

Business – A Great Profession

But Don't Forget The Math!

Critical For Your Success

Business is a great profession!

The entire organizational team (Finance, Accounting, Marketing, Manufacturing, R&D, Marketing, Supply Chain, HR, etc.) relies on individual leaders driving value creation. . That means regardless of your level in the organization, in a professional business career you are not only accountable for your own family – you are responsible for lots of families associated with the business team you are a member of!

There are many areas of expertise that you must master for a great professional business career. You need to find prospects and generate their interest. You need to identify solutions to problems that you uncover. You need to negotiate agreements that are "win-win" in order to build and maintain a sustainable and profitable business. Obviously, this all requires a positive attitude, great questioning and listening skills, creative problem solving capability and extraordinary communication aptitude. Not as obvious is the requirement to master your business math skills to assure an awesome business career.

Why is mastering business math so important? Because a business transaction is not truly a success unless the math works – and sometimes successful negotiations often happen very quickly and result in unintended consequences. Frankly, professionals in purchasing (which are often involved in some portion of the buying process) often use their capabilities in business math as a competitive advantage. Therefore, not understanding the differences in language involving business math can turn a success in getting a signed contract into a disaster when the profitability is measured.

Here's an example where the language can get weird. Let's assume you're a manufacturer that is sitting in a meeting with your distributor and calling on a buyer for a retail chain and negotiating for the purchase of an item that sells to consumers for \$5. The retailer says "if I can make a 20% profit I'll buy 5,000 units now" and the distributor says to you off to the side "let's close this deal now." Sound simple? Not so quick! The words "make" and "profit" can mean different things to different people – and if you don't realize that you can make a bad deal really quickly. In this case the retailer may be thinking a gross profit of \$0.83 (20% over their cost which is "mark-up") or they could mean \$1 (20% of \$5 selling price which is "margin"); if you assumed \$1 and the retailer was thinking \$0.83 cents – you just walked away from lots of profit!

Let's take that scenario one more step; the retailer says "I need to make 20% on a purchase of 5,000 units; but, if I give you another 1,000 units, will you give me another 10%?" - and they want an answer NOW! Again – be careful! Not being able to clarify the true meaning of "make 20%" and "another 10%" that the retailer is discussing can lead to a disaster. Further, not being able to calculate quickly whether that additional volume is really profitable or not is critical! You must know the "price sensitivity" of any deals negotiated – and they sometimes happen FAST!

While there is an accurate definition and difference between the words "make" and the terms margin, mark-up and gross profit, many people intermingle them all improperly – and end up with false assumptions of the agreements they're committing to!

So, this note attached about "Common Business and Marketing Math" is designed to help you avoid typical mistakes that are made with business math everyday that often leads to profit disasters – ruined business relationships and even kills careers!

