Hello, class. This is the tutorial for the breakeven analysis module. And this is module 2. And so we're going to go ahead and work this breakeven analysis. I want to give you kind of an overview of the spreadsheet before we get started here.

So the spreadsheet's set up similar to what we looked at in one of the former tutorials when we looked at the profit and loss statement. And again, we're working with these input boxes here. We have year 1 actuals. And we have projected revenue, variable cost, a fixed cost that's associated with this problem, total cost here. And then, a projected profit, or loss, in this case.

Now, there's a number of breakeven analysis tools that we have below here. And we're going to demonstrate each one of these and work through this. Just to kind of give you an overview again of how this is set up-- so we've got our input boxes here. And there are some conditions that we're looking at here.

So for scenario A and B. You can see the difference in the number of visits per year change. They go up in scenario A and the per visit revenue fee, which is the fee that we charge our customer, goes down in scenario A. And our variable cost goes up and all of that.

There's formulas in these input boxes. And they're driven by the assumptions that we have down here below. So in scenario A, we're saying a 10% increase in the number of visits per year. We've applied that up above, a 5% decrease in the per visit revenue fee is in here, and a 10% increase in variable cost as well.

So all of those are applied. In each of these boxes, you can see it's a similar formula to what we looked at before. And so we're able to determine our number of visits per fee for this scenario A. And then, our projected revenue is simply our revenue fee, which is this $99.75 times the number of visits that we have. Our variable cost is our variable cost per visit, which is this $38.50 times the number of visits, again, which is 77,000 to get that.

And then, our fixed cost. We have a fixed cost inflation that we've added to our base year. So we've added 5% to this 3,828,000 is 4,020,000. And same way with the coordinators and our nonsalary. It's the same way. We've just added 5%.

So in this scenario here, you can see that our bottom line has gone from $142,000 to a projected bottom line of $278,000 underwater or a deficit of $278,678. And that's what these changes that we have implemented here. The first piece of information that we're going to calculate is the average cost per visit.

Now, so in the base year here, our average cost per visit was $102.96. If you take a look-- I want you to see this association here. So we had a profit of $142,000. And our per visit revenue fee is $105 per visit. We know that the

average cost per visit has to be something less than that $105, because we're producing a profit here.

In this case here, in scenario A-- and we're going to calculate this in just a second-- but we know that our average cost, because we're in a deficit here has to be above this per visit revenue fee. And I want you guys to see this. So right now, the revenue fee is $99.75. We know that our average cost per visit has to be something north of that or something larger than that $99.75. So let's go ahead and calculate this and see if our assumption's correct.

The average cost per visit is simply the total cost that we've incurred or projected divided by the number of visits per year, or the $77,000. And what we find is that it is in fact our average cost per visit is $103.37. So every visit or every patient that we see, it costs us $103.37, although we're only charging $99.75. So that's a problem. In essence, that's what's happening here. And that's the reason that we're showing a deficit here in scenario A.

Now, if we do the same calculation for scenario B, which has a positive balance here right now of $353,219 under these different conditions that we set down here in scenario B. So we've applied these changes here. But under this scenario, we're showing a profit projected of $353,219.

So we know that, in this case here, our average cost per visit is going to be something less than this $115.50 that we're charging under this scenario. And so let's take a look and see if that is, in fact, the case.

So again, it's the total cost divided by the number of visits per year. And in this case, it is. Our average cost per visit is more than it is in scenario A. But it just so happens that our per visit revenue fee is above that. So that's what's helping to drive this bottom line, or this positive bottom line, that we have here. So that's our average cost per visit.

The book has an example on this too. You'll want to take a look at-- and in our lecture as well, we show an example of the average cost per visit and how the number of-- as we have more visits and see more patients and stuff, that average cost per visit goes down. We're able to drive that down as we spread our fixed cost across more visits and it works to drive that average cost per visit down.

So the next calculation that we're going to do here is what we call accounting volume breakeven. So what we're trying to calculate here is what is the number of visits per year that will drive our bottom line to 0? And we have a way to do that.

Now that we've separated out our variable cost on our fixed cost, which is important. It's an important part of this exercise. We have to be able to identify variable cost from fixed cost. And you'll see when we go to do this calculation, that we have to know what that fixed cost is, because that becomes the numerator in this equation.

