## 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: 
$$\frac{(x-2)+1}{(x-2)^2+1}$$

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  $u = e^x$ , 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  $u = 1 + e^x$ , 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  $|e^x 1|$  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  $dv = \tan^2(\theta)$ .