Interview Questions: Finance Interview Brainteasers by Vault

Perhaps even more so than tough finance questions, brainteasers can unnerve the most icy-veined, well-prepared finance candidate. Even if you know the relationships between inflation, bond prices and interest rates like the back of a dollar bill, all your studying may not help you when your interviewer asks you how many ping pong balls fit in a 747.

That is partly their purpose. Investment bankers and other finance professionals need to be able to work well under pressure, so many interviewers believe that throwing a brainteaser at a candidate is a good way to test an applicant's battle-worthiness. But these questions serve another purpose, too - interviewers want you to showcase your ability to analyze a situation, and to form conclusions about this situation. It is not usually important that you come up with a "correct" answer, just that you display strong analytical ability.

Remember, brainteasers are very unstructured, so it is tough to suggest a step-by-step methodology. There are a couple of set rules, though. First, take notes as your interviewer gives you a brainteaser, especially if it's heavy on the math. Second, think aloud so your interviewer can hear your thought process. Here are some samples:

1. *If you look at a clock and the time is 3:15, what is the angle between the hour and the minute hands?*

The answer to this is not zero! The hour hand, remember, moves as well. The hour hand moves a quarter of the way between three and four, so it moves a quarter of a twelfth (1/48) of 360 degrees. So the answer is seven and a half degrees, to be exact.

2. *You have a five-gallon jug and a three-gallon jug. You must obtain exactly four gallons of water. How will you do it?*

You should find this brainteaser fairly simple. If you were to think out loud, you might begin by examining the ways in which combinations of five and three can come up to be four. For example: (5 - 3) + (5 - 3) = 4. This path does not actually lead to the right answer, but it is a fruitful way to begin thinking about the question. Here's the solution: fill the three-gallon jug with water and pour it into the five-gallon jug. Repeat. Because you can only put two more gallons into the five-gallon jug, one gallon will be left over in the three-gallon jug. Empty out the five-gallon jug and pour in the one gallon. Now just fill the three-gallon jug again and pour it into the five-gallon jug. Ta-da. (Mathematically, this can be represented 3 + 3 - 5 + 3 = 4)

3. *You are faced with two doors. One door leads to your job offer (that's the one you want!), and the other leads to the exit. In front of each door is a guard. One guard always tells the truth. The other always lies. You can ask one question to decide which door is the correct one. What will you ask?*

The way to logically attack this question is to ask how you can construct a question that provides the same answer (either a true statement or a lie), no matter who you ask.

There are two simple answers. Ask a guard: "If I were to ask you if this door were the correct one, what would you say?" The truthful consultant would answer yes (if it's the correct one), or no (if it's not). Now take the lying consultant. If you asked the liar if the correct door is the

right way, he would answer no. But if you ask him: "If I were to ask you if this door were the correct one, what would you say," he would be forced to lie about how he would answer, and say yes. Alternately, ask a guard: "If I were to ask the other guard which way is correct, what would he say?" Here, the truthful guard would tell you the wrong way (because he is truthfully reporting what the liar would say), while the lying guard would also tell you the wrong way (because he is lying about what the truthful guard would say).
If you want to think of this question more mathematically, think of lying as represented by -1, and telling the truth as represented by +1. The first solution provides you with a consistently truthful answer because (-1)(-1) = 1, while (1)(1) = 1. The second solution provides you with a consistently false answer because (1)(-1) = -1, and (-1)(1) = -1.

VAULT

1. How many gallons of white house paint are sold in the U.S. every year?

THE "START BIG" APPROACH: If you're not sure where to begin, start with the basic assumption that there are 270 million people in the U.S. (or 25 million businesses, depending on the question). If there are 270 million people in the United States, perhaps half of them live in houses (or 135 million people). The average family size is about three people, so there would be 45 million houses in the United States. Let's add another 10 percent to that for second houses and houses used for other purposes besides residential. So there are about 50 million houses.

If houses are painted every 10 years, on average (notice how we deftly make that number easy to work with), then there are 5 million houses painted every year. Assuming that one gallon of paint covers 100 square feet of wall, and that the average house has 2,000 square feet of wall to cover, then each house needs 20 gallons of paint. So 100 million gallons of paint are sold per year (5 million houses x 20 gallons). (Note: If you want to be fancy, you can ask your interviewer whether you should include inner walls as well!) If 80 percent of all houses are white, then 80 million gallons of white house paint are sold each year. (Don't forget that last step!)

(more of this guesstimate on the next page)

THE "START SMALL" APPROACH: You could also start small, and take a town of 27,000 (about 1/10,000 of the population). If you use the same assumption that half the town lives in houses in groups of three, then there are 4,500 houses, plus another 10 percent, then there are really 5,000 houses to worry about. Painted every 10 years, 500 houses are being painted in any given year. If each house has 2,000 square feet of wall, and each gallon of paint covers 100 square feet, then each house needs 20 gallons - and so 10,000 gallons of house paint are sold each year in your typical town. Perhaps 8,000 of those are white. Multiply by 10,000 - you have 80 million gallons.

Your interviewer may then ask you how you would actually get that number, on the job, if necessary. Use your creativity - contacting major paint producers would be smart, putting in a call to HUD's statistics arm could help, or even conducting a small sample of the second calculation in a few representative towns is possible.

