Homework Hints: Section 7.5

1. u, du substitution.
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3. Break up the integrand as $\cos(x) + \csc(x)$
4. $u = \cos(x)$
5. $u = t^2$
6. $u = 2x + 1$
7. $u = \tan^{-1}(y)$
8. Before doing integrating by parts, you might use $\sin(2t) = 2\sin(t)\cos(t)$.
9. Integration by parts.
10. Partial fractions- Denominator factors as $(x-5)(x+1)$
11. Rewrite integrand: $\dfrac{(x-2)+1}{(x-2)^2+1}$
12. First, let $u = x^2$. The problem then has denominator $u^2 + u + 1$, so complete the square. You may want to do a second substitution.
13. Let $u = \cos(t)$
14. Let $u = 1 + x^2$.
15. Let $x = \sin(\theta)$
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17. Before doing integration by parts, you might use the half angle formula on $\cos^2(t)$.
18. Let $u = \sqrt{t}$.
19. Let $u = e^x$, and note that $e^{x+e^x} = e^x e^{e^x}$
20. e^2 is a constant!
21. Substitute first, $t = \sqrt{x}$. Then integration by parts.
22. $u = 1 + (ln(x))^2$
23. $u = 1 + \sqrt{x}$

24. Long division first (kind of partial fractions)

25. Long division first

26. Let $u = x^3 - 2x - 8$

27. Let $u = 1 + \mathrm{e}^x$, then do partial fractions on the resulting expression.

28. Let $u = \sqrt{at}$ (so $u^2 = at$). Integration by parts after that.

29. Integration by parts with middle: $\ln(x + \sqrt{x^2 - 1})$

30. Rewrite $|\mathrm{e}^x - 1|$ using a piecewise defined function.

31. Tricky: Multiply numerator and denominator by $\sqrt{1 + x}$.

32. Tricky: Let $u = \sqrt{2x - 1}$, so that $2x + 3 = u^2 + 4$ and $u\,du = dx$

33. Complete the square, then let $(x + 1) = 2\sin(\theta)$

34. Tricky: Multiply numerator and denominator by $\sin(x)$ (rewrite $\cot(x)$ in terms of sines and cosines). Let $u = 4\sin(x) - \cos(x)$ (not obvious).

35. Uses a sum formula from the table of formulas- The formula for $\cos(au)\cos(bu)$.

36. An odd function.

37. Let $u = \tan(\theta)$.

38. Simplify the integrand using sine and cosine.

39. Let $u = \sec(\theta)$, then partial fractions.

40. Complete the square, then factor the two out of the denominator.

41. Integration by parts with $u = \theta$ and $dv = \tan^2(\theta)$.