Simplifying Expressions Worksheet

Math Tutorial Lab Special Topic Presentation*

Example Problems

Simplify the following expressions.

1. $4x^2 + 3xy + 2y + 2xy + 3x + 5y$
2. $2 + 3x^2 - 6 + 4x - 2x + 9x^2$
3. $2\sqrt{2} + \sqrt{3} + 3\sqrt{2} + \sqrt{7} + \sqrt{3}$
4. $\sqrt{8} + 3\sqrt{2} + \sqrt{32}$
5. $\frac{(x^5)^4}{(x^{-3}p^5)^{-5}}$
6. $\frac{(t^{-3})^{-1}}{(t^{-5}z^2)^2}$
7. $(3e^x)(2e^{4x})$
8. $\frac{e^3}{e^{x+3}}$
9. $\sqrt{45}$
10. $(\frac{16}{25})^{-\frac{3}{2}}$
11. $\frac{\sqrt{60x^2y}}{\sqrt{48x}}$
12. $\sqrt[3]{125x^6y^3}$
13. $\frac{(9p)^{\frac{2}{3}}}{\sqrt{4p^3}}$
14. $\log_{14} 196$
15. $\log_{12} \frac{1}{144}$
16. $3^{\log_3 8}$
17. $\ln e^e$
18. $e^{-\frac{1}{2}\ln(16)}$

Simplify the logarithm so that the result does not contain logarithms of products, quotients, or powers.

19. $\log_2(2x-1)^5$
20. $\ln \frac{2x^3}{(x+4)^2}$
21. $\log_3 \frac{x^2\sqrt{x+1}}{\sqrt[3]{x^2+2x+1}}$
22. $\ln \sqrt{x^2\sqrt{\frac{x-2}{x+3}}}$

Rewrite the expression as a single logarithm.

23. $\frac{1}{2}\ln x - 2\ln(x-1)$
24. $\ln(x^2+x+1) - 3\ln(x+2) + \ln x$

Write the following in terms of $\ln(2)$ **and** $\ln(3)$**.**

25. $\ln(27) - \ln(\frac{3}{16})$

*Created by Maria Gommel, July 2014

Answers

1. $4x^2 + 3x + 7y + 5xy$
2. $12x^2 + 2x - 4$
3. $5\sqrt{2} + 2\sqrt{3} + \sqrt{7}$
4. $9\sqrt{2}$
5. $x^5 p^{25}$
6. $\frac{t^{13}}{z^4}$
7. $6e^{5x}$
8. $\frac{1}{e^x}$
9. $3\sqrt{5}$
10. $\frac{125}{64}$
11. $\frac{1}{2}\sqrt{5xy}$
12. $5x^2 y$
13. $\frac{3\sqrt[3]{3}}{2p^{\frac{5}{6}}}$
14. 2
15. -2
16. 8
17. e
18. $\frac{1}{4}$
19. $5\log_2(2x-1)$
20. $\ln(2) + 3\ln(x) - 2\ln(x+4)$
21. $2\log_3(x) - \frac{1}{6}\log_3(x+1)$
22. $\ln(x) + \frac{1}{4}\ln(x-2) - \frac{1}{4}\ln(x+3)$
23. $\ln(\frac{\sqrt{x}}{(x-1)^2})$
24. $\ln(\frac{x(x^2+x+1)}{(x+2)^3})$
25. $2\ln(3) + 4\ln(2)$