So to calculate that-- and again, what we're trying to do is to determine how many visits per year. Is it going to

take to drive this number right here to 0. We can calculate exactly. And the way that we do this is we take our total fixed cost, which we have here. It's this $4,994,000 total fixed cost. And we're going to divide that by what we call the contribution margin.

The contribution margin is the difference between the per visit revenue fee, or this $99.75, and the variable cost per visit, which is $38.50. We're looking for that difference here. So we're going to take $99.75 minus $38.50 to calculate our accounting breakeven.

So we'll just reference these. Minus the $38.50. And when we do that, we find that our breakeven number-- this is not dollar amount. This is a number of visits. I have a lot of students that put this in and then they put dollar signs in front of this 81,549. That's not correct. This is the number of visits per year, which is 81,549.84 patients seen.

And we can do the same thing for scenario B as well. Now, in scenario B, because we're showing a profit here, we know that it's going to be something less than this current 66,500. So again, we take the total fixed cost and we're going to divide that by the contribution margin here, which is $115 minus the $31.50.

And we were correct. It's 62,295, which is less than that 66,500. Now, you're probably saying, now, how do we know that that's-- you say that that's the breakeven for this. But how do we know that? Well, here's the beauty of our input tables and the way that we set this up.

Remember how we said that these problems really kind of come to life if you set them up this way. And you're able to test them as well. So we're going to test this. If you take that 81,549.84 and we drop that in here-- so we're going to override this formula. And then, I'm going to reverse it back.

But for now, just to test this, if we drop the [INAUDIBLE] 81,549.84, now, if we did this correctly, this $278,678, or this profit loss is going to go to 0. And it does. So that's the number of visits that we need to produce a breakeven bottom line.

And in this financial analysis and as a financial manager and as a manager of a division or a department, it's important for us to know what level of business we have to have to hit that breakeven point. It's going to be important for us to know these other breakevens as well, our per visit revenue fee and our variable cost and all of those. And we're going to calculate those as well. But we can find a breakeven for each one of these.

So strategically, we can set up our units based upon the information that we're receiving here. And we know what that floor is for us. Or we know that we can't go below whatever that number is with the rest of these parameters held in place. If we're going to be charging $99.75 and $38.50 with a variable cost per visit and our yearly fixed costs are going to be what they are, we know that we need 81,549 visits for us to breakeven.

You do the same thing over here. We can take this 62,295.02 and we can force that to 0 as well. So we know there, our formulas are working.

Now, if we take this one step further, maybe we want something more than just a breakeven bottom line. So say our management of our organization says, we're not going to be happy if all we do is breakeven here across our profit line. And they come to us and say, really, what we want is we want something more like a $300,000 profit, which is what we're claiming right here.

What is the level of business, or how many visits do we have to make to drive this to this $300,000 profit? Well, our formula's similar to what we just wrote. But if we take our total fixed costs, like we did, and we add that $300,000, or whatever that is that we're determining that we want for our profit, and then we divide that by the contribution margin again, which is the revenue fee minus the variable cost per visit and we find that now our number is 86,447.8 visits per year to drive this to $300,000, or to drive our profit to $300,000. And let's test that number again.

So if we drop that again up here, it does in fact drive that to the $300,000, like we anticipated. And we can do the same thing with scenario B here as well. So it's the total fixed cost plus the $300,000 that we're looking for for our profit. And then, divide it by-- again, we call this the contribution margin-- $115.50 minus the $31.50. And that's 65,866.45. And we're able to see that it drives that to that point.

This contribution margin is an important factor. The book talks about this and what it is is it's the difference between what we're charging. In this variable cost per visit, again, it's that value added piece. It's the cost of every time we see a patient or have the level of business, whatever it is, there's a cost associated with that. That variable cost and that difference between what we charge the customer and that variable cost is called our contribution margin.

It first goes to pay our fixed cost. And then, once those fixed costs are paid off, then every patient on that we see, that piece goes to our profit. So there's a certain level of business that has to be done here, or volume of business, to pay for those fixed costs. And once we eclipse that, then that amount, that $99.75 minus $38.50 starts to roll into our profit. And that's an important concept here that I want you guys to kind of grasp and get under your belt.