2. What is the size of the market for disposable diapers in China?

Here's a good example of a market sizing. How many people live in China? A billion. Because the population of China is young, a full 600 million of those inhabitants might be of child-bearing age. Half are women, so there are about 300 million Chinese women of childbearing age. Now, the average family size in China is restricted, so it might be 1.5 children, on average, per family. Let's say two-thirds of Chinese women have children. That means that there are about 200 million children in China. How many of those kids are under the age of two? About a tenth, or 20 million. So there are at least 20 million possible consumers of disposable diapers.

To summarize:

1 billion people x 60% childbearing age = 600,000,000 people
600,000,000 people x 1/2 are women = 300,000,000 women of childbearing age
300,000,000 women x 2/3 have children = 200,000,000 women with children
200,000,000 women x 1.5 children each = 300,000,000 children
300,000,000 children x 1/10 under age 2 = 30 million

3. How many square feet of pizza are eaten in the United States each month?

Take your figure of 300 million people in America. How many people eat pizza? Let's say 200 million. Now let's say the average pizza-eating person eats pizza twice a month, and eats two slices at a time. That's four slices a month. If the average slice of pizza is perhaps six inches at the base and 10 inches long, then the slice is 30 square inches of pizza. So four pizza slices would be 120 square inches. Therefore, there are a billion square feet of pizza eaten every month.

To summarize:

300 million people in America
200 million eat pizza
Average slice of pizza is six inches at the base and 10 inches long = 30 square inches (height x half the base)
Average American eats four slices of pizza a month
Four pieces x 30 square inches = 120 square inches (one square foot is 144 inches), so let's assume one square foot per person
200 million square feet a month

4. How would you estimate the weight of the Chrysler building?

This is a process guesstimate - the interviewer wants to know if you know what questions to ask. First, you would find out the dimensions of the building (height, weight, depth). This will allow you to determine the volume of the building. Does it taper at the top? (Yes.) Then, you need to estimate the composition of the Chrysler building. Is it mostly steel? Concrete? How much would those components weigh per square inch? Remember the extra step - find out whether you're considering the building totally empty or with office furniture, people, etc.? (If you're including the contents, you might have to add 20 percent or so to the building's weight.)

5. Why are manhole covers round?

The classic brainteaser, straight to you via Microsoft (the originator). Even though this question has been around for years, interviewees still encounter it.

Here's how to "solve" this brainteaser. Remember to speak and reason out loud while solving this brainteaser!

Why are manhole covers round? Could there be a structural reason? Why aren't manhole covers square? It would make it harder to fit with a cover. You'd have to rotate it exactly the right way. So many manhole covers are round because they don't need to be rotated. There are no corners to deal with. Also, a round manhole cover won't fall into a hole because it was rotated the wrong way, so it's safer.

Looking at this, it seems corners are a problem. You can't cut yourself on a round manhole cover. And because it's round, it can be more easily transported. One person can roll it.

6. If you look at a clock and the time is 3:15, what is the angle between the hourand the minute hands?

The answer to this is not zero! The hour hand, remember, moves as well. The hour hand moves a quarter of the way between three and four, so it moves a quarter of a twelfth (1/48) of 360 degrees. So the answer is seven and a half degrees, to be exact.

7. You have a five-gallon jug and a three-gallon jug. You must obtain exactly four gallons of water. How will you do it?

You should find this brainteaser fairly simple. If you were to think out loud, you might begin by examining the ways in which combinations of five and three can come up to be four. For example: (5 - 3) + (5 - 3) = 4. This path does not actually lead to the right answer, but it is a fruitful way to begin thinking about the question. Here's the solution: fill the three-gallon jug with water and pour it into the five-gallon jug. Repeat. Because you can only put two more gallons into the five-gallon jug, one gallon will be left over in the three-gallon jug. Empty out the five-gallon jug and pour in the one gallon. Now just fill the three-gallon jug again and pour it into the five-gallon jug. Ta-da. (Mathematically, this can be represented 3 + 3 - 5 + 3 = 4)

8. You have 12 balls. All of them are identical except one, which is either heavier or lighter than the rest. The odd ball is either hollow while the rest are solid, or solid while the rest are hollow. You have a scale, and are permitted three weighings. Can you identify the odd ball, and determine whether it is hollow or solid?

This is a pretty complex question, and there are actually multiple solutions. First, we'll examine what thought processes an interviewer is looking for, and then we'll discuss one solution.

Start with the simplest of observations. The number of balls you weigh against each other must be equal. Yeah, it's obvious, but why? Because if you weigh, say three balls against five, you are not receiving any information. In a problem like this, you are trying to receive as much information as possible with each weighing.

For example, one of the first mistakes people make when examining this problem is that they believe the first weighing should involve all of the balls (six against six). This weighing involves all of the balls, but what type of information does this give you? It actually gives you

no new information. You already know that one of the sides will be heavier than the other, and by weighing six against six, you will simply confirm this knowledge. Still, you want to gain information about as many balls as possible (so weighing one against one is obviously not a good idea). Thus the best first weighing is four against four.

Secondly, if you think through this problem long enough, you will realize how precious the information gained from a weighing is: You need to transfer virtually every piece of information you have gained from one weighing to the next. Say you weigh four against four, and the scale balances. Lucky you! Now you know that the odd ball is one of the unweighed four. But don't give into the impulse to simply work with those balls. In this weighing, you've also learned that the eight balls on the scale are normal. Try to use this information.

