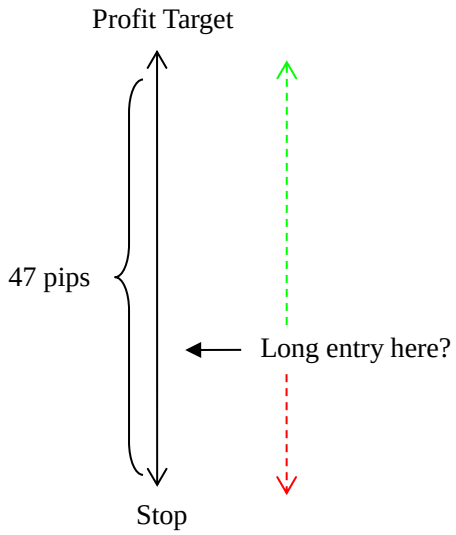
As soon as the range is formed we know that:

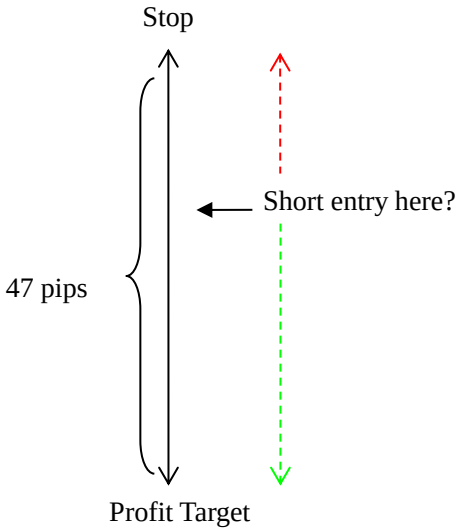
Lower Range	1.2607
Higher Range	1.2622
Opening Range	15 pips

This means that the exact profit target levels for both a potential long or short trigger and their respective stop-loss levels can be calculated before an actual signal is given:

	Long entry	Short entry
Profit target	Higher range + 2 times open range 1.2622 + 0.0030 = 1.2652	Lower range – 2 times open range 1.2607 – 0.0030 = 1.2577
Stop-loss	Lower range – 2 pips safety 1.2607 – 0.0002= 1.2605	Higher range + 2 pips safety 1.2622 + 0.0002 = 1.2624
Distance between profit target and stop-loss	1.2652 – 1.2605 = 0.0470	1.2577 – 1.2624 = -0.0470

Therefore, the total between the stop and profit target level is 47 pips. So if a trader aims to make 30 pips, the trader will risk 17. If the trader wants to make 31 pips the risk will be 16 pips and if the trader wants to make 29 pips, the risk taken would be 18 pips.





In order to obtain the exact level where the risk reward ratio is 1.70 we need to do the following calculations:

$$\frac{\text{Profit target}}{\text{Stop}-\text{loss}} = \text{risk reward ratio}$$

$$\frac{47-x}{x} = 1.7; \qquad 47 - x = 1.7x \qquad 47 = 2.7x \qquad x = \frac{47}{2.7} = 17.41$$

$$\text{Profit target} = 47 - x = 47 - 17.41 = 29.59$$
$$\text{Stop - loss} = x = 17.41$$

$$\text{Risk reward ratio} = \frac{29.59}{17.41} = 1.70$$

Since this is not a round number we always will need to round up the profit target so that the ratio is greater than 1.70 and not less. So in our case we would obtain a risk reward ratio of $1.76\left(\frac{30}{17} = 1.76\right)$.

As a result, the ideal entry for a long or short trigger would be:

	Long entry	Short entry
Profit target	Higher range + 2 times open range 1.2622 + 0.0030 = 1.2652	Lower range – 2 times open range 1.2607 – 0.0030 = 1.2577
Stop-loss	Lower range – 2 pips safety 1.2607 – 0.0002= 1.2605	Higher range + 2 pips safety 1.2622 + 0.0002 = 1.2624
Distance between profit target and stop-loss	1.2652 – 1.2605 = 0.0470	1.2577 – 1.2624 = -0.0470
Ideal entry:	Profit target level – 0.0030 1.2652 - 0.0030 = 1.2622	Profit target level + 0.0030 1.2577 + 0.0030 = 1.2607

In this example, the ideal entries turn out to be the level of the higher range (1.2622) and the lower range (1.2607) for long and short entries respectively.

For a short entry, the way to trade this set-up would be to wait for a close below the range first and then to place a limit working order at the exact level of the lower end of the range. If the price retraces a bit you get filled at the right price to maintain a risk reward ratio of at least 1.70 but if the price does not retrace you will have to wait for the next trading opportunity.

Appendix M: Turtle Trading

The original turtle trading rules were published for free by one of the original turtles to fight scam, frauds and charlatans who pretended to sell them for money. So if you are interested you can find them at: http://www.metastocktools.com/downloads/turtlerules.pdf

In this section we will simply outline some of the features of the turtle system which might be relevant. As we have seen, the turtles used a 20 day break-out system to generate trades with a 2xATR initial stop and a 10 day high or low trailing stop.

Whilst trading this system, the turtles also used an additional filter- they ignored a 20 day break-out signal if the previous break-out for that instrument was a winning trade. However, if a 55 day break-out was given later, they were allowed to take it. The 55 day break-out system was a longer term trading system which the turtles were also allowed to use but instead of a 10 day trailing stop, it had a 20 day trailing stop.