So that takes care of our accounting volume breakeven, our economic volume breakeven. And now, we're going to delve into these other breakevens. And these are not in the book. But if you think your way through these calculations, these are formulas that we've written. And you're going to have many times, I think, in your working career where you run across problems and you may not be able to go to a book or whatever and find that, where

you end up having to customize or write your own formula. And there's a little bit of that here.

These are out there. You can find these formulas. These are ones that we wrote ourselves. And they apply to the same thing. It's important, in this case, to know what is the largest amount of fixed costs that we can take on and, again, still produce a breakeven of 0 in our profit line. So we're going to write this formula here.

So what does this fixed cost need to be to drive this to 0? So here, our calculation for this one is, we use our projected revenue. And it's minus our variable cost per visit times the number of visits that we're going to do in the year.

And for this case here, we find that the fixed cost breakeven for scenario A here is $4,716,250. And if we override this formula, just to test it again, when we put this in we're going to find that drives us to zero there. And we want to reverse that out, pull that back out.

And we can do the same thing with scenario B as well. And so if we take our projected revenue, minus our variable cost per visit times the number of visits per year and we find that, in this case here, in this scenario, with these variable changes that we have here, we could run our total fixed cost up to $5,586,000 and still be able to breakeven.

What we're finding here too, and what I want you guys to see is, you can kind of get an idea of how sensitive our worksheet is and our profit and loss is through these different variables. It's extremely sensitive to the per visit revenue fee. And if you think about that, when we increase the per visit revenue fee, it doesn't add any additional cost. Doesn't add any cost to the variable cost or to the fixed cost. So we're able to do that outside of increasing in any of those costs.

So it turns out that of these different variables that we have here, this per visit revenue fee is extremely sensitive to change. And you can see that in this case here. We did many less visits per year, but because we were able to charge this additional per visit fee amount, we were able to produce this bottom line. And our fixed cost breakeven is much, much larger. We're able to take on more fixed cost, if we were able to pass that extra charge onto our customer.

In some cases, that's just not the case. You've got competition in the marketplace that's just not going to allow that. But it turns out that that is a very sensitive variable in this analysis.

So that takes us through the fixed cost breakeven. We're going to work our way down here and do breakeven analysis for the variable cost per visit revenue fee. And then, we're going to do something called the degree of leverage as well.

So for the variable cost breakeven, what we're determining here is what's the largest amount that we can pass through this variable cost per visit and still breakeven again? So what is that? And we know, again, by looking at this, it's something less than $38.50. Right now, it's $38.50. And under these same conditions, that needs to drop to cover this deficit that we're looking at here.

So let's go ahead and write that formula. And so this one is the per visit revenue fee minus the total fixed cost divided by the number of visits per year.

What we find is is that variable cost breakeven is $34.88. And if we drop that in up here, just to test this-- and this would be taken out to another decimal point or so, but it basically drives it to 0. If you took this out to another decimal point, we would people to get that all the way down to 0 there.

And we can do the same thing for scenario B as well. And we take the per visit fee minus our total fixed cost divided by the number of visits. And in this case, it's $36.81, which is above the 31,000, which we would expect, because we're currently at a surplus here in our profit line.

So again, this kind of value added piece to our delivery to our customer, it's what we're adding to the services that we're providing, additional tests that are run, something that every time we see a patient there's this cost associated with seeing them. And in a lot of cases, it's value added services that are provided to them. So we can gauge that and determine if we're able to add to that, or if we have to cut back on that, like we do in scenario A here.

Our per revenue fee breakeven, it's our total fixed cost. And again, this is what we would be able to-- let's calculate this. And then, we'll talk through that. Divided by the number of visits per year plus the variable cost per visit. And this is $103.37.

To drive our projected profit loss to zero, we would need to charge our patients, on average, $103.37 per visit. And again, we can test that $103.37. And again, with a fraction, we were able to get that to 0. If we were to take this out-- and we can expand this a little bit. So it's actually $103.369, or $103.69. We can even get it closer to 0 and eventually take it out to another decimal point. And we would be able to get that all the way down.

So we can do the same thing, again, with scenario B. It's our total fixed cost Divided by number of visits per year. We have to put parentheses around this. And then, plus our variable cost.

[INAUDIBLE]

Or $110.19. And for each of these ones that we're doing down here in the yellow, there is more than one way that

you can calculate these. And if you enjoy kind of writing your own formulas and stuff, you can practice with this and do some searching and research and determine what those other ways to write these formulas. This is not the only way to do this.