Finally, remember to use your creativity. Most people who work through this problem consider only weighing a number of balls against each other, and then taking another set and weighing them, etc. This won't do. There are a number of other types of moves you can make - you can rotate the balls from one scale to another, you can switch the balls, etc.

Let's look at one solution:

(more of this brainteaser on next page)

For simplicity's sake, we will refer to one side of the scale as Side A, and the other as Side B.

Step 1: Weigh four balls against four others.

Case A: If, on the first weighing, the balls balance
If the balls in our first weighing balance we know the odd ball is one of those not weighed, but we don't know whether it is heavy or light. How can we gain this information easily? We can weigh them against the balls we know to be normal. So:

> **Step 2 (for Case A):** Put three of the unweighed balls on the Side A; put three balls that are known to be normal on Side B.
>
> > I. If on this second weighing, the scale balances again, we know that the final unweighed ball is the odd one.
>
> **Step 3a (for Case A):** Weigh the final unweighed ball (the odd one) against one of the normal balls. With this weighing, we determine whether the odd ball is heavy or light.
>
> > II. If on this second weighing, the scale tips to Side A, we know that the odd ball is heavy. (If it tips to Side B, we know the odd ball is light, but let's proceed with the assumption that the odd ball is heavy.) We also know that the odd ball is one of the group of three on Side A.
>
> **Step 3b (for Case A):** Weigh one of the balls from the group of three against another one. If the scale balances, the ball from the group of three that was unweighed is the odd ball, and is heavy. If the scale tilts, we can identify the odd ball, because we know it is heavier than the other. (If the scale had tipped to Side B, we would use the same logical process, using the knowledge that the odd ball is light.)

Case B: If the balls do not balance on the first weighing

If the balls do not balance on the first weighing, we know that the odd ball is one of the eight balls that was weighed. We also know that the group of four unweighed balls are normal, and that one of the sides, let's say Side A, is heavier than the other (although we don't know whether the odd ball is heavy or light).

Step 2 (for Case B): Take three balls from the unweighed group and use them to replace three balls on Side A (the heavy side). Take the three balls from Side A and use them to replace three balls on Side B (which are removed from the scale).

I. If the scale balances, we know that one of the balls removed from the scale was the odd one. In this case, we know that the ball is also light. We can proceed with the third weighing as described in step 3b from Case A.

II. If the scale tilts to the other side, so that Side B is now the heavy side, we know that one of the three balls moved from Side A to Side B is the odd ball, and that it is heavy. We proceed with the third weighing as described in step 3b in Case A.

III. If the scale remains the same, we know that one of the two balls on the scale that was not shifted in our second weighing is the odd ball. We also know that the unmoved ball from Side A is heavier than the unmoved ball on Side B (though we don't know whether the odd ball is heavy or light).

Step 3 (for Case B): Weigh the ball from Side A against a normal ball. If the scale balances, the ball from Side B is the odd one, and is light. If the scale does not balance, the ball from Side A is the odd one, and is heavy.

(more of this brainteaser on next page)

Whew! As you can see from this solution, one of the keys to this problem is understanding that information can be gained about balls even if they are not being weighed. For example, if we know that one of the balls of two groups that are being weighed is the odd ball, we know that the unweighed balls are normal. Once this is known, we realize that breaking the balls up into smaller and smaller groups of three (usually eventually down to three balls), is a good strategy - and an ultimately successful one.

9. You are faced with two doors. One door leads to your job offer (that's the one you want!), and the other leads to the exit. In front of each door is a guard. One guard always tells the truth. The other always lies. You can ask one question to decide which door is the correct one. What will you ask?

The way to logically attack this question is to ask how you can construct a question that provides the same answer (either a true statement or a lie), no matter who you ask.

There are two simple answers. Ask a guard: "If I were to ask you if this door were the correct one, what would you say?" The truthful consultant would answer yes (if it's the correct one), or no (if it's not). Now take the lying consultant. If you asked the liar if the correct door is the right way, he would answer no. But if you ask him: "If I were to ask you if this door were the correct one, what would you say," he would be forced to lie about how he would answer, and say yes. Alternately, ask a guard: "If I were to ask the other guard which way is correct, what would he say?" Here, the truthful guard would tell you the wrong way (because he is

truthfully reporting what the liar would say), while the lying guard would also tell you the wrong way (because he is lying about what the truthful guard would say).

If you want to think of this question more mathematically, think of lying as represented by -1, and telling the truth as represented by +1. The first solution provides you with a consistently truthful answer because (-1)(-1) = 1, while (1)(1) = 1. The second solution provides you with a consistently false answer because (1)(-1) = -1, and (-1)(1) = -1.

10. A company has 10 machines that produce gold coins. One of the machines is producing coins that are a gram light. How do you tell which machine is making the defective coins with only one weighing?

Think this through - clearly, every machine will have to produce a sample coin or coins, and you must weigh all these coins together. How can you somehow indicate which coins came from which machine? The best way to do it is to have every machine crank a different number of coins, so that machine 1 will make one coin, machine 2 will make two coins, and so on. Take all the coins, weigh them together, and consider their weight against the total theoretical weight. If you're four grams short, for example, you'll know that machine 4 is defective.

