Example Worksheet 1 Solutions

1 Linear equations

1. $$G = -\frac{d+20}{b+1}$$

2. $$c = \frac{25}{S+2}$$

3. $$y = \frac{H}{24} - \frac{d}{24}$$

4. $$J = \frac{23}{H-M}$$

5. $$r = \frac{Y-12}{m+19}$$

6. $$T = \frac{2}{25}$$

7. $$J = -\frac{K+13}{s+25}$$

8. $$m = -\frac{R+21}{k+4}$$

9. $$J = \frac{7}{K-S}$$

10. $$U = -\frac{h+10}{Z+2}$$

11. $$m = \frac{33}{19}$$

12. $$T = -\frac{G}{35} + \frac{23}{35}$$

13. $$j = \frac{f}{17} - \frac{u}{17}$$

14. $$F = -\frac{J}{26} - \frac{11}{13}$$

15. $$s = -\frac{K}{37} + \frac{Z}{37}$$

16. $$X = \frac{W - 10}{a - 14}$$

17. $$m = \frac{a + 21}{P - c}$$

18. $$P = \frac{c - s}{J - Q}$$

19. $$e = \frac{8}{Z + 12}$$

20. $$H = \frac{p - s}{M - W}$$

2 Quadratic equations

1. $$y = \frac{9}{22} + \frac{\sqrt{301}}{22}, y = -\frac{\sqrt{301}}{22} + \frac{9}{22}$$

2. $$y = \frac{5}{23} + \frac{\sqrt{462}}{23}, y = -\frac{\sqrt{462}}{23} + \frac{5}{23}$$

3. $$y = -21, y = -19$$

4. $$y = 5, y = 8$$

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

6. $$x = -1, x = 12$$

7. $$x = -5, x = -1$$

8. $$x = \frac{11}{19} + \frac{2\sqrt{130}}{19}, x = -\frac{2\sqrt{130}}{19} + \frac{11}{19}$$

9. $$x = -12, x = -8$$

10. $$x = -\frac{15}{76} + \frac{5\sqrt{161}}{76}, x = -\frac{5\sqrt{161}}{76} - \frac{15}{76}$$

11. $$x = 15, x = 18$$

12. $$x = \frac{5}{32} + \frac{\sqrt{569}}{32}, x = -\frac{\sqrt{569}}{32} + \frac{5}{32}$$

13. $$y = -3, y = 22$$

14. $$y = -\frac{1}{20} - \frac{\sqrt{479}i}{20}, y = -\frac{1}{20} + \frac{\sqrt{479}i}{20}$$

15. $$y = -26, y = 17$$

16. $$y = -i, y = i$$

17. $$x = \frac{3}{10} - \frac{2i}{5}, x = \frac{3}{10} + \frac{2i}{5}$$

18. $$y = -\frac{2}{3} + \frac{\sqrt{79}}{6}, y = -\frac{\sqrt{79}}{6} - \frac{2}{3}$$

19. $$x = -21, x = 24$$

20. $$x = \frac{13}{36} - \frac{\sqrt{191}i}{36}, x = \frac{13}{36} + \frac{\sqrt{191}i}{36}$$

3 Differentiation

1. $$\frac{-22y + e^y}{\sin(y)} - \frac{\cos(y)}{\sin^2(y)}\left(-11y^2 + e^y + 10\right)$$

2. $$0$$

3. $$\frac{-45x^2 + e^x - 1}{-7x^3 - 2x^2 + 20x - 18} + \frac{\left(21x^2 + 4x - 20\right)\left(-15x^3 - x + e^x\right)}{\left(-7x^3 - 2x^2 + 20x - 18\right)^2}$$

4. $$\frac{(y + \cos(y))\left(-27y^2 + 50y + 1\right)}{\left(9y^3 - 25y^2 - y - 19\right)^2} + \frac{-\sin(y) + 1}{9y^3 - 25y^2 - y - 19}$$

5. $$\frac{1}{\tan^2(x)}\left(-\tan^2(x) - 1\right)\left(4x^3 + 32x^2 - 8x\right) + \frac{12x^2 + 64x - 8}{\tan(x)}$$

6. $$\frac{-27x^2 + 15 + \frac{1}{2\sqrt{x}}}{\log(x)} - \frac{\sqrt{x} - 9x^3 + 15x - 24}{x\log^2(x)}$$

7. $$\frac{\sin(z)}{\cos^2(z)}(z + \sin(z)) + \frac{\cos(z) + 1}{\cos(z)}$$

8. $$\frac{1}{z}\left(-57z^2 - 16z - 24\right) - \frac{1}{z^2}\left(-19z^3 - 8z^2 - 24z\right)$$

9. $$\frac{-12x + 23}{\sin(x)} - \frac{\cos(x)}{\sin^2(x)}\left(-6x^2 + 23x\right)$$

10. $$\frac{1}{\sqrt{z}}\left(\tan^2(z) + 2\right) - \frac{1}{2z^{\frac{3}{2}}}(z + \tan(z))$$

4 Compute the integral

1. $$\frac{11y^4}{4} + \frac{16y^3}{3} - \frac{5y^2}{2} - 23y + C$$

2. $$-5z^3 - 7z^2 - 11z + C$$

3. $$11y^2 + 19y + C$$

4. $$-\frac{7z^2}{2} + C$$

5. $$18z + C$$

6. $$\frac{17y^4}{4} + \frac{23y^2}{2} - 21y + C$$

7. $$-7y^3 + C$$

8. $$9z + C$$

9. $$-13y + C$$

10. $$-8z^2 + 20z + C$$

5 Compute the integral

1. $$\frac{2y^{\frac{3}{2}}}{3} + C$$

2. $$\frac{4z^{\frac{5}{4}}}{5} + C$$

3. $$\frac{3y^{\frac{4}{3}}}{4} + C$$

4. $$\frac{4y^{\frac{5}{4}}}{5} + C$$

5. $$\frac{3z^{\frac{4}{3}}}{4} + C$$

6. $$\frac{2z^{\frac{3}{2}}}{3} + C$$

7. $$\frac{z^2}{2} + C$$

8. $$\frac{4y^{\frac{5}{4}}}{5} + C$$

9. $$\frac{y^2}{2} + C$$

10. $$\frac{z^2}{2} + C$$