Dave Harrison

Assigned Reading

Common Business & Marketing Math

Quick Facts

Assumptions	Retail Sell Price = \$1.50 Distributor Sell Price/ Retailer CGS = \$0.90 Manufacturer Sell Price/ Distributor CGS = \$0.80 Manufacturer CGS (Including Freight and Allowances) = \$0.35 Manufacturer Fixed Cost = \$1 Million Important: The “Contribution Margin” (Mathematically – The Variable Profit) = Selling Price Less “Variable Cost” Note: If there are no variable costs BELOW the gross profit line on the income statement, then use CGS as the variable cost; in this case, gross profit and contribution margin will be the same number. The contribution margin will be different than the gross profit if there are variable costs BELOW the gross profit line on the income statement; an example might be a business commission when it is paid based on a percent of business.		
Example With Assumptions	Retailer Perspective		The Math
	Gross Profit = Sell Price Less CGS		\$1.50 minus \$0.90 = \$0.60
	Margin = Gross Profit As % Of Sell Price		\$0.60 divided \$1.50 = 40%
	Mark-Up = Gross Profit As % Of CGS		\$0.60 divided \$0.90 = 67%
	Distributor Perspective		The Math
	Gross Profit = Sell Price Less CGS		\$0.90 minus \$0.80 = \$0.10
	Margin = Gross Profit As % Of Sell Price		\$0.10 divided \$0.90 = 11%
	Mark-Up = Gross Profit As % Of CGS		\$0.10 divided \$0.80 = 13%
	Manufacturer Perspective		The Math
	Gross Profit = Sell Price Less CGS		\$0.80 minus \$0.35 = \$0.45
	Margin = Gross Profit As % Of Sell Price		\$0.45 divided \$0.80 = 56%
	Mark-Up = Gross Profit As % Of CGS		\$0.45 divided \$0.35 = 129%
	Break Even Units = Fixed Cost Divided By Contribution Margin Note: If Don't Have Variable Cost To Compute Contribution Margin – Use CGS		\$1,000,000 divided by \$0.45 = 2,222,222 units
	Break Even Dollars = Break Even Units Times Selling Price		2,222,222 times \$0.80 = \$1,777,778
What If?	Do Know	Don't Know	The Math – Retailer Perspective
Retailer Perspective	CGS	Sell Price	Sell Price = CGS Plus Gross Profit \$0.90 plus \$0.60 = \$1.50
	Gross Profit	Sell Price	Sell Price equals CGS divided by (1 – Margin) \$0.90 divided by (1 Minus 40%) = \$1.50
	CGS	Sell Price	Sell Price equals CGS divided by (1 – Margin) \$0.90 divided by (1 Minus 40%) = \$1.50
	Margin	Sell Price	Sell Price equals CGS divided by (1 – Margin) \$0.90 divided by (1 Minus 40%) = \$1.50
	Sell Price	Gross Profit	Sell Price less CGS \$1.50 less \$0.90 = \$0.60
	CGS	Gross Profit	Business Price times Margin \$1.50 times 40% = \$0.60
	Sell Price	Margin	Sell Price less CGS divided by Business Price (\$1.50 less \$0.90) divided by \$1.50 = 40%
	CGS	Margin	Gross Profit Divided by Sell Price \$0.60 divided by \$1.50 = 40%
	Sell Price	Mark-Up	Sell Price minus CGS divided by CGS \$0.60/\$0.90 = 68%
	CGS	Mark-Up	Sell Price times Margin divided/ Sell Price times (1-margin) \$1.50*40%/\$1.50* .6 = 68%
	Sell Price	Mark-Up	Gross Profit divided by Sell Price Minus Gross Profit \$0.60/\$90= 68%
	Gross Profit		

Assigned Reading (Continued)