11. The four members of U2 (Bono, the Edge, Larry and Adam) need to get across a narrow bridge to play a concert. Since it's dark, a flashlight is required to cross, but the band has only one flashlight, and only two people can cross the bridge at a time. (This is not to say, of course, that if one of the members of the band has crossed the bridge, he can't come back by himself with the flashlight.) Adam takes only a minute to get across, Larry takes two minutes, the Edge takes five minutes, and slowpoke Bono takes 10 minutes. A pair can only go as fast as the slowest member. They have 17 minutes to get across. How should they do it?

The key to attacking this question is to understand that Bono and the Edge are major liabilities and must be grouped together. In other words, if you sent them across separately, you'd already be using 15 minutes. This won't do. What does this mean? That Bono and the Edge must go across together. But they can not be the first pair (or one of them will have to transport the flashlight back).

Instead, you send Larry and Adam over first, taking two minutes. Adam comes back, taking another minute, for a total of three minutes. Bono and the Edge then go over, taking 10 minutes, and bringing the total to 13. Larry comes back, taking another two minutes, for a total of 15. Adam and Larry go back over, bringing the total time to 17 minutes.

12. What is the decimal equivalent of 3/16 and 7/16?

A commonly-used Wall Street interview question, this one isn't just an attempt to stress you out or see how quick your mind works. This question also has practical banking applications. Stocks often are traded at prices reported in 1/16s of a dollar. (Each 1/16 = .0625, so 3/16 = .1875 and 7/16 = .4375).

13. What is the sum of the numbers from one to 50?

Another question that recent analyst hires often report receiving. This is a relatively easy one: pair up the numbers into groups of 51 (1 + 50 = 51; 2 + 49 = 51; etc.). Twenty-five pairs of 51 equals 1275.

14. You have a painting that is $320 that is selling for 20 percent off. How much is the discounted price?

Calculate quickly: What's 80 percent of $320? The answer's $256. Even in a question like this, if you are good with numbers and use shortcuts, don't be afraid to talk aloud. For example: 80 percent of $320 can be broken down to a calculation like 80 percent of $80 x $4, or 162.

15. You're playing three-card monte. Two cards are red, one is black. (Note: In three-card monte, the three cards are face down and you try to pick the black card in order to win.) You pick the middle card. After you pick, the dealer shows that one of the cards you have not chosen is red. You are given the chance to switch your selection. Should you?

The short answer is yes. By switching, you are betting that the card you initially chose was red. By not switching, you are betting that the card you initially chose was black. And because two out of three cards are red, of course, betting on red is the way to go.

Let's break it down, starting with the not switching case. Say the first card you chose was the black one. This happens one-third of the time. If you do not switch your choice, you win. Needless to say, the other two-thirds of the time, having picked a red card, and deciding not to switch, you lose. In other words, if you do not switch, you win a third of the time.

Now let's examine what happens when you switch cards. Say the first card you chose was the black one. Again, this would happen one-third of the time. If, after being shown a red card, you switch, you lose. The other two-thirds of the time, if you switch, you win because the dealer has already shown you that one of the cards you did not pick is red. Given the premise that your original pick was a red card, the card you are switching to must be the black one. You will win two-thirds of the time.

16. A straight flush beats a four-of-a-kind in poker because it is more unlikely. But think about how many straight flushes there are - if you don't count wraparound straights, you can have a straight flush starting on any card from two to 10 in any suit (nine per suit). That means there are 36 straight flushes possible. But how many four of a kinds are there - only 13. What's wrong with this reasoning?

Immediately, you should think about what the difference is between a straight flush and a four-of-a-kind. One involves five cards, and the other involves four. Intuitively, that's what should strike you as the problem with the line of reasoning. Look closer and you'll see what that means: for every four of a kind, there are actually a whole bunch of five-card hands: 48 (52 - 4) in fact. There are actually 624 (48 x 13) of them in all.

17. If you have seven white socks and nine black socks in a drawer, how many do you have to pull out blindly in order to ensure that you have a matching pair?

Three. Let's see - if the first one is one color, and the second one is the other color, the third one, no matter what the color, will make a matching pair. Sometimes you're not supposed to think that hard.

18. Tell me a good joke that is neither sexist nor racist.

If you can't think of any, you're in the same boat as the unfortunately tongue-tied recent candidate at Salomon Smith Barney. Find one and remember it.

19. If I were to fill this room with pennies, how many pennies would fit in?

A literally in-your-face guesstimate.

20. Say you are driving on a one-mile track. You do one lap at 30 miles an hour. How fast do you have to go to average 60 miles an hour?

This is something of a trick question, and was recently received by a Goldman candidate. The first thought of many people is to say 90 miles an hour, but consider: If you have done a lap at 30 miles an hour, you have already taken two minutes. Two minutes is the total amount of time you would have to take in order to average 60 miles an hour. Therefore, you can not average 60 miles an hour over the two laps.

*Guesstimates are commonly asked in consulting and investment banking interviews. Generally, your interviewer asks you to estimate the number or size of something, and observes your reasoning process. Most interviewers don't care if you actually get the correct number - what they want to see is that you are able to logically think through a process, creatively think through any possible exceptions or short cuts, and calculate basic sums in your head. You won't be given any real data (though you won't need to know much more beyond the fact that the United States has about 270 million inhabitants and 25 million businesses), and you shouldn't request any; it's irrelevant to the problem at hand. Make reasonable assumptions, with easy-to-work-with numbers, and go from there (remember that you're expected to use a pen and notepad to work through your calculations). These guesstimates may also involve elements of creativity and problem solving. For example, when posed the question "How much change would you find on the floor of a mall?" you might want to ask "Is there a fountain in the mall?"