In terms of risk management and position size, the turtles used what were called units. A unit represented the amount of an asset they would buy so that when their 2xATR stop would be hit they would lose a fixed and predefined percentage of their account.

So for example if we had a $50,000 account and would be ready to risk 2% per trade, it would mean our maximum loss would be $1,000 on a given trade. If NZDUSD had an ATR of 0.0040 (40 pips), the initial stop for a trade in this pair would be placed 0.0080 or 80 pips from the entry. As a result, the trader can only trade 125,000 NZDUSD (1.25 lots).

Account	50,000
Max risk per trade	2%

	2 x ATR	Unit (position size)
NZDUSD	0.0080	$\frac{0.02 \times 50{,}000}{0.0080} = \frac{1000}{0.0080} = 125{,}000$

The turtles were allowed to add to their position each half ATR movement into their favour until they had a maximum position of 4 units. Every time a unit would be added to their existing position, the stop for the whole position would be placed two times the ATR from the entry level of the last unit added to the overall position. A look at this example might help understand this better.

EURJPY	
20 day high	105
ATR	0.5

	Entry price	Stop	Open risk
First Unit	105	104	2.00%

1st unit is triggered on the 20 day breakout at 105 and the stop is placed two times ATR from this level at 104.

	Entry price	Stop	Open risk
First Unit	105	104.25	1.50%
Second Unit	105.25	104.25	2.00%

2nd unit is added at 105.25 and the stop is placed two times ATR from this level at 104.25 for the whole position.

	Entry price	Stop	Open risk
First Unit	105	104.5	1.00%
Second Unit	105.25	104.5	1.50%
Third Unit	105.5	104.5	2.00%

3rd unit is added at 105.50 and the stop is placed two times ATR from this level at 104.50 for the whole position.

	Entry price	Stop	Open risk
First Unit	105	104.75	0.50%
Second Unit	105.25	104.75	1.00%
Third Unit	105.5	104.75	1.50%
Fourth Unit	105.75	104.75	2.00%

4th unit is added at 105.75 and the stop is placed two times ATR from this level at 104.75 for the whole position.

Continues on the following page

The turtles were also taught an alternative stop strategy called the whipsaw. This strategy was much harder to execute and incurred in many losing trades forcing the turtles to be more dynamic and exit and re-enter the markets much more often. This is mainly because stops were placed only 1/2 ATR from entry (as opposed to 2xATR) and if a unit was stopped out, it would be re-entered at the original entry price. As a result, not much risk could be taken on each trade and therefore only half a percent was risked on each unit (as opposed to two percent in the original system). The following example might clarify this strategy a bit better.

EURJPY	
20 day high	105
ATR	0.5

	Entry price	Stop	Open risk
First Unit	105	104.75	0.50%

1st unit is triggered at the 20 day breakout at 105 and the stop is placed half an ATR from this level at 104.75

	Entry price	Stop	Open risk
First Unit	105	104.75	0.50%
Second Unit	105.25	105	0.50%

2nd unit is added at 105.25 and stop for this unit is placed half ATR from the entry at 105.

	Entry price	Stop	Open risk
First Unit	105	104.75	0.50%
Second Unit	105.25	105	0.50%
Third Unit	105.5	105.25	0.50%

3rd unit is added at 105.50 and stop for this unit is placed half ATR from the entry at 105.25.

	Entry price	Stop	Open risk
First Unit	105	104.75	0.50%
Second Unit	105.25	105	0.50%
Third Unit	105.5	105.25	0.50%
Fourth Unit	105.75	105.50	0.50%

4th unit is added at 105.75 and the stop for this unit is placed half ATR from the entry at 105.50.

Appendix N: Recommended readings

Al Brooks, *Trading Price Action*.

Bennett A. McDowell, *A Trader's Money Management System: How to Ensure Profit and Avoid the Risk of Ruin.*

Curtis Faith, *Way of the Turtle: The Secret Methods that Turned Ordinary People into Legendary Traders.*

David Aronson, *Evidence-Based Technical Analysis: Applying the Scientific Method and Statistical Inference to Trading Signals.*

Edwin Lefèvre, *Reminiscences of a Stock Operator.*

Jack D. Schwager, *Market Wizards.*

John J. Murphy, *Technical Analysis of the Financial Markets.*

L.A Little, *Trend Qualification and Trading: Techniques to Identify the Best Trends to Trade.*

Lex van Dam, *How to Make Money Trading: Everything You Need to Know to Control Your Financial Future*

Linda Bradford Raschke, *Street Smarts: High Probability Short Term Trading Strategies.*

Michael W. Covel, *The Complete Turtletrader: The Legend, the Lessons, the Results.*

Michael W. Covel, *Trend Following: Learn to Make Millions in Up or Down Markets.*

Murray A. Ruggiero, *Cybernetic Trading Strategies: Developing a Profitable Trading System with State-of-the-art Technologies.*

Perry J. Kaufman, *The New Trading Systems and Methods.*

Rob Booker, *Adventures of a Currency Trader: A Fable About Trading, Courage and Doing the Right Thing.*

Robert C. Miner, *High Probability Trading Strategies: Entry to Exit Tactics for the Forex, Futures, and Stock Markets.*

Van K. Tharp, *Trade Your Way to Financial Freedom.*

Welles Wilder, *New Concepts in Technical Trading Systems.*