Algebra 101 worksheet 1 Solutions

1 Linear equations

1. $$a = \frac{g - 5}{H - 14}$$

2. $$N = \frac{16}{-S + w}$$

3. $$A = \frac{h + 4}{E - 6}$$

4. $$w = \frac{z}{15} - \frac{23}{15}$$

5. $$b = \frac{K - 5}{Y - 23}$$

6. $$M = \frac{10}{S - 4}$$

7. $$y = \frac{-V + z}{T - X}$$

8. $$p = \frac{6}{Q + 2}$$

9. $$p = \frac{-V + g}{t + 5}$$

10. $$H = \frac{y - 20}{E - u}$$

11. $$M = \frac{R + 10}{R - k}$$

12. $$M = \frac{-b + 9}{j + 26}$$

13. $$V = \frac{P - X}{Q - S}$$

14. $$P = -\frac{e}{13} + \frac{1}{13}$$

15. $$g = -\frac{37}{7}$$

16. $$K = \frac{S + 6}{T + 23}$$

17. $$d = \frac{Q + 24}{N + 10}$$

18. $$D = -\frac{27}{m - 8}$$

19. $$E = \frac{-y + 2}{q + 5}$$

20. $$r = \frac{c - 10}{x + 5}$$

2 Quadratic equations

1. $$y = -\frac{15}{8} - \frac{\sqrt{65}}{8}, y = -\frac{15}{8} + \frac{\sqrt{65}}{8}$$

2. $$x = \frac{19}{18} + \frac{\sqrt{757}}{18}, x = -\frac{\sqrt{757}}{18} + \frac{19}{18}$$

3. $$x = -10, x = 23$$

4. $$y = \frac{1}{4} + \frac{\sqrt{177}}{4}, y = -\frac{\sqrt{177}}{4} + \frac{1}{4}$$

5. $$x = 0, x = 22$$

6. $$x = \frac{8}{13} - \frac{3i}{13}\sqrt{29}, x = \frac{8}{13} + \frac{3i}{13}\sqrt{29}$$

7. $$x = -2, x = 10$$

8. $$x = -\frac{1}{22} + \frac{\sqrt{309}}{22}, x = -\frac{\sqrt{309}}{22} - \frac{1}{22}$$

9. $$x = 0, x = \frac{24}{5}$$

10. $$y = -\frac{11}{20} - \frac{\sqrt{799}i}{20}, y = -\frac{11}{20} + \frac{\sqrt{799}i}{20}$$

11. $$x = 0, x = \frac{4}{15}$$

12. $$x = 12, x = 15$$

13. $$y = 2, y = 6$$

14. $$x = -17, x = 23$$

15. $$x = -7, x = -1$$

16. $$x = -13, x = -5$$

17. $$x = -3, x = \frac{7}{4}$$

18. $$x = \frac{5}{21} + \frac{2\sqrt{85}}{21}, x = -\frac{2\sqrt{85}}{21} + \frac{5}{21}$$

19. $$y = \frac{25}{26} + \frac{\sqrt{1041}}{26}, y = -\frac{\sqrt{1041}}{26} + \frac{25}{26}$$

20. $$x = 0, x = 1$$

3 Compute the derivative

1. $$\frac{1}{x}\left(14x+12\right)-\frac{1}{x^2}\left(7x^2+12x-24\right)$$

2. $$\frac{2\sqrt{x}\left(27x^2-18\right)}{\left(-9x^3+18x+7\right)^2}+\frac{1}{\sqrt{x}\left(-9x^3+18x+7\right)}$$

3. $$\frac{1}{\left(16x^3-23x^2+5x\right)^2}\left(\log\left(x\right)+\tan\left(x\right)\right)\left(-48x^2+46x-5\right)+\frac{\tan^2\left(x\right)+1+\frac{1}{x}}{16x^3-23x^2+5x}$$

4. $$-\left(e^x+\tan\left(x\right)\right)e^{-x}+\left(e^x+\tan^2\left(x\right)+1\right)e^{-x}$$

5. $$-\left(19x+e^x\right)e^{-x}+\left(e^x+19\right)e^{-x}$$

6. $$\frac{1}{x}\left(48x-\sin\left(x\right)+7\right)-\frac{1}{x^2}\left(24x^2+7x+\cos\left(x\right)\right)$$

7. $$\frac{1}{\tan^2\left(x\right)}\left(\log\left(x\right)+\sin\left(x\right)\right)\left(-\tan^2\left(x\right)-1\right)+\frac{\cos\left(x\right)+\frac{1}{x}}{\tan\left(x\right)}$$

8. $$\frac{1}{x}\left(12x^2+\frac{1}{x}\right)-\frac{1}{x^2}\left(4x^3+\log\left(x\right)-17\right)$$

9. $$\frac{1}{\sin\left(x\right)}\left(-51x^2+48x+14+\frac{1}{x}\right)-\frac{\cos\left(x\right)}{\sin^2\left(x\right)}\left(-17x^3+24x^2+14x+\log\left(x\right)-14\right)$$

10. $$\left(\frac{1}{x}+\frac{1}{2\sqrt{x}}\right)e^{-x}-\left(\sqrt{x}+\log\left(x\right)\right)e^{-x}$$