Sample guesstimate:

1. How many gallons of white housepaint are sold in the U.S. each year?

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Other guesstimates:

1. How much orange juice is consumed each day in America?
2. How many golf balls would fit into a 747?
3. How many grocery stores are there in the U.S.?
4. What's the size of

Stock Interview Questions

1. What kind of stocks would you issue for a startup?

A startup typically has more risk than a well-established firm. The kind of stocks that one would issue for a startup would be those that protect the downside of equity holders while giving them upside. Hence the stock issued may be a combination of common stock, preferred stock and debt notes with warrants (options to buy stock).

2. When should a company buy back stock?

When it believes the stock is undervalued and believes it can make money by investing in itself. This can happen in a variety of situations. For example, if a company has suffered some decreased earnings because of an inherently cyclical industry (such as the semiconductor industry), and believes its stock price is unjustifiably low, it will buy back its own stock. On other occasions, a company will buy back its stock if investors are driving down the price precipitously. In this situation, the company is attempting to send a signal to the market that it is optimistic that its falling stock price is not justified. It's saying: "We know more than anyone else about our company. We are buying our stock back. Do you really think our stock price should be this low?"

3. Is the dividend paid on common stock taxable to shareholders? Preferred stock? Is it tax deductible for the company?

The dividend paid on common stock is taxable on two levels in the U.S. First at the firm level, as a dividend comes out from the net income after taxes (i.e., the money has been taxed

once already) and then at the shareholder level. The shareholders are taxed for the dividend as ordinary income (O.I.). Dividend for preferred stock is treated as an interest expense and is tax-free at the corporate level.

4. When should a company issue stock rather than debt to fund its operations?

There are several reasons for a company to issue stock rather than debt. The first is if it believes its stock price is inflated, and it can raise money (on very good terms) by issuing stock. The second is when the projects for which the money is being raised may not generate predictable cash flows in the immediate future. A simple example of this is a startup company. The owners of startups generally will issue stock rather than take on debt because their ventures will probably not generate predictable cash flows, which is needed to make regular debt payments, and also so that the risk of the venture is diffused among the company's shareholders. A third reason for a company to raise money by selling equity is if it wants to change its debt-to-equity ratio. This ratio in part determines a company's bond rating. If a company's bond rating is poor because it is struggling with large debts, they may decide to issue equity to pay down the debt.

5. Why would an investor buy preferred stock?

(1.) An investor that wants the upside potential of equity but wants to minimize risk would buy preferred stock. The investor would receive steady interest-like payments (dividends) from the preferred stock that are more assured than the dividends from common stock. (2.) The preferred stock owner gets a superior right to the company's assets should the company go bankrupt. (3.) A corporation would invest in preferred stock because the dividends on preferred stock are taxed at a lower rate than the interest rates on bonds.

6. Why would a company distribute its earnings through dividends to common stockholders?

Regular dividend payments are signals that a company is healthy and profitable. Also, issuing dividends can attract investors (shareholders). Finally, a company may distribute earnings to shareholders if it lacks profitable investment opportunities.

7.What stocks do you like?

This is a question often asked of those applying for equity research positions. (Applicants for investment banking and trading positions, as well as investment management positions have also reported receiving this question.) If you're interviewing for one of these positions, you should prepare to talk about a couple of stocks you believe are good buys and some that you don't. This is also a question asked of undergraduate finance candidates to gauge their level of interest in finance.

8. What did the S&P 500 close at yesterday?

Another question designed to make sure that a candidate is sincerely interested in finance. This question (and others like it - "What's the Dow at now?" "What's the yield on the Long Bond?") can be expected especially of those looking for sales and trading positions.

9. Why did the stock price of XYZ company decrease yesterday when it announced increased quarterly earnings?

A couple of possible explanations: 1) the entire market was down, (or the sector to which XYZ belongs was down), or 2) even though XYZ announced increased earnings, the Street was expecting earnings to increase even higher.

10. Can you tell me about a recent IPO that you have followed?

Read *The Wall Street Journal* and stay current with recent offerings.

11. What is your investing strategy?

Different investors have different strategies. Some look for undervalued stocks, others for stocks with growth potential and yet others for stocks with steady performance. A strategy could also be focused on the long-term or short-term, and be more risky or less risky. Whatever your investing strategy is, you should be able to articulate these attributes.

12. How has your portfolio performed in the last five years?

If you are applying for an investment management firm as an MBA, you'd better have a good answer for this one. Also, if you think you are going to say it has outperformed the S&P each year, you better be well prepared to explain why you think this happened.

13. If you read that a given mutual fund has given 50% returns last year, would you invest in it?

You should look for more information, as past performance is not necessarily an indicator of future results. How has the overall market done? How did it do in the years before? Why did it give 50% returns last year? Can that strategy be expected to work continuously over the next five to 10 years? You need to look for answers to these questions before making a decision.

14. ou are in the board of directors of a company and own a significant chunk of the company. The CEO, in his annual presentation states that the company's stock is doing as it has gone up 20% in the last 12 months. Is the company's stock doing well?

Another "trick" stock question that you should not answer too quickly. First, ask what the Beta of the company is. (Remember, the Beta represents the volatility of the stock with respect to the market.) If the Beta is 1 and the market (i.e. the Dow Jones Industrial Average) has gone up 35%, the company actually has not done too well in the stock market.

