| # | Question | Answer(s) |
|---|---|---|
| 1 | Will grading distributions be released? | From the piazza post "Since this class is graded on an absolute scale and your performance relative to your colleagues has no impact on your final grade, grade distribution information will not be released." |
| 2 | what is the link to professor waller's office hours after lecture? | https://berkeley.zoom.us/my/laura.waller |
| 3 | Is IV relationship P=IV or V=IR | IV relation is the relation between the voltage and current for an element. For a resistor the Ohm's Law gives I = V/R or V = IR. |
| 4 | what does it mean to have the same IV relationship again | When you apply the same voltage over terminals a and b, you will get the same current flowing through the resistors (or the equivalent resistor) |
| 5 | what does the p represent | I think you are refering to the resistivity rho. |
| 6 | If i missed the midterm 1 redo and i want to use the midterm clobber. Can i do the midterm 2 redo and replace my midterm 1 score? | From course policy "Specifically, for students who (1) complete an optional midterm redo and (2) perform significantly better on the final than on the relevant midterm, we will provide the opportunity to clobber a midterm." If you have further questions please direct them to Piazza or eecs16a@berkeley.edu |
| 7 | Can we simplify our circuits using equivalence when doing circuit analysis as long as we don't need the node voltage between the two resistors or other cases like that? | Generally yes, unless the questions explicitly ask to use the NVA. |
| 8 | so if you had two resistors of different heights too, would the denominator be (w*(h1 +h2))? | If that's the case, Req still equals R1 + R2, but we will have different w1 and w2 for R1 and R2. So Req = rho*L1/(w1*h) + rho*L2/(w2*h) |
| 9 | could you describe the intuition behind the row formulas again? the R = p(L1/(wh)) | Intuitively a longer resistor will have a larger resistance, and a thicker resistor (larger w or h) will have a smaller resistance |
| 10 | for the req for resistors in series do we assume that the w and h are the same | Yes |
| 11 | Would running resistors in parallel be like balancing their resistance between the two resistors? | I'm not sure if we are balancing them. We split the current into the two resistors and the currents can be different |
| 12 | Why was the professor just able to smash the two resistors together on the parallel example? | Since they are in parallel, they share the same voltage, and we can use an equivalent resistor to describe the total current flowing through them. |
| 13 | Will L always be the same or is this just an example | Just an example |
| 14 | why is (1/R1) + (1/R2) = R1R2/(R1 + R2)? Isn't it equal to (R1 + R2)/R1R2? | Req = 1/((1/R1) + (1/R2)) |
| 15 | Why did Is turn negative? | Since we follow the passive sign convention to label Vs and Is. A negative solution means the current is actually in the opposite direction from our labeling. |
| 16 | Why would Is be negative in this example, conceptually? | Since we follow the passive sign convention to label Vs and Is. A negative solution means the current is actually in the opposite direction from our labeling. |
| 17 | why is Ir equal to -Is? | By KCL |
| 18 | did you mean V r | |
| 19 | Why is Is negative | Since we follow the passive sign convention to label Vs and Is. A negative solution means the current is actually in the opposite direction from our labeling. |
| 20 | how is Vr=Vs? | By KVL |

| | | |
|---|---|---|
| **21** | if we had to find the current at a specific resistor, would we be unable to do the series and parallel combining tricks that we are currently doing? | We can still simplify other part of the circuit by series/parallel, but for the specific resistor if an equivalent will lose the details then we cannot do the equivalent. |
| **22** | why is it -Is? | Since we follow the passive sign convention to label Vs and Is. A negative solution means the current is actually in the opposite direction from our labeling. |
| **23** | What is the I_R in the simplified circuit equivalent to in the original circuit? | There is no direct equivalent in the original circuit since we don't have the details of all the original resistors after we do the equivalent. |
| **24** | In the bottom left example, why are the middle resistor and R4 not parallel? | They don't share the same two nodes. |
| **25** | wait sorry what just happened, I know the bottom is 0 and the top is Vs but why is u1 (R5 / R4 + R5) * Vs | That part is a voltage divider |
| **26** | So can the current go both ways? | live answered |
| **27** | why does R5 not matter when determining u1? | u1 = R5/(R4 + R5)*Vs |
| **28** | would we have arrived at that if followed the steps of NVA or should we always make Is negative. | If you follow the NVA steps you should get the correct sign. Don't assume Is is always negative. |
| **29** | So the horizontal resistors are the reason for no horizonal current? Do we need them to keep current from flowing horizontally? | They are not the reason for no horizontal current. No horizontal current is because the node voltages in the same horizontal line are the same. So even if we don't have any resistance (short circuit) the horizontal line, there will still be no current. |
| **30** | Do all the resistors in this grid need to have the same resistance? | Yes since we assume it's a uniform resistive sheet. |
| **31** | What's the point of the horizontal resistors if theres no resistance? | There are resistances, but no current. The resistance is because we have a 2D resistive sheet, so the phyiscal model has to have the horizontal resistors to model the sheet completely. |
| **32** | Where do we put the voltmeter to measure it | live answered |
| **33** | Why is the middle row = Vs / 2? | The upper and lower resistors have the same resistance for that row, so by the voltage divider formula we have the node voltage = Vs/2 |
| **34** | wait what does touching exactly do to the circuit? | It connects the top and bottom sheets together at the touch point |
| **35** | Arevertical resistors the same? | Yes all the resistors in the grid have the same resistance |
| **36** | Are the voltages across the horizontal resistors the same? | voltages across the horizontal resistors are all zero |
| **37** | is the blue color the bottom sheet? like the voltmeter and Rtouch | I think the blue one is the top sheet |
| **38** | Are the voltages across the vertical resistors the same? | Yes |
| **39** | since the bottom sheet acts as a conducting plate for the top sheet, what acts as the conducting plate for the bottom sheet? | i think the top sheet |
| **40** | So we are charging the bottom plate by increasing the electric potential? Is it now charged with static electricity? | We are not actually charging them, since we cannot charge a resistor. They are just like wires connecting the touch point to the voltmeter. Once we connect the two sheets at the touch point, the bottom sheet gets the voltage of Vtouch. |
| **41** | arent there only horizontal resistors on the second plate in the picture? | No, it will also have both vertical and horizontal resistors in the model |