Common Business & Marketing Math

Quick Facts - Continued

Price Sensitivity Analysis PRICE INCREASE Retailer Perspective	Example: 10% Price INCREASE How Much Can Business Drop For The Same Profit Change In “Contribution Margin” (Current Sell Price less New Sell Price) divided by New “Contribution Margin” (\$1.50 - \$1.65)/ (\$0.60 + \$0.15) = -(\$0.15)/\$0.75 = -20% This Means: If 10% Price Increase And Lose Less Than 20% Of The Volume – DO IT! You’ll Make More Money Remember: If there are no variable costs BELOW the gross profit line on the income statement, then use CGS as the variable cost; in this case, gross profit and contribution margin will be the same number. The contribution margin will be different than the gross profit if there are variable costs BELOW the gross profit line on the income statement; an example might be a business commission when it is paid based on a percent of business.																																								
Price Sensitivity Analysis PRICE DECREASE	Example: 10% Price DROP What’s The Required Minimal Business Increase For Same Profit Change In “Variable” Profit (Current Sell Price less New Sell Price) Profit divided By New “Variable” Profit = Growth Needed (\$1.50 - \$1.35)/(\$0.60 - \$0.15) – \$0.15/\$0.45 = 33% This Means: With 10% Price Decrease If Don’t INCREASE Business More Than 33% – DON’T DO IT! You’ll LOSE More Money Note: If Don’t Know Variable Cost – Use Cost Of Goods Sold And Therefore Use “Gross Profit”																																								
Did You Notice?	Margin: Typically As A Percent Mark Up: Typically As A Percent Gross Profit: Is A Dollar Amount If They Say: Margin Dollars: It Really Is “Gross Profit” Mark Up Dollars: It Really Is “Gross Profit” Gross Profit Percent: It Really Is Margin Gross Margin: No Difference From Margin Largest: Mark-Up % Is Always Larger Than Margin %																																								
Price Sensitivity Examples If Increase Price... If Decrease Price... At What Level Of Growth Don’t I Care (Same Profit)	If INCREASED The Selling Price By X% What Percent DECREASE In Business Revenue Is Acceptable (i.e. No Change In Profit) <table><tr><th>If Sell Price Decreases Only...</th><th>At 20% Margin</th><th>At 30% Margin</th><th>At 40% Margin</th><th>At 50% Margin</th></tr><tr><td>5%</td><td>33%</td><td>20%</td><td>14%</td><td>11%</td></tr><tr><td>10%</td><td>100%</td><td>50%</td><td>33%</td><td>25%</td></tr><tr><td>15%</td><td>300%</td><td>100%</td><td>60%</td><td>43%</td></tr></table> If DECREASED The Selling Price By X% (Discount) What Percent INCREASE In Business Revenue Is Required (i.e. No Change In Profit) <table><tr><th>If Sell Price Increases Only...</th><th>At 20% Margin</th><th>At 30% Margin</th><th>At 40% Margin</th><th>At 50% Margin</th></tr><tr><td>5%</td><td>(20%)</td><td>(14%)</td><td>(11%)</td><td>(9%)</td></tr><tr><td>10%</td><td>(33%)</td><td>(25%)</td><td>(20%)</td><td>(17%)</td></tr><tr><td>15%</td><td>(43%)</td><td>(33%)</td><td>(27%)</td><td>(23%)</td></tr></table> Implications: Price Decrease: A small drop in price requires a large increase in business revenue to even break even! Price Increase: A small price increase can justify a significant drop in business revenue and still break even THEREFORE: Isn’t It Easier To Invest In Delivering (Communicating) Real/Perceived Value Versus Discounting?	If Sell Price Decreases Only...	At 20% Margin	At 30% Margin	At 40% Margin	At 50% Margin	5%	33%	20%	14%	11%	10%	100%	50%	33%	25%	15%	300%	100%	60%	43%	If Sell Price Increases Only...	At 20% Margin	At 30% Margin	At 40% Margin	At 50% Margin	5%	(20%)	(14%)	(11%)	(9%)	10%	(33%)	(25%)	(20%)	(17%)	15%	(43%)	(33%)	(27%)	(23%)
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Margin vs Markup Chart Quick Facts	15% Markup = 13.0% Gross Profit 20% Markup = 16.7% Gross Profit 25% Markup = 20.0% Gross Profit 30% Markup = 23.0% Gross Profit 33.3% Markup = 25.0% Gross Profit 40% Markup = 28.6% Gross Profit 43% Markup = 30.0% Gross Profit 50% Markup = 33.0% Gross Profit 75% Markup = 42.9% Gross Profit 100% Markup = 50.0% Gross Profit																																								