15. What is your Beta?

Don't be too surprised if an interviewer asks you this question. He/she could be doing this to throw you off guard! Take it in the spirit and reply based on how "risky" you think you are!

16. What do you think is happening with ABC stock?

Expect to be asked this question if you say you like to follow the Internet sector or the pharmaceutical sector. Interviewers will test you to see how well you know your industry. In case you don't know that stock, admit it, and offer to describe a stock in that sector that you like or have been following.

17. Where do you think the DJIA will be in three months and six months - and why?

Nobody knows the answer to this one. However, you should at least have some thoughts on the subject and be able to articulate why you think this is the case. If you have been following the performance of major macroeconomic indicators (which will be reviewed in the next section), you can state your case well.

18. Why do some stocks rise so much on the first day of trading and others don't? How is that "money left on the table?"

By "money left on the table," bankers mean that the company could have successfully completed the offering at a higher price, and that the difference in valuation thus goes to initial investors rather than the company. Why this happens and when it will happen is not easy to predict from responses received from investors during roadshows. Moreover, if the stock rises a lot the first day it is good publicity for the firm. But in many ways it is money left on the table because the company could have sold the same stock in its initial public offering at a higher price. However, bankers must honestly value a company and its stock over the long-term, rather than simply trying to guess what the market will do. Even if a stock trades up significantly initially, a banker looking at the long-term would expect the stock to come down, as long as the market eventually correctly values it.

19. What is insider trading and why is it illegal?

Undergraduates may get this question as feelers of their business knowledge. Insider trading describes the illegal activity of buying or selling stock based on information that is not public information. This is to prevent those with privileged information (company execs, I-bankers and lawyers) from using this information to make a tremendous amount of money unfairly.

20. Who is a more senior creditor, a bondholder or stockholder?

The bondholder is always more senior. Stockholders (including those who own preferred stock) must wait until bondholders are paid during a bankruptcy before claiming company assets.

Bonds and interest rates

1. How are bonds priced?

Bonds are priced based on the net present value of all future cash flows expected from the bond.

2. How would you value a perpetual bond that pays you $1,000 a year in coupons?

Divide the coupon by the current interest rate. For example, a corporate bond with an interest rate of 10% that pays $1,000 a year in coupons would be worth $10,000.

3. When should a company issue debt instead of issuing equity?

First, a company needs a steady cash flow before it can consider issuing debt (otherwise, it can quickly fall behind interest payments and eventually see its assets seized). Once a company can issue debt, it will do so for a couple of main reasons.

If the expected return on equity is higher than the expected return on debt, a company will issue debt. For example, say a company believes that projects completed with the $1 million raised through either an equity or debt offering will increase its market value from $4 million to $10 million. It also knows that the same amount could be raised by issuing a $1 million bond that requires $300,000 in interest payments over its life. If the company issues equity, it will have to sell 20% of the company ($1 million / $4 million). This would then grow to 20% of $10 million, or $2 million. Thus, issuing the equity will cost the company $1 million ($2 million - $1 million). The debt, on the other hand, will only cost $300,000. The company will therefore choose to issue debt in this case, as the debt is "cheaper" than the equity.

Also, interest payments on bonds are tax deductible. A company may also wish to issue debt if it has taxable income and can benefit from tax shields.

4. What major factors affect the yield on a corporate bond?

The short answer: (1) interest rates on comparable U.S. Treasury bonds, and (2) the company's credit risk. A more elaborate answer would include a discussion of the fact that corporate bond yields trade at a premium, or "spread," over the interest rate on comparable U.S. Treasury bonds. (For example, a five-year corporate bond that trades at a premium of 0.5%, or "50 basis points," over the five-year Treasury note is priced at "50 over.") How large this "spread" is depends on the company's credit risk: the riskier the company, the higher the interest rate the company must pay to convince investors to lend it money and, therefore, the wider the spread over U.S. Treasuries.

5 If you believe interest rates will fall, which should you buy: a 10-year coupon bond or a 10-year zero coupon bond?

The 10-year zero coupon bond. A zero coupon bond is more sensitive to changes in interest rates than an equivalent coupon bond, so its price will increase more if interest rates fall.

6. Which is riskier: a 30-year coupon bond or a 30-year zero coupon bond?

A 30-year zero coupon bond. Here's why: A coupon bond pays interest semi-annually, then pays the principal when the bond matures (after 30 years, in this case). A zero coupon bond pays no interest, but pays one lump sum upon maturity (after 30 years, in this case). The coupon bond is less risky because you receive some of your money back before over time, whereas with a zero coupon bond you must wait 30 years to receive any money back. (Another answer: The zero coupon bond is more risky because its price is more sensitive to changes in interest rates.)

7. What is The Long Bond trading at?

The Long Bond is the U.S. Treasury's 30-year bond. In particular for sales & trading positions, but also for corporate finance positions, interviewers want to see that you're interested in the financial markets and follow them daily. If the price of the 10-year Treasury note rises, does the note's yield rise, fall or stay the same?

8. Bond yields move in the opposite direction of bond prices.

Therefore, if the price of a 10-year note rises, its yield will fall.

9 If you believe interest rates will fall, should you buy bonds or sell bonds?

Since bond prices rise when interest rates fall, you should buy bonds. *10. How many "basis points" equal ? percent?*

Bond yields are measured in "basis points," which are 1/100 of 1%. 1% = 100 basis points. Therefore, ? percent = 50 basis points.

