A1 Q4

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4. This is true. For this to be false, the rounded difference of two floating points would need to be inbetween 0 and some other floating point. However, even at the smallest values, we are still between or equal to a floating point value. For instance, the smallest number we can produce in IEEE single format is 2^{-149}, a denormalized number. If we do $2^{-148} - 2^{-149}$, we just get 2^{-149} again, the machine epsilon of the denormalized IEEE numbers. Thus, we cannot get any number closer to 0, so we will always round to a floating point. It is therefore impossible for x and y to be two different numbers and $x \ominus y = 0$ still be true.