Multiple Choice (2 points each)

Provide all MC responses on the first page of your blue book.

1. An exponential discounter is indifferent between $100 now and $125 in 3 weeks. What is their approximate one-week δ?
   a. 0.8
   b. 0.93
   c. 0.97
   d. 1.25

   We start with $100 = 125 * \delta^3$ so that $\delta = 0.8^{1/3} = 0.93$

2. Consider a present-biased individual with daily $\beta = 0.5$ and $\delta = 1$. How much do you need to pay them 2 days from now to make them indifferent between that amount and $100 today?
   a. $25
   b. $50
   c. $100
   d. $200
   e. $400

   Since it isn't today, it is worth only half as much, so $200.

3. Suppose you offer a present-biased individual with daily $\beta = 0.8$ and $\delta = 0.99$ a choice between $100 today and $125 in 5 days' time. What will they choose?
   a. They will be indifferent between the two options
   b. $100 today
   c. $125 in 5 days' time
   d. We require more information to answer the question

   We are comparing $100 and $125 * 0.8 * 0.99\wedge5. The first of these is larger

4. Consider Ella, whom you know to be an exponential discounter. You offer Ella a choice between $200 today and $250 in a month. She chooses $250 in a month. You now offer Ella the choice between $200 in 6 months versus $250 in 7 months. What will she choose?
   a. $200 in 6 months
   b. $250 in 7 months
   c. We require more information on her preferences to answer this question

   Payoffs a month later are worth a (constant) δ less for an exponential discounter. So money is worth that much less if it comes a month later,

5. Consider Edward, who has preferences that are well-described by quasi-hyperbolic discounting. You know that the one-month β is less than 0.9 for Edward. When offered a choice between $200 in 6 months and $250 in 7 months, he chooses $250 in 7 months. You now offer Edward the choice between $200 today versus $250 in a month. What will he choose?
   a. $200 in today
   b. $250 in a month
   c. **We require more information on her preferences to answer this question**

   A lot **of people got this one wrong. The fact that Edward will wait for the higher payoff for something that is off in the future tells us that his one-month δ is at least 0.8. But for the immediate choice, we also need to consider his β – if it is sufficiently high, he may still prefer the bigger payoff later on. If it's sufficiently low, he'll prefer the immediate payoff.**

6. Consider Emily, who also has preferences that are well-described by quasi-hyperbolic discounting. You know that $\beta < 0.8$ for Emily. When offered a choice between $200 in 6 months and $250 in 7 months, she chooses $250 in 7 months. You now offer Emily the choice between $200 in a month versus $250 in 7 months. What will she choose?
   a. **$200 in today**
   b. $250 in a month
   c. We require more information on her preferences to answer this question

   Regardless of Emily's δ, she will prefer the immediate payoff, since $250 * \beta < 250 * 0.8 = 200$.

7. *Based on our class discussion*, the most compelling argument for payday loan regulation is:
   a. Payday borrowers often do not understand the payday loan product (e.g., costs associated with a given payday loan)
   b. **Payday borrowers often misperceive how they are likely to use payday loans**
   c. Both of the above were equally important in our discussions
   d. Neither of the above represent important reasons for regulating payday lending

   This is straight from class discussion. The results, e.g., of the Pew study suggest that borrowers believe they understand the payday loan product. The findings from the Allcott et al study suggest that they expect they will take out fewer payday loans than they actually do.

8. Consider a naive present-biased individual who is participating in a variant on the Ariely and Wertenbroch study we went through in class. Instead of being randomly assigned to Group A or B or C, subjects are instead permitted to *choose* which group they are in. It is free to join Group B. In order to join Group A or Group C, subjects need to pay a small fee ($0.50) out of their earnings. The naïve present-biased subject will most plausibly choose:
    a. Group A – evenly spaced deadlines
    b. **Group B – final deadline only**
    c. Group C – pick own deadlines

    A naïve present-biased individual doesn't see the need to have any commitment/deadlines, and so is certainly unwilling to pay for them

9. The findings of the Ausubel credit card study (in which interest rates and teaser rate length were randomly varied) suggest that, when it comes to credit card contracts:
    a. The exponential model works quite well in explaining customers' enrollment decisions
    b. **Enrollment decisions are better explained by a model that incorporates present bias**
    c. Credit card customers are generally very poor

    This is why teaser rates (next question) are so influential

10. Consider the following contracts from the Ausubel study. Pick the one that is the cheapest way to attract an additional customer:
    a. **6 month teaser rate of 4.9%, post-intro rate of 20 percent**
    b. 6 month teaser rate of 7.9%, post-intro teaser rate of 12 percent
    c. It depends on sensitivity of customers to short- versus long-term interest rates, and there is insufficient information in the study to answer.

