

## HINTS

These were done quickly. Please let me know if you find errors!

1. Let  $u = x/\sqrt{3}$ .
2. Let  $u = \sqrt{3} x$ .
3. Let  $u = 3 + x^2$ .
4. Let  $u = x/\sqrt{3}$ .
5. Let  $u = \sqrt{3} x$ .
6. Let  $u = 3 - x^2$ .
7. Let  $u = x/\sqrt{3}$ .
8. Let  $u = \sqrt{3} x$ .
9. Let  $u = 3 + x^2$ .
10. Let  $u = x/\sqrt{3}$ .
11. Let  $u = \sqrt{3} x$ .
12. Let  $u = 3 - x^2$ .
13. Let  $u = x/\sqrt{3}$ .
14. Let  $u = 3x^2 - 1$ .
15. Let  $u = x^2 - 3$ .
16. Let  $u = x^2 - 3$ .
17. Let  $u = 3 - x^2$ .
18. Let  $u = 1 - 3x^2$ .
19. Simplify.
20. Let  $u = x - \frac{1}{2}x^2$ .
21. Let  $u = x^4$ .
22. Expand the numerator.
23. Let  $u = 1 + x$ . Then  $x = u - 1$ .
24. Let  $u = 1 - x$ . Then  $x = u + 1$ .
25. Let  $u = \ln(x)$ .
26. Let  $u = \ln(x)$ .
27. Let  $u = x^3$ .
28. Let  $u = 1 - x^6$ .
29. Let  $u = \sqrt{x}$ .
30. Let  $u = 1 + e^x$ .
31. Expand the numerator.
32. Let  $u = e^x$ .
33. Let  $u = \tan^{-1}(x)$ .
34. Let  $u = 3^x + 4$ .
35. Let  $u = 3^x$ .
36. Let  $u = 3x + 4$ .
37. Let  $u = \cosh(x)$  (or  $\sinh(x)$ ).
38. Let  $u = \cosh(x)$ .
39. Let  $u = \cos(x)$ .
40. Use the Pythagorean identity.
41. Let  $u = \ln(\cos(x))$ . (Or let  $u = \cos(x)$ , followed by  $v = \ln(u)$ .)
42. Let  $u = \sinh(x)$ .
43. Let  $u = 1 + \cot(x)$ .
44. You know this. Alternatively, rewrite in terms of  $\sin(x)$  and  $\cos(x)$ .
45. Rewrite in terms of  $\sin(x)$  and  $\cos(x)$ .
46. Rewrite in terms of  $\sinh(x)$  and  $\cosh(x)$ .

## ANSWERS

These were done quickly. Please let me know if you find errors!

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| 1. $\frac{1}{\sqrt{3}} \tan^{-1}(x/\sqrt{3}) + C$  | 14. $\frac{1}{\sqrt{3}} \cosh^{-1}(x\sqrt{3}) + C$             |
| 2. $\frac{1}{\sqrt{3}} \tan^{-1}(x\sqrt{3}) + C$   | 15. $\sqrt{x^2 - 3} + C$                                       |
| 3. $\frac{1}{2} \ln  3 + x^2  + C$                 | 16. $\frac{1}{3}(x^2 - 3)^{3/2} + C$                           |
| 4. $\frac{1}{\sqrt{3}} \tanh^{-1}(x/\sqrt{3}) + C$ | 17. $-\frac{1}{3}(3 - x^2)^{3/2} + C$                          |
| 5. $\frac{1}{\sqrt{3}} \tanh^{-1}(x\sqrt{3}) + C$  | 18. $-\frac{1}{9}(1 - 3x^2)^{3/2} + C$                         |
| 6. $-\frac{1}{2} \ln  3 - x^2  + C$                | 19. $\ln  1 + x  + C$  |
| 7. $\sinh^{-1}(x/\sqrt{3}) + C$                    | 20. $\frac{1}{2} \ln  2x - x^2  + C$                           |
| 8. $\frac{1}{\sqrt{3}} \sinh^{-1}(x\sqrt{3}) + C$  | 21. $\frac{1}{4} \tan^{-1}(x^4) + C$                           |
| 9. $\sqrt{3 + x^2} + C$                            | 22. $\ln  x  + 2x + \frac{1}{2}x^2 + C$                        |
| 10. $\sin^{-1}(x/\sqrt{3}) + C$                    | 23. $\ln  1 + x  + \frac{1}{1 + x} + C$                        |
| 11. $\frac{1}{\sqrt{3}} \sin^{-1}(x\sqrt{3}) + C$  | 24. $-\frac{2}{3}(1 - x)^{3/2} + \frac{2}{5}(1 - x)^{5/2} + C$ |
| 12. $-\sqrt{3 - x^2} + C$                          | 25. $\ln  \ln(x)  + C$   |
| 13. $\cosh^{-1}(x/\sqrt{3}) + C$                   | 26. $\tan^{-1}(\ln(x)) + C$                                    |

27.  $\frac{1}{3} \sin^{-1}(x^3) + C$

28.  $-\frac{1}{3} \sqrt{1-x^6}$

29.  $2e^{\sqrt{x}} + C$

30.  $-\frac{1}{1+e^x} + C$

31.  $2x - e^{-x} + e^x + C$

32.  $\tan^{-1}(e^x) + C$

33.  $\frac{1}{2} \tan^{-1}(x) + C$

34.  $\log_3(3^x + 4) + C$

35.  $\frac{1}{\ln(3)} \tan^{-1}(3^x) + C$

36.  $\frac{1}{3} \ln|3x+4| + C$

37.  $\frac{1}{2} \cosh^2(x) + C = \frac{1}{2} \sinh^2(x) + X$

38.  $\ln|\sinh(x)| + C$

39.  $-\tan^{-1}(\cos(x)) + C$

40.  $\ln|\sin(x)| + C$

41.  $\frac{1}{2} \ln^2(\cos(x)) + C$

42.  $\frac{7^{\sinh(x)}}{\ln(7)}$

43.  $-\ln|1+\cot(x)| + C$

44.  $\sec(x) + C$

45.  $\sec(x) + C$

46.  $-\frac{1}{\sinh(x)} + C$