But these clearly work and they tell the financial story. Or they give us the information that we need to help us make good decisions within our unit. And as far as pricing and variable costs value added back to the customer and volume of business and all of this tells the story of what we need within our organization or within our department, division to be able to breakeven. And those are important numbers to determine.

Now, this--

So I wanted to take this back to where it was. And we can copy this formula over here and drive that. And we're back to where we were.

So now, we're going to calculate the degree of operating leverage. And what this tells us is this is a powerful tool that we're working with here. And what we're going to determine here is is we're looking for every change in volume that we do, it rolls through to our profit line and what we want to do is we want to determine what that ratio is.

And so we're going to calculate what we call the degree of operating leverage. And we're going to get a factor down here. And it's an absolute value. So it doesn't matter if it comes in as a negative amount or a positive amount. It's going to be determined whether or not if we're showing a loss or if we have a gain here.

But the degree of operating leverage is going to tell us, for every 1% change in volume, there's going to be a degree of operating leverage that flows through to our profit and loss. And we'll go ahead and calculate this here. And then, I'll kind of describe a little bit better exactly how to interpret this number that we receive.

So in this case here, the calculation for the degree of operating leverage, it's the projected revenue minus the total variable cost divided by our projected profit, or loss. So in this case here, we get a degree of operating leverage. And again, we call these absolute values. So it doesn't matter if it comes through as a negative or a positive. This is negative, because we're currently showing a loss here.

But what we're saying is that a 1% increase in volume here will mean a 16.92% increase in profit. And we can test that. Let's calculate it for scenario B first and see what this says. So in this case here, again, it's the projected revenue minus the total variable cost divided by our projected profit. And in this case, it's 15.81.

Now, we can test this number. And actually, we already have here. So in this column out here, we call this degree of leverage test. And so we're testing scenario A here. And what we say is, if you recall, I said for every 1%

change in volume means a 16.92% change in profit.

So in this case here, we changed the volume by 10%. We went from $77,000 to $84,700. That's a 10% increase. Or we took H9-- you can see the formula here. H9 times 1 plus P55. And P55 is this 10% change here.

So the calculation is we're projecting 100 in that-- the way we interpret this is from this negative $278 to the positive $192,000 is a 169% increase in profit. That 169.24% profit is 10 times, or 10%, times this 16.92. Remember, 16.92 degrees of leverage for every 1% change. We have a 10% change here, which takes this to 169.24% change and profit from $278 to $192.

And we proved that formula here. The way that we determine a percent change in profit is to take the difference between where we ended up, which was this $192 minus where we started divided by where we started.

So $192 minus this $278 divided it by this $278 is 169.24. And that is exactly 10 times our degree of leverage, 1% change in volume means a 16.92% change for every 1% change in the change of volume here. And so that's how we calculate that.

We could do the same thing with this entry as well. What's important though is this only applies for this condition here. Everything else has to stay the same. OK so if you notice here, when we tested this, the only thing we changed here was the volume. We went from $77,000 to $84,700. The rest of these variables have to stay the same for this to work out.

But it's a way that companies or businesses can test if we're able to project say a 10% increase in volume, then that's what this does to our bottom line. And we know that each 1% change means a 16.92% change in our profit line. So that's a powerful number.

Of course, the higher that number is, the more your bottom line is affected by small incremental changes in volume. And that's important. That's an important measure that we need when we're measuring additional volume that's going to roll through our business. We have a clear pathway to determine what that's going to mean for our bottom line. So the larger that number is here, the more impact it has on our profit.

And it's a little bit skewed. And we see that down here. So when we call it the degree of leverage limitations, current projected profits, or the denominator determines the magnitude of the degrees of leverage. So in essence, the smaller this number is, the larger that this number here is going to be. But it's still a function of what's in the numerator too. And it's this difference between revenue and this variable cost. It's that spread there that works through the numerator to help increase that number.

That's all we have for this section. You're going to see within the module this completed as well. You can complete

this as well. There's a completed version of this that you can take a look at. The problem that you're going to have is going to be very similar to this. So you're going to be able to use this as a template to drive through the calculations that are required in the problem. So I'll see you on the next tutorial.