    Again this is straight from our discussion of the paper – low introductory rates attract customers and cost the bank relatively little

Short Answer Questions [Please make sure to explain your answers carefully and concisely, i.e. do not simply write a numeric answer without an explanation of how you arrived at this answer. Answers without adequate explanation will not receive full credit.]

1. (4 points each) Answer True, False, or Uncertain for each of the following, and provide a few sentences of explanation, ideally using an example, counterexample, or discussion from class:

    a. Someone who is a quasi-hyperbolic discounter will <u>always</u> put less value on utility a year in the future as compared to the present, relative to an exponential discounter.

        False. Just think of someone with a very modest present bias – say $\beta = 0.95$ – and a high δ – and compare them to an exponential

discounter with a low δ, e.g., $\delta = 0.8$. Note that some students answered "true" and assumed the same δ for both types. We gave partial credit for this answer.

b. Sophisticated present-biased individuals will <u>never</u> take out payday loans.

False. Sophistication may affect whether someone seeks commitments to avoid payday borrowing, or the extent to which someone accurately predicts their future borrowing behavior. But such a person may still do things with high future costs relative to present benefits. We gave partial credit if answered True with the reasoning that sophisticated people are aware of their present bias and want to avoid the undesired rollovers.

2. Consider the following "behavioral" labor contract of the type we discussed in class. That is, workers have the chance to set an output target for themselves. If they fall short of the target their payment will be <u>half</u> of the piece rate, and if they hit or exceed their target, their payment will be the piece rate.

So, for example, suppose a worker sets a target of 2000 pages, and the piece rate is 2 rupees per page. If they complete 1500 pages, they will be paid 1500 rupees (1 rupee per page); if they complete 1999 pages they will be paid 1999 rupees; if 2000 pages, it jumps up to 4000 rupees (2 rupees per page) etc.

(4 x 3 points) In the first set of questions, we will consider four 'types' of workers. In each case, write down: (a) will they set a target for themselves? (b) if they do set a target, will it make them: (i) definitely better off; (ii) definitely worse off; (iii) can't say. Explain your reasoning in up to a few sentences each.

a. Exponential discounter

(a) No, no target, because exponential discounters set plans for themselves and stick to them

b. Fully naïve present-biased

(b) No, no target, because naïve present-biased individuals don't realize that they won't stick to the plans they make

c. Fully sophisticated present-biased

(c) Yes, they will set a target because they recognize their tendency to slack off early in the week. It will make them better off because they accurately forecast the target that will motivate them to work hard

earlier in the week.

d. Partially naïve present-biased.

   (d) They might or might not set a target. Certainly if you said yes, we accepted that for full marks. Will it make them better off? Depends – as discussed in class, they might set too aggressive a target because they underestimate their present-bias, which will lead to lower earnings.

e. (3 points) Consider a worker who is fully naïve present-biased. Describe (possibly with a graph) how you expect their output to vary over the pay cycle (e.g., if payday is Friday, how much work will they do on Monday, Tues, etc.) before the target contract is offered? And after the target contract is offered?

   Before, they will work more as the week progresses. A fully naïve person won't set a target so the offer won't affect them.

f. (3 points) Repeat part (e) for a worker who is fully sophisticated.

   Before, they will work more as the week progresses. A fully sophisticated person will set a target to motivate harder work earlier in the week, and so their productivity profile will be flatter after the target is offered.

3. Consider a payday borrower – let's call him George – who takes out a payday loan of $200 in order to pay off an overdue bill, and has to pay back the loan two weeks later plus a 20 percent charge.

