Section 14.6 It would be really good to have an exercise or an example showing how to use Lie derivatives. Otherwise nobody knows why you introduce this weird thing and call it a derivative.

It took me a long, long time to figure out how to calculate volume acceleration with Lie derivatives (exercise 19.16). I kept on trying to take the Lie derivative wrt time, or second Lie derivatives, and it wasn't working. I finally figured it out based on an article online where they took the Lie derivative wrt velocity. So I took the Lie derivative of the volume form wrt acceleration and it worked.

Hardly anybody knows how to actually use Lie derivatives. I searched an online physics forum for clues but the people there were as puzzled as I.

Section 14.6 The equation for the Lie derivative of a vector field has a superscript wrong. Should be $\mathcal{L}\eta^b$, not $\mathcal{L}\eta^a$. The same mistake is repeated in the caption to Fig. 14.17.

Fig. 14.19 The equation for the Riemann tensor is all messed up in the caption.

Exercise 21.6 The freely falling frame should have $Z = z + \frac{1}{2}t^2 g$. I don't remember if this affects the formula for Ψ that one is asked to derive.

Exercise 21.14 There are sign errors in both the Fourier transforms, maybe they're wrong in the exponent.

Exercise 22.23 Surely you mean the dimension of the space is 2j+1.

Section 24.3 You say in the text that the energy in QM has to be positive. That isn't true, and it actually makes more intuitive sense that the energies of states have to be bounded below. I don't think it's a good idea to say things that aren't true for the sake of "simplifying", because it'll give people a vague sense of something wrong, which it did me. You could explain that you have to be able to adjust the energy scale so that all the states are positive energy. You try to explain much more difficult concepts than that!

Section 24.6 At the start, the equation for factoring Laplacian should be

$$i\frac{\partial}{\partial x} + j\frac{\partial}{\partial y}$$

etc ...

Section 24.6 At the end when you're defining the Dirac operator, should be $\gamma^a \partial/\partial x^a$ not $\gamma^a \partial/\partial x_a$

Sec. 25.2 In the coupled Dirac equations the second α should be α_A, not $\alpha_{A'}$.

Sec. 25.8. says "recall the dual ${}^*F$ of the Maxwell tensor F. We could imagine a 'dual' U(1) gauge connection that has ${}^*F$ as its bundle curvature". Confusing. I thought and thought and I couldn't see how you could use ${}^*F$ as a gauge curvature *unless* $d^*F = 0$. Then I thought and thought and thought and finally I thought that in the application of a dual gauge connection, the field probably *would* be source-free, because the gauge connection's applied to quantum wavefunctions and when you're at the quantum level, you wouldn't have a charge-current vector.

If true, this should be made explicit, because it's not obvious to a confused beginner!

Exercise 27.16 has a counterexample: If the universe were a 3-sphere, it could be isotropic around a pair of antipodal points w/o being homogeneous. But I explored the mathematical landscape & found this is the only counterexample.

Exercise 27.18 got the metric wrong for the unit 3-sphere. Should be $dw^2 + sin^2 w(d\phi^2 + sin^2\phi d\theta^2)$ where w is the distance (or angle) from the origin.

section 28.3, p. 744 in the hardcover ed. paragraph starting "The difficulty has to do" says, further on, "then the past light cones of p and q will not intersect each other". Should be "then the past light cones of q and r will not intersect each other"

Exercise 28.5 Is there really a metric for de Sitter space of the form $ds^2 = dt^2 - R(t)^2 d\Sigma^2$ where $d\Sigma^2$ is a *hyperbolic* metric?? It seemed unlikely, both because the expression has two hyperbolic "elements", while Minkowski 5-space only has one - and because Wikipedia gives a metric for de Sitter space that looks exactly the same, except that $d\Sigma^2$ is a metric on the 3-sphere!

Fig 29.2 has $\frac{1}{2}(|\varphi > +\psi >)(|\varphi > +\varphi >)$. Should be $\frac{1}{2}(|\varphi > +\psi >)(|\varphi > +\psi >)$.

Exercise 30.5 (perturbations in the Schwarzschild metric) I was not sure whether I was missing something important or whether I solved it and I had the wrong idea about what was wanted. I asked for help in 2 physics forums and nobody came up with the missing something important, so maybe it doesn't exist. Clarification is needed. My maybe missing something important answer is click here.

Exercises 30.11, 30.12 Scale factors of 4π and 2 have been left out.

Fig. 33.16 The caption is confusing. You say for a choice of spacetime point R, the contour integral is over the region $\mathbf{R}$ in $\mathbb{T}^+$ defined by $\omega = i\mathbf{r}\pi$. But if R is a point in Minkowski space, $\mathbf{R}$ is in $\mathbb{N}$! It should be made clear that R could be a complex spacetime point.

Exercise 33.24 There's a typo, it should be $\psi_{01} = -C_3$, not $-iC_3$.