GOING ONCE, GOING TWICE

How much should you bid in an auction?

name

date

Act One: Mano a Mano

1 Imagine you're participating in a **sealed-bid auction** in which you submit a single, secret bid. You value the item at $80, but you'd like to spend as little as possible to get it; if you can win with a bid of $8, for instance, you'll effectively make a "**profit**" of $72. With each bid below, how much profit would you make if you won?

Bid	$8	$20	$32	$48	$64	$80	b
Profit	$72						

2 For simplicity, let's assume you're only competing against one other person in the auction; since you know nothing about how much your opponent values the item, let's also assume (i) he/she values it exactly the same as you do, and (ii) he/she is equally likely to place any bid from $0.01 to $80.00. Based on this, what is your **probability of winning** the auction with each bid amount below?

Bid	$8	$20	$32	$48	$64	$80	b
P(win)							

3 If a certain bid offers a 25% chance of yielding a $60 profit, we say it has an **expected profit** of 0.25 × $60 = $15. Write an equation for the relationship between the bid amount, *b*, and the expected profit, and sketch it below. If you value the item at $80, how much do you think you should bid and why?
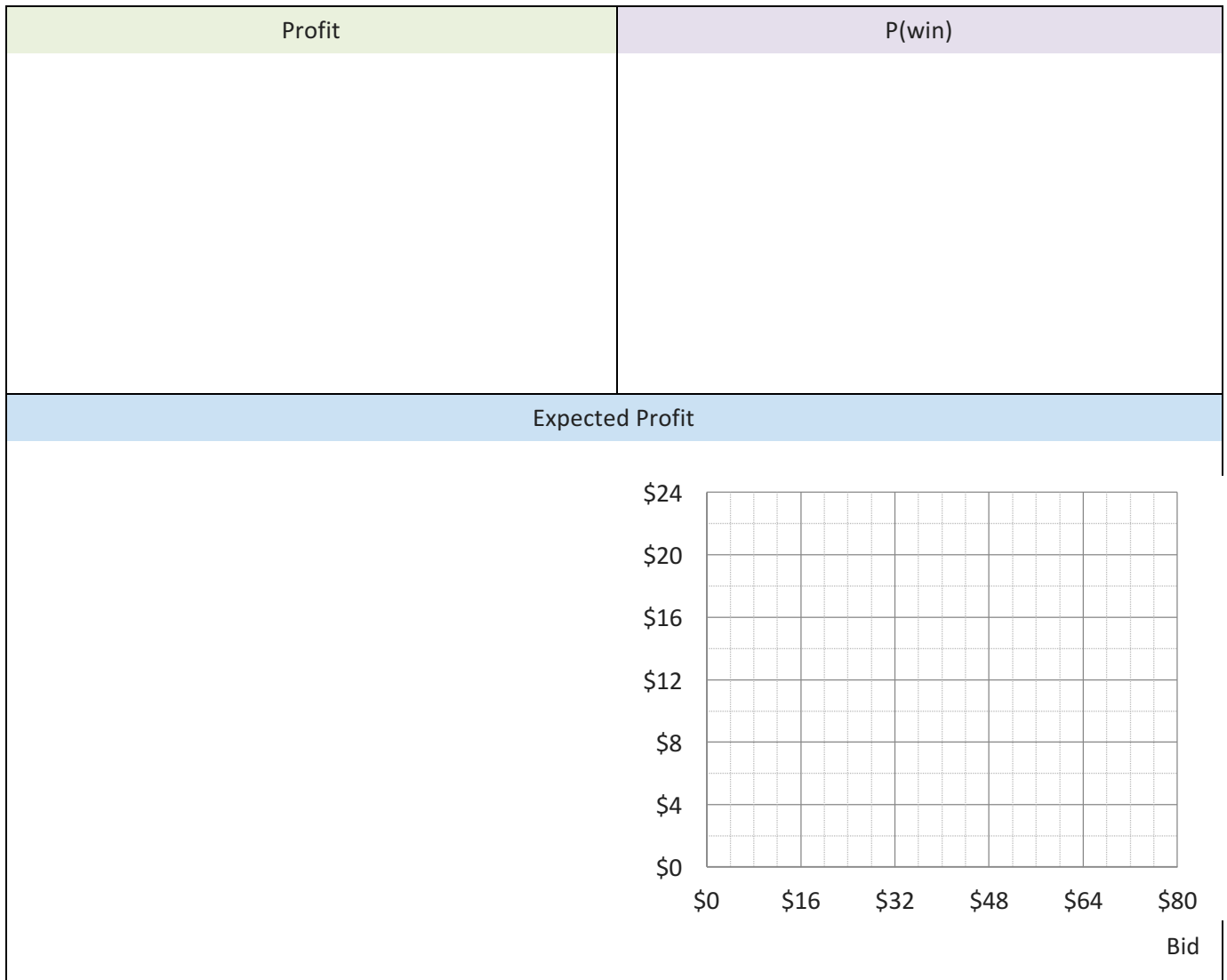
Bid	$8	$20	$32	$48	$64	$80	b
Exp. Profit							
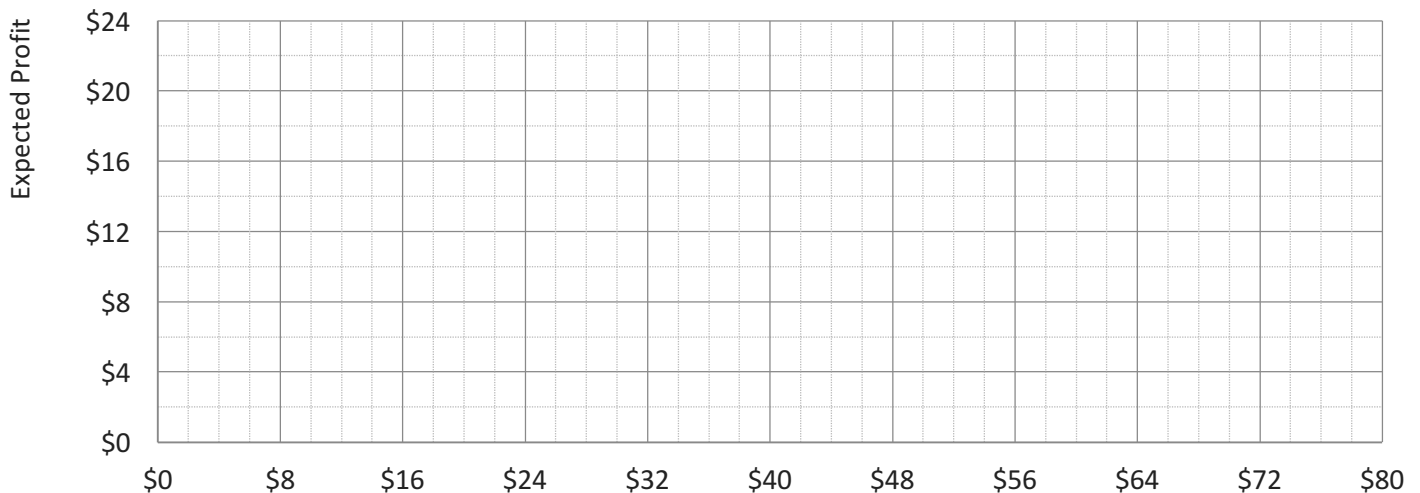
Act Two: Melee!

4 Imagine a third person joins the auction. For a given bid, *b*, briefly describe how this second opponent will affect your profit and your probability of winning the auction. Then write an equation for the new expected profit and sketch it below. What is your optimal bid now?

Profit	P(win)

Expected Profit

5 In reality, auctions can have hundreds – even thousands – of participants. As more people join your auction and compete with you for the $80 item, how would you adjust your bidding strategy? Put another way, as the number of opponents in an auction increases, what happens to the optimal bid and why?