   Two weeks have now passed. So for this question, assume that George has $240 in payday debt, and is considering what to do.

   Specifically, he faces the choice between paying off the loan plus service charge (i.e., $240), or rolling over the loan by taking out a new $240 loan from the payday lender, which will be due in two weeks, plus a further 20 percent charge (so that in two weeks he will owe $288=$240*1.2).

   Finally, let us assume (as is roughly the case) that payday lenders will not make a loan such that the payback amount exceeds the applicant's two-week earnings. We will assume that George earns $400 every 2 weeks, so the lender will be willing to offer him a loan of, e.g., $330 (since the payback of $330*1.2 = 396 < 400) but will not be willing to extend a loan of, say, $340 (since this would require a payback of 340*1.2 = 408 > 400).

a. (6 points) Suppose George has quasi-hyperbolic preferences, with a two-week $\beta = .8$ and $\delta = 1$ (assume these values for George for all other parts as well). Suppose, furthermore, he is naïve about his present bias. Will he roll over his loan? If so, when will he stop doing so?

Note that many people didn't get the timing quite right and allowed for a 4ᵗʰ period. We did not deduct any points for this – it only made the question a bit harder.

The first thing to realize is that George can roll things over at most 3 times. Why? Because 200*1.2^4 > 400. So there are essentially just 3 "periods" and 2 decision points. You can provide an adequate analysis without a table but I'm going to use one here, as I prefer to think it through in this way.
(How do we know George will roll over the loan repeatedly without looking at a table? Because the benefit of money now versus pain later is captured by, e.g., $200 - $200*1.2*0.8 > 0. This will be true for any loan George takes out – the short-term benefit always exceeds the perceived pain that is 2 weeks away (240 - $240*1.2*.8 > 0 etc). When will George stop? He will continue until the payback exceeds $400, which is 2 rollovers ($240*1.2^3 > 400, so the third rollover won't be allowed.)

Now, to the table:

Perspective	t=1	t=2	t=3	Ranking
Inst. Utility	-240	-288	-346	1,2,3
t=1	-240	-230	-277	2,1,3
t=2	X	-288	-277	3,2

The naïve person works forward through this thinking he'll do it at 2, then postponing till 3, at which point he has to pay it back

b. (4 points) Now suppose that he is sophisticated about his present-bias. Will he roll over the loan? If so, when will he stop doing so?

A sophisticated present-biased George will compare paying $240 in the present to eventually having to pay $345.60 a month later, which is what will happen if he keeps postponing, and $345.60*0.8 is still bigger than $240.

It is again a bit easier to see this from the table above.

[These next two parts are harder]

c. (4 points) Suppose that, when George goes in to pay back his original loan, the company gives George the opportunity to commit, in advance, how many times he will be allowed to roll over his loan, including the possibility that he be forced to pay back the loan right away and not roll it over at all. The company will charge him a very small fee for this service (let's say $0.25).

    To be clear, if he signs the contract, he can choose whatever limit he wants – no rollovers (i.e., so he has to pay back the $240 without extending the loan any longer), a single rollover (so he will have to pay back $288 in two weeks), 2 rollovers, etc. Assume that the contract is *completely* binding.

    Will George choose to sign such a contract if he is naïve about his present bias? And if so, what will he choose as the cap on number of rollovers?

    So, it's the usual answer for the naïve present-biased individual – he doesn't see any need for commitment so he won't sign the contract.

d. [Bonus](4 points) For the previous question, will George choose to sign the commitment contract if he is sophisticated about his present bias? And if so, what will he choose as the cap on number of rollovers?

    It is considerably trickier for the sophisticated type. When considering the possible rollovers, what George prefers the most is a single rollover, so that is what he commits to.

e. [Bonus] (6 points) Suppose that the contract in (c) is unavailable. Instead, let us now assume that the Consumer Finance Protection Bureau *imposes* a maximum of 1 rollover. (so the most he could do is roll over his $240 loan and pay back $288 in 2 weeks).

    Under this new rule, will George roll over his loan if he is naïve about his present bias?

    Under this new rule will George roll over his loan if he is sophisticated about his present bias?

    They will both allow the loan to roll over exactly once.