| | | |
|---|---|---|
| **42** | why is v touch not impacted by the resistors in the bottom plate | because no current is flowing in the bottom plate |
| **43** | Why the bottom sheet takes on Vtouch entirely if it does not have current flowing through it? I cannot catch the logic behind that | We assume the voltmeter is idea. Remember for an ideal voltmeter there is no current flowing through but we can still measure the voltage |
| **44** | why does the bottom plate has Vtouch volts? | Because there is no current flowing through the bottom plate, all the nodes in the bottom plate will have the same voltage, which is the same as Vtouch |
| **45** | why does the plate take on v touch? how is that related to conducting plates? I dont think I super clear on what a conducting plate does | A conducting plate help us to connect the voltmeter to the touch point. It's like a wire connecting the voltmeter and the touch point. |
| **46** | When you rotate it 90% shouldnt the wire now touch nodes u2 and u4? | We rotate the entire thing by 90 degrees so u2 and u4 is also rotated |
| **47** | do we use 2 different voltage sources to measure x and y positions or just one voltage source measuring both? | We typically use one source but use switches to switch between the two sheet. |
| **48** | so are there two voltmeters and voltage sources connected to both plates? and they just switch on and off depending upon what needs to be measured, which is either the x or y position? | Yes it's switching back and forth |
| **49** | So do we essentially repeat the same procedure but instead with the bottom plate | Yes |
| **50** | What units is x in? | in meters (length unit) |
| **51** | I'm having a hard time understanding why we measure the opposite plate that doesn't have any voltage source | the opposite plate is acting like a wire connecting the touch point and the voltmeter |
| **52** | why aren't we labeling the current going through each voltage source? because we're just looking at the current and resitances around umid? | Yeah we can also label them, and by KCL, Is1 = -I1 = -I2 and Is2 = I2 = I1 |
| **53** | How does the second resistive plate not have current traveling through it once the first resistive plate touches it? Is it because there is a switch that is disconnecting the circuit so essentially the second resistive plate is an open circuit? | We just connect an ideal voltmeter to it, so there are no paths the current can flow in. |
| **54** | Can we connect one end of the voltmeter to the conductive plate, while connecting the other end of the voltmeter directly to ground? I wasn't sure why Prof Waller connected from ground to the plate again | Yes we connect exactly in that way, since that measures the voltage in the conductive plate vs the ground. |
| **55** | why is it i1 in both eq'ns? | live answered |
| **56** | How did we get the values for the matrix? | live answered |
| **57** | What are the I1 umid equations written in black? | I1 = (Vs1 - Vs2)/(R1+R2), umid = (R1Vs2 - R2Vs1)/(R1+R2) |
| **58** | how did we get R1=R2=0? | If A is not invertible, the two columns should be linearly dependent, so R1 = -R2. We also know resistance cannot be negative, so it has to be R1 = R2 = 0. But that's not the normal case, since that will create a short circuit. |

| | | |
|---|---|---|
| **59** | So if the turning off the first one V1 is 2A, and turning of the second one V1 is -3A, the actual V1 would be -1A? | Sorry I1 |
| **60** | Maybe Im confusing something but when the first resistive plate touches the second one doesnt it transfer some current. If we use an ideal voltmeter exactly at the point that they are touching then we can get the voltage, but if the voltmeter is somewhere else wont there be current traveling through the resistors on the second resistive plate and affect the voltage? | Nope, even we connect the voltmeter somewhere away from the touch point, as long as it's ideal, we still don't have current in the second plate. |