

**Algebra Review Worksheet (with solutions)**  
**Algebra Exam – Monday, November 16th**

There are 30 problems on this worksheet.

In problems 1-16, simplify each expression completely. Your final answer should not have any negative number exponents. Also, all fractions must be in simplest form, i.e. no compound fractions.

In problems 17-30, solve the following equations for  $x$ , unless otherwise specified. Assume  $a$ ,  $b$ , and  $c$  are parameters. Give **exact** answers.

1.  $\frac{3}{y-7} + x$

6.  $\frac{\frac{c}{x+h} - \frac{c}{x}}{h}$

2.  $\frac{6}{z-5} - \frac{8}{5-z}$

7.  $\frac{(x^2+1)\frac{1}{2}x^{-\frac{1}{2}} - x^{\frac{1}{2}}(2x)}{(x^2+1)^2}$

3.  $\frac{(a+5)^3 - 4a^2(a+5)}{(a+5)^4}$

8.  $\frac{3(y-6)^{1/2} - 2y(y-6)^{-1/2}}{y-6}$

4.  $\frac{b^{-2}}{c^{-1} + b^{-1}}$

9.  $\frac{a^{2-t}b^{-3n}}{a^{t+1}b^n}$

5.  $\frac{\frac{36}{x} - x}{\frac{6}{x} + 1}$

10.  $(e^4)^a \cdot e^a$

11.  $\sqrt{25}$

17.  $5^{x+1} = \sqrt[3]{5}$

12.  $\sqrt[3]{64x^5} - \sqrt[3]{x^2}$

18. Solve for  $z$ :  $\frac{z^2(3-z)}{z+1} < 0$

13.  $\log t - 2 \log w + 3 \log v$

19. Solve for  $W$ :  $|-7w+4| - 6 = -3$

14.  $10^{(2+\log x)}$

20.  $\frac{-2x}{9} - \frac{x}{4} = -3$

15.  $2 \ln(e^{\sqrt{x}})$

21. Solve for  $y$ :  $7y(y-2) = 1$

16. Factor completely:  $z^3 + 2z^2 - 16z - 32$

$$22. x^{\frac{5}{3}} = 32$$

$$28. \log(\sqrt{12-x}) = \log(x)$$

$$23. \text{Solve for } t : -2at + 3 = 7a - 4t$$

$$29. \text{Solve for } r :$$

$$N = 3\pi\sqrt{\frac{M}{r}}$$

$$24. \text{Solve for } z : 3(z+17)^2 - 8 = 0$$

$$30. \text{Solve for } y : e^{3-7y} = 4$$

$$25. \text{Solve for } z : \frac{3}{a} - \frac{4}{z} = \frac{-2}{b} \text{ (simplify your solution completely)}$$

$$26. \text{Solve for } w : 2w^2e^w - 14w^5e^w = 0$$

$$27. \log_3(4x-1) = -2$$

1.  $\frac{3+xy-7x}{y-7}$

2.  $\frac{14}{z-5}$

3.  $\frac{-3a^2+10a+25}{(a+5)^3}$

4.  $\frac{c}{b(b+c)}$

5.  $6-x$

6.  $\frac{-c}{x(x+h)}$

7.  $\frac{-3x^2+1}{2\sqrt{x}(x^2+1)^2}$

8.  $\frac{y-18}{(y-6)^{\frac{3}{2}}}$

9.  $\frac{1}{a^{2t-1}b^{4n}}$

10.  $e^{5a}$

11.  $5$

12.  $(4x-1)\cdot\sqrt[3]{x^2}$

$$13. \log\left(\frac{tv^3}{w^2}\right)$$

$$14. 100x$$

$$15. 2\sqrt{x}$$

$$16. (z+4)(z-4)(z+2)$$

$$17. x = \frac{-2}{3}$$

$$18. z < -1 \text{ or } z > 3$$

$$19. w = 1 \text{ or } w = \frac{1}{7}$$

$$20. x = \frac{108}{17}$$

$$21. y = \frac{7 \pm 2\sqrt{14}}{7}$$

$$22. x = 8$$

$$23. t = \frac{7a-3}{4-2a}$$

$$24. z = -17 \pm \frac{2\sqrt{6}}{3}$$

$$25. z = \frac{4ab}{3b+2a}$$

26.  $w = 0$  or  $w = \sqrt[3]{\frac{1}{7}}$

27.  $x = \frac{5}{18}$

28.  $x = 3$

29.  $r = \frac{9M\pi^2}{N^2}$

30.  $y = \frac{3 - \ln 4}{7}$