

Hints:

1. Use $\sin^2(u) = \frac{1}{2}(1 - \cos(2u))$
2. Use $\sin^2(u) = 1 - \cos^2(u)$.
3. Use $\sin^2(u) = \frac{1}{2}(1 - \cos(2u))$.
4. Let $u = \sin(7x)$.
5. Let $u = \sin(7x)$.
6. Use $\sin(u) \cos(u) = \frac{1}{2} \sin(2u)$, $\sin^2(u) = \frac{1}{2}(1 - \cos(2u))$, and/or $\cos^2(u) = \frac{1}{2}(1 + \cos(2u))$.
7. Use $\cos^2(u) = 1 - \sin^2(u)$.
8. Write $\tan(u) = \sin(u)/\cos(u)$.
9. Use $\tan^2(u) = \sec^2(u) - 1$.
10. Multiply by $\frac{\tan(u)+\sec(u)}{\tan(u)+\sec(u)}$.
11. Let $u = 7x$.
12. Let $u = 7x$.
13. Use $\tan^2(u) = \sec^2(u) - 1$.
14. Let $u = \tan(7x)$.
15. Let $u = \tan(7x)$.
16. Let $u = \sec(7x)$.
17. Simplify first.
18. Let $u = \sin(x)$.
19. Let $u = x^2$.
20. Let $x = \tan(u)$.
21. Use $\cos^2(u) + \sin^2(u) = 1$.
22. Let $x = (\sqrt{5}) \cos(u)$.
23. Let $x = \sec(u)$.
24. Let $x = \tan(u)$.
25. IBP: Let $f = \csc(x)$ and $g' = \csc^2(x)$.
26. Use $\cos^2(u) + \sin^2(u) = 1$.
27. IBP: Let $f = \cos^{-1}(2x)$ and $g = x$. Follow up with trig sub.
28. Simplify first.
29. IBP: Let $f = x^2$ and $g' = 2^x$. You'll need to do IBP again.
30. Let $5x = \sec(u)$.
31. Let $2x = \sin(u)$.
32. Expand.
33. Let $u = 1 + \cot(x)$.
34. Separate into $\int \frac{x}{x^2+4} dx$ and $\int \frac{-3}{x^2+4} dx$
35. Let $u = 1 + x$.
36. Simplify first.
37. Let $u = x - 2$. Expand and simplify.
38. Let $x = \sin(u)$.
39. Let $u - x^2 - x - 6$
40. IBP: Let $f = x$ and $g' = \cos(2x)$.
41. IBP: Let $f = \ln(x)$ and $g' = x^{-1/2}$.
42. IBP: Let $f = \tan^{-1}(5x)$ and $g' = 1$.
43. This is one of our elementary integrals.
44. Let $x/\sqrt{6} = \sin(u)$.
45. Let $4x^2 = \cos(u)$.

46. Let $u = x^2 + 1$.
47. Multiply by $(\csc(x) + \cot(x))/(\csc(x) + \cot(x))$
48. Let $u = \cot(x)$
49. Complete the square of the denominator.
50. Partial fractions: $x^2 - x - 6 = (x + 2)(x - 3)$
51. Let $u = 1 + x^2$.
52. Use $\sin(2x) = 2 \sin(x) \cos(x)$.
53. IBP: Let $f = x$ and $g' = e^{2x}$
54. IBP: Let $f = (\ln(x))^2$ and $g' = 1$.
55. This is one of our elementary integrals.
56. IBP: Let $f = \sin^{-1}(3x)$ and $g' = x$.
57. Let $u = 4x^2 + 1$.
58. IBP: Let $f = \ln(2x)$ and $g' = x$.
59. IBP twice, then let $I = \int e^{3x} \cos(2x) dx$ and solve algebraically for I
60. Let $x/2 = \tan(u)$.