Student Assignment

TANSTAAFL

Let's Launch A Business

Who Are These Companies? Truth In Advertising	Company: TANSTAAFL = <i>"There Ain't No Such Thing As A Free Lunch"</i> (REALITY) Manufacturer: WAC = <i>"We Are Cheap"</i> (TRUTH) Broker: AA-YSR = <i>"Ask And - You Shall Receive"</i> (SERVICE) Retailer: WAIJA = <i>"We Are Incredible Just Ask"</i> (BET ON IT)																				
Big Picture – An Opportunity For TANSTAAFL... An Overview	• UINDY Students - Seniors... three friends came up with an idea for an interactive software involving a business educational simulation game for children ages 8 – 12; the product will be sold in the toy department. In this game, children are exposed to the basics of business. This insight is considered useful, regardless of what profession these children end up pursuing. It includes insight into drivers of business decisions. Their intention would be to run this business while they complete one more year of school; then they will decide if/who will join the business full time • "AA-YSR" Broker Opportunity... a large broker of educational toys named "AA YSR" approached TANSTAAFL and expressed interest in representing TANSTAAFL; they specifically believe that they can obtain distribution in a major retailer named "WAIJA" if the price point is attractive. • The Situation... the TANSTAAL team needs to gather information requested by the distributor and determine if they can justify borrowing money required from relatives and friends.																				
What AA-YSR Shared... Requirements TANSTAAFL Has To Work With	1. Broker Mark-Up... they require ("work on") 10% mark-up to the retailer with all vendors they represent; this is for account management (selling activity). They do not warehouse the product; they do not manage the accounts receivable. 2. Retailer Margin... the mass retailers require a 35% margin on software in the toy department during non-promotional periods ("everyday"); they require a 25% margin during promotional periods. 3. Competitive Retail Price... the distributor knows that a price to the consumer of \$9.99 will be required by the retailer. 4. Retailer Promotions... this product will be promoted for the winter holidays; they drop the retail price to the consumer by 20%; they require a promotional discount from the vendor to allow for a 25% retailer margin. The distributor estimates that 60% of the annual volume will be sold with during this promotional period. 5. Projected Volume... assuming that TANSTAAFL can meet the requirements above, AA-YSR believes the retailer will commit to first year annual business of 10,000 units – and will be "an exclusive" retailer for one year.																				
What TANSTAAFL Believes... Assumptions About The Business	A. Cost Of Goods... they've gotten three quotes from reputable vendors to produce and package the educational software. The lowest cost was from a vendor named "WAC" <table border="1" data-bbox="394 1257 954 1320"> <thead> <tr> <th>Quantity - Units</th><th>"WAC" Pricing</th></tr> </thead> <tbody> <tr> <td>10,000</td><td>\$1.00</td></tr> </tbody> </table> Note: assume that to get these prices, TANSTAAFL must agree to an exclusive vendor agreement for the first year. B. Family And Friends Loans... they can borrow whatever is needed – BUT – they must be able to pay it all back within a year. (In other words – they must demonstrate that they can at least break even in Year 1.) C. Their Plans... continue school and work on the side to develop further products and prepare for year 2. D. Cost Of Year One Operations... they would need to commit to one year with the following minimal expectations for this start-up company: <table border="1" data-bbox="394 1497 1511 1740"> <thead> <tr> <th>What's Needed</th><th>Annual Amount</th></tr> </thead> <tbody> <tr> <td>Rent... office and warehouse</td><td>\$15,000</td></tr> <tr> <td>Administration... take orders, etc.</td><td>\$15,000</td></tr> <tr> <td>Warehouse Person... fulfill orders</td><td>\$15,000</td></tr> <tr> <td>TANSTAAFL Owners Compensation</td><td>\$0</td></tr> <tr> <td>Professional Fees (Incorporate; Legal; Etc.)</td><td>\$5,000</td></tr> <tr> <td>Total Estimated Expenses (Fixed Costs)</td><td>\$50,000</td></tr> <tr> <td>Estimated Incremental Shipping Cost/Unit</td><td>\$0.50</td></tr> </tbody> </table>	Quantity - Units	"WAC" Pricing	10,000	\$1.00	What's Needed	Annual Amount	Rent... office and warehouse	\$15,000	Administration... take orders, etc.	\$15,000	Warehouse Person... fulfill orders	\$15,000	TANSTAAFL Owners Compensation	\$0	Professional Fees (Incorporate; Legal; Etc.)	\$5,000	Total Estimated Expenses (Fixed Costs)	\$50,000	Estimated Incremental Shipping Cost/Unit	\$0.50
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Life Is Great... TANSTAAFL Is On It's Way!	The three partners are ECSTATIC They have a likely order for 10,000 units. The everyday retail selling price is \$9.99 and their cost from the manufacturer for production including packaging and delivered to their warehouse is ONLY \$1.00! How can they miss??? That's \$8.99 over the selling price to the consumer. They know they're going to be rich!																				
Questions?	1) Break-Even... how many units do they need to sell before they make money? 2) Profits... how much money will they make – with these assumptions? 3) Options... what would you do?																				

Template – To Help Guide You Through The Math

TANSTAAFL

Let's Do The Math!