11. Why can inflation hurt creditors?

Think of it this way: If you are a creditor lending out money at a fixed rate, inflation cuts into the percentage that you are actually making. If you lend out money at 7% a year, and inflation is 5%, you are only really clearing 2%.

12. How would the following affect the interest rates? U.S. bombers attack Iraq (again). The President is impeached and convicted.

While it can't be said for certain, chances are that these kind of events will lead to fears that the economy will go into recession, so the Fed would want to balance that by giving expansionary signals and lowering interest rates.

13. What does the government do when there is a fear of hyperinflation?

The government has fiscal and monetary policies it can use in order to control hyperinflation. The monetary policies (the Fed's use of interest rates, reserve requirements, etc.) are discussed in detail in this chapter. The fiscal policies include the use of taxation and government spending to regulate the aggregate level of economic activity. Increasing taxes and decreasing government spending slows down growth in the economy and fights inflationary fears.

14. Where do you think the U.S. economy will go over the next year?

Talking about the U.S. economy encompasses a lot of topics: the stock market, consumer spending, unemployment, etc. Underlying all these topics are the way interest rates, inflation, and bonds interact. Make sure you can speak articulately about the concepts discussed in this chapter as they relate to the current situation.

15. How would you value a perpetual zero coupon bond?

The value will be zero. A zero coupon doesn't pay any coupons, and if that continues on perpetually, when do you get paid? Never - so it ain't worth nothing!

16. Let's say a report released today showed that inflation last month was very low. However, bond prices closed lower. Why might this happen?

Bond prices are based on expectations of future inflation. In this case, you can assume that traders expect future inflation to be higher (regardless of the report on last month's inflation

figures) and therefore they bid bond prices down today. (A report which showed that inflation last month was benign would benefit bond prices only to the extent that traders believed it was an indication of low future inflation as well.)

17. If the stock market falls, what would you expect to happen to bond prices, and interest rates?

Bond prices increase and interest rates fall.

18. If unemployment is low, what happens to inflation, interest rates, and bond prices?

Inflation goes up, interest rates also increase, and bond prices decrease.

BOND YIELD = INTEREST PAID

BOND PRICE

***as price rises, yield goes down**

Derivatives Questions

1. When would you write a call option on Disney stock?

When you expect the price of Disney stock to fall (or stay the same). Because a call option on a stock is a bet that the value of the stock will increase, you would be willing to "write" (sell) a call option on Disney stock to an investor if you believed Disney stock would not rise. (In this case, the profit you would make would be equal to the option premium you received when you sold the option.)

2. Explain how a swap works.

A swap is an exchange of future cash flows. The most popular forms include foreign exchange swaps and interest rate swaps. They are used to hedge volatile rates, such as currency exchange rates or interest rates.

3. Say I hold a put option on Amazon.com stock with an exercise price of $250, the expiration date is today, and Amazon is trading at $220. About how much is my put worth, and why?

Your put is worth about $30, because today, you can sell a share of stock for $250, and buy it for $220. (If the expiration date were in the future, the option would be more valuable, because the stock could conceivably drop more.)

4. When would a trader seeking profit from a long-term possession of a future be in the "long position"?

The trader in the long position is committed to buying a commodity on a delivery date. She would hold this position if she believes the commodity price will increase.

5. All else being equal, which would be less valuable: a December put option on Amazon.com stock or a December put option on Bell Atlantic stock?

The put option on Bell Atlantic should be less valuable. Amazon.com is a more volatile stock, and the more volatile the underlying asset, the more valuable the option.

6. All else being equal, which would be more valuable: a December call option for eBay or a January call option for eBay?

The January option: The later an option's expiration date, the more valuable the option.

7. Why do interest rates matter when figuring the price of options?

Because of the ever-important concept of net present value, higher interest rates lower the value of options.

8. If the strike price on a put option is below the current price, is the option holder at the money, in the money or out of the money?

Because a put option gives the holder the right to sell a security at a certain price, the fact that the strike (or exercise) price is below the current price would mean that the option holder would lose money. Translate that knowledge into option lingo, and you know that the option holder is "out of the money."

9. If the current price of a stock is above the strike price of a call option, is the option holder at the money, in the money, or out of the money?

Because a call option gives the holder the right to buy a security, the holder in this scenario is "in the money" (making money).

10. When would you buy a put option on General Mills stock?

Because buying a put option gives you the option to sell the stock at a certain price, you would do this if you expect the price of General Mills stock to fall.

10 Things They Hate About You

by Anita Kapadia

Investment banking interviews are starting up and soon there will be scores of disappointed candidates who didn't get an offer from the bulge-bracket bank of their choice. The reasons

might not always be clear, and sometimes it's just a matter of numbers -- they only have so many spots and too many qualified candidates. But sometimes, a mistake made in your interview can be the difference.

Investment banks move fast. They are especially aggressive in pursuit of the candidates they want. Interviewers often congregate at the end of the "Super Saturday" to discuss and rank candidates. Offers and rejections are often extended within a day or two. The decisions are made rapidly, often on the basis of one or two interviewers' opinions. However, when you get a call from the firm, don't expect a detailed summary of the reasons for your rejection. "We're not able to make you an offer," may be the extent of the explanation from the investment banker who has the unfortunate task of turning you down.

