

Name: _____

Date: _____

Astron 211 OOM #9 Black Holes Don't Kill People

OOM Policy: You can work in pairs or groups of 3 if desired. You can consult class notes and books — no phones or computers. Make sure you are clear about the process you use to solve the problems: partial credit will be awarded. Always include units.

What size black hole will kill a person at the event horizon via tidal effects?

1. What force difference between your head and your feet do you think will be fatal?
2. If you have a black hole of mass M , what is the difference in acceleration between a point at r and $r + h$? Assume r is outside the event horizon.
3. Equate the answer from #2 to the answer from #1. Solve for M .
4. If you have a black hole with mass $> M$, are the tidal forces stronger or weaker at the event horizon?