Helpful Hint: "Yellow" Are "CASE FACTS" – Remainder Needs Your Critical Thinking

What's The Math?	At Everyday Price	At Promotion Price	At Weighted Avg. Price	Some Detail
WAIJA Required Margin				Mix %
Mix Of Total WAIJA Business				
WAIJA Discount To Consumer				Mix %
Sell Price To Consumer				Mix %
WAIJA Gross Profit				
Sell Price To WAIJA				
WAIJA Mark-Up %				
AA-YSR Required Mark-Up				
Sell Price To AA-YSR				
AA-YSR Gross Profit				
AA-YSR Margin %				
TANSTAAFL Product Cost/ Unit				
TANSTAAFL Incr. Shipping/Unit				
TANSTAAFL CGS				
TANSTAAFL Gross Profit/ Unit				
TANSTAAFL Margin				
TANSTAAFL Mark-Up %				
QUESTION 1 - TANSTAAFL Break Even Units				
QUESTION 1 - TANSTAAFL Break Even Dollars				
Project Business				
Projected CGS				
Projected Gross Profit				
Annual Expense (Fixed Cost)				
QUESTION 2 TANSTAAFL Projected Profit				
QUESTION 3 TANSTAAFL OPTIONS – INCLUDE?				
Math – Your Options?				

Extra Credit
TANSTAAFL

Let's Launch A Business

TANSTAAFL Options... The Broker Has Ideas	The broker realizes the problem these UINDY students are having. They provide a few options; however, the phone call to the retailer is in five minutes – so they need to decide – FAST! A Different Retail Price With hindsight, the broker thinks this educational software is so good, they might be able to get two different options approved: a) justify more quantity commitment with a lower retail price or b) justify a higher price with only a less quantity commitment. Option 1: They believe that at an \$8.99 retail price to the consumer (which is only 10% less) they can get a quantity commitment of 13,000 units – an increase of 30% above the current annual commitment. The retail margin requirements would not change (35% on the new price at retail and 25% on promotional price when discounted 20% below retail; HOWEVER, after calculating these margins, the retailer would get an additional \$1.00 rebate from TANSTAAFL directly to the retailer to offset this change in retail price and lost profitability per unit. Option 2: They also believe that at a retail price only 50 cents higher, they would still get a commitment of 9,500 units; only a 5% reduction versus the 10,000 commitment. Everybody would make more money – because everybody in the value chain will get 5% more! All other margin requirements remain the same.
Question?	Should They Offer The Retailer One Of These Options?

TANSTAAFL – OPTION 1

Let's Do The Math!

Helpful Hint: "Yellow" Are "CASE FACTS" – Remainder Needs Your Critical Thinking

What's The Math?	At Everyday Price	At Promotion Price	At Weighted Avg. Price	Some Detail And/Or Notes
WAIJA Required Margin				
Mix Of Total WAIJA Business				
WAIJA Discount To Consumer				
New Sell Price To Consumer				
New WAIJA Gross Profit				
Sell Price To WAIJA				
AA-YSR Required Mark-Up				
Sell Price To AA-YSR				
TANSTAAFL REBATE To WAIJA				
TANSTAAFL Product Cost/ Unit				
TANSTAAFL Incr. Shipping/Unit				
TANSTAAFL CGS				
TANSTAAFL Gross Profit/ Unit				
TANSTAAFL Margin				
TANSTAAFL Mark-Up %				
NEW TANSTAAFL BUSINESS				
NEW Projected CGS				
Projected Gross Profit				
Annual Expense (Fixed Cost)				
Original TANSTAAFL Projected Profit				
New TANSTAAFL Projected Profit				
CHANGE In PROFIT				

TANSTAAFL – OPTION 2

Let's Do The Math!

TANSTAAFL – OPTION 1

Let's Do The Math!

Helpful Hint: "Yellow" Are "CASE FACTS" – Remainder Needs Your Critical Thinking

What's The Math?	At Everyday Price	At Promotion Price	At Weighted Avg. Price	Some Detail And/Or Notes
WAIJA Required Margin				
Mix Of Total WAIJA Business				
WAIJA Discount To Consumer				
New Sell Price To Consumer				
New WAIJA Gross Profit				
Sell Price To WAIJA				
AA-YSR Required Mark-Up				
Sell Price To AA-YSR				
TANSTAAFL Product Cost/ Unit				
TANSTAAFL Incr. Shipping/Unit				
TANSTAAFL CGS				
TANSTAAFL Gross Profit/ Unit				
TANSTAAFL Margin				
TANSTAAFL Mark-Up %				
NEW TANSTAFFL BUSINESS				
NEW Projected CGS				
Projected Gross Profit				
Annual Expense (Fixed Cost)				
Original TANSTAFFL Projected Profit				
New TANSTAFFL Projected Profit				
CHANGE In PROFIT				
EFFECT: OTHER OPTIONS IDENTIFIED?				