So why did you get turned down? Vault spoke with some investment bankers to get a sense of the main factors that cause I-banks to turn down candidates. The result of our discussions is the following list of the 10 most common reasons for rejection. If you're still interviewing, you might want to keep this list in mind before you enter that room for a two-on-one interview at your favorite investment bank.

Here are the top 10 things they hate about you:

Arrogance
Bankers are supposed to be cocky, aren't they? Not true, our banker sources replied. "Arrogance and confidence are too easily confused," said one. "This is still a business where people expect you to pay your dues. You're not going to make it if you think you're too good for a project." Another source said, "One of the most important aspects to succeeding in this business is getting along with people. All kinds of unusual and sometimes difficult personalities occupy senior positions. The last thing we need is a fresh MBA with a big mouth."

A lack of "crispness"
Other sources replaced "crisp" with the words "sharp" or "polished" to describe a candidate that "has it together." Basically, the bankers noted that candidates have to be well prepared. "You would be surprised how many people don't know how to walk you through their resumes. You have to know your story and tell it convincingly," advised one source. Another added a caveat to preparing oneself for the interview. "Don't be too slick. I hate when I feel like I'm hearing a rehearsed speech word for word."

A lack of social skills
"I've been bored by people in interviews," said one I-banking source. "I hate to say it, because it sounds so elitist. But investment banks are selective organizations - highly selective - and some people have great resumes and no personalities." Another added, "It's a people business. I'm not saying that everybody at [my firm] is the most exciting person, but there are basic sociability requirements." One more I-banker said his selections process includes a beer test. "I basically ask myself: could I sit down and have a beer with this person?"

Apathetic
Some people are boring, and others are *bored*. "Enthusiasm is key. I don't want someone giving me a line about how much they love working all night, but I like to see some energy," explained one source. Another I-banker added, "It's important that people think you're ready to go. A lot of us get burned out sometimes, and it's refreshing to meet someone who has just had a two-year vacation [that is, business school], and is raring to go. I like to hear that

they're looking forward to getting back to work. Some people come in here and seem so exhausted. I think, if they're tired now, what will they do when they haven't slept in two days? I guess some people get nervous and just clam up. That's going to hurt you a lot in an interview."

Shut up already
The opposite site of the "clam-up" problem, one source told us is "verbal diarrhea." "Some people, I guess," our source explained, "get nervous and they talk. And talk and talk. You give them a simple question, something that should take them one minute to answer, and you end up listening to a life history." "Brevity is key," another source added. "In banking, speed and efficiency are key. There's no room for rambling."

Not tough enough
"One thing I hear a lot [in meetings when candidates are discussed]," one source explained, "is people saying: "that guy would get killed in this job."" Despite efforts by investment banks to promote more positive work environments, at least one insider told us that "you still need to be tough. I meet someone sometimes and know 100 percent that the person would get eaten alive here." Projecting an ability to handle the unexpected is part of the toughness that interviewers seek. As one source explained, "I'm sure that a lot of these candidates we turn away might be able to hack it, but no one wants to take a chance on a maybe."

Doesn't demonstrate enough quantitative skills
"Some candidates just don't make me feel like they can handle the numbers," said one source. "It's a tough thing to explain, because it has a lot of components. If they don't seem to have the coursework or professional background, I worry that they won't be comfortable with the quantitative side of things. A lot of candidates don't seem to realize the problem in their resume and so they never go out of their way to show us that they have the skills. I think that's key, looking at your resume and finding the blanks."

Personality doesn't fit with the firm
"Once in a while," one source explained, "you meet someone who you know will just hate it here." He went on to say that this situation was often a combination of various factors, some of which we've already listed. "They could be a fine banker, but something about their philosophy or their personality doesn't seem to fit. I don't want it to sound snobbish because it's not about being good enough. Certain places have personalities. Big places are often very different form small places. Some people want a lot of structure, and some people can't stand too much structure, for instance. People here often say, "I could never have worked at such and such bank." I've found that people who like the Merrill culture and people who like the Goldman culture are often very different, for example. There's a dynamic that you have to keep in mind when you're recruiting people."

Little white lies
"It seems like at least once during each Super Saturday session," one source reported, "we get one candidate who gets caught lying on his resume. Not an outright, ridiculous lie, but someone will ask them about something on their resume and it will be obvious that the candidate doesn't know as much about a project as his resume might imply." Another source agrees, and says that a rejection is guaranteed if someone uncovers a "highly embellished resume." "People are going to ask you about your resume. If something looks too good to be true, you'll be called out on it," he comments. "Be prepared. And don't lie. If you said you worked on some complicated transaction, you better be prepared to discuss it."

It's not you, it's me

"Sometimes," one source says, "one [interviewer] will really have a bad reaction to somebody." Many of our sources agreed that people had been rejected based on an unexplainable reaction by one (usually senior) person. "I feel bad even saying it, because I'm not sure what kind of advice I could offer to prevent it from happening." One source adds, "I would say that some candidates have a tendency to focus on their next answer and don't concentrate on gauging how they're doing with the interviewer. Sometimes if you pick up a bad vibe from someone, you can perform some damage control." Another source was less optimistic about these situtations. "Some people decide they don't like a candidate the second he walks into the room. That's just the luck of the draw if you get one of those interviewers. I wouldn't say a lot of people are like that, but they are out there. To some extent, interviewing is a crapshoot. Some people get lucky, others don't."