## Homework Hints: Section 7.5

1. $u, d u$ substitution.
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3. Break up the integrand as $\cos (x)+\csc (x)$
4. $u=\cos (x)$
5. $u=t^{2}$
6. $u=2 x+1$
7. $u=\tan ^{-1}(y)$
8. Before doing integrating by parts, you might use $\sin (2 t)=2 \sin (t) \cos (t)$.
9. Integration by parts.
10. Partial fractions- Denominator factors as $(x-5)(x+1)$
11. Rewrite integrand: $\frac{(x-2)+1}{(x-2)^{2}+1}$
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 $x=\sin (\theta)$
16. Let $x=\sin (\theta)$
17. Before doing integration by parts, you might use the half angle formula on $\cos ^{2}(t)$.
18. Let $u=\sqrt{t}$.
19. Let $u=\mathrm{e}^{x}$, and note that $\mathrm{e}^{x+\mathrm{e}^{x}}=\mathrm{e}^{x} \mathrm{e}^{\mathrm{e}^{x}}$
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 $u=x^{3}-2 x-8$
27. Let $u=1+\mathrm{e}^{x}$, then do partial fractions on the resulting expression.
28. Let $u=\sqrt{a t}$ (so $u^{2}=a t$ ). Integration by parts after that.
29. Integration by parts with middle: $\ln \left(x+\sqrt{x^{2}-1}\right)$
30. Rewrite $\left|\mathrm{e}^{x}-1\right|$ using a piecewise defined function.
31. Tricky: Multiply numerator and denominator by $\sqrt{1+x}$.
32. Tricky: Let $u=\sqrt{2 x-1}$, so that $2 x+3=u^{2}+4$ and $u d u=d x$
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 $\cos (a u) \cos (b u)$.
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 $d v=\tan ^{2}(\theta)$.
