Example Worksheet 1

1 Linear equations

Solve the following equations for the specified variable.

1. Solve for E :
$$-15E + 23 = EF + T$$
2. Solve for q :
$$E - 12q = Tq + 15$$
3. Solve for v :
$$fv - 15 = 18v + y$$
4. Solve for x :
$$Hx + 16 = -5x - 5$$
5. Solve for n :
$$c - 11n = Bn + 12$$
6. Solve for b :
$$11b + g = A + Tb$$
7. Solve for X :
$$-18X - 13 = -5X + a$$
8. Solve for b :
$$Tb + h = bz - 2$$
9. Solve for d :
$$10d - 3 = Kd + j$$
10. Solve for q :
$$g + 4q = 17q + r$$
11. Solve for d :
$$dr + 21 = A + Sd$$
12. Solve for u :
$$-4u - 17 = 24u - 2$$
13. Solve for Y :
$$E - Y = -7Y - 17$$
14. Solve for j :
$$jt + 5 = -13j - 9$$
15. Solve for W :
$$-26W + c = C + Wg$$
16. Solve for r :
$$-19r + t = Hr - 2$$
17. Solve for N :
$$15N + 4 = -16N - 14$$
18. Solve for v :
$$24v + 5 = -13v - 6$$
19. Solve for d :
$$15d - 4 = 23d + 5$$
20. Solve for x :
$$Nx + S = Wx - 25$$

2 Quadratic equations

Solve the following quadratic equations.

1. $$-8y^2 + 3 = y - 21$$
2. $$-20y^2 - 20y = 23$$
3. $$-12x^2 = 14x^2 + 2x + 18$$
4. $$y^2 + 28y + 132 = 0$$
5. $$x^2 - 39x + 368 = 0$$
6. $$x^2 - 17x + 42 = 0$$
7. $$x^2 + 6x - 520 = 0$$
8. $$y^2 + 12y - 364 = 0$$
9. $$y^2 - 32y + 231 = 0$$
10. $$17y^2 - 24y = 0$$
11. $$y^2 + 8y + 12 = 0$$
12. $$y^2 - 8y - 308 = 0$$
13. $$15x^2 + 8x - 21 = 9x^2 + 14$$
14. $$-25y^2 - 8y - 2 = 18y^2 - 12y - 8$$
15. $$x^2 - 18x + 77 = 0$$
16. $$x^2 + 6x - 247 = 0$$
17. $$y^2 - 27y + 92 = 0$$
18. $$-19y^2 = -5y^2 + 2y + 20$$
19. $$12x^2 - 4x = -19x$$
20. $$x^2 + 18x - 208 = 0$$

3 Differentiation

Compute each derivative

1. $$\frac{d}{dx}\left(\frac{e^x + \log(x)}{\tan(x)}\right)$$
2. $$\frac{d}{dz}\left(\left(\sqrt{z} + \sin(z)\right)e^{-z}\right)$$
3. $$\frac{d}{dy}\left(\frac{-5y^2 + y - 21}{\tan(y)}\right)$$

4. $$\frac{d}{dy}\left(\left(-16y^3 - 19y + \sin\left(y\right) + 23\right)e^{-y}\right)$$

5. $$\frac{d}{dz}\left(\frac{\sqrt{z} - 10z^3 + 15z^2 + z}{-23z^2 + 11z + 12}\right)$$

6. $$\frac{d}{dx}\left(-\frac{1}{11x^2}\left(\log\left(x\right) + \cos\left(x\right)\right)\right)$$

7. $$\frac{d}{dy}\left(\frac{y + e^y}{17y^3 - 24y - 10}\right)$$

8. $$\frac{d}{dz}\left(\left(z + \tan\left(z\right)\right)e^{-z}\right)$$

9. $$\frac{d}{dy}\left(\frac{\sin\left(y\right) + \tan\left(y\right)}{-8y + 5}\right)$$

10. $$\frac{d}{dy}\left(\frac{6y^3 + 36y^2}{\sin\left(y\right)}\right)$$

4 Compute the integral

Compute the integral of the polynomials.

1. $$\int \left(-7\right)\, dz$$

2. $$\int 18y\, dy$$

3. $$\int \left(-13z - 22\right)\, dz$$

4. $$\int 2\, dz$$

5. $$\int \left(-17y^3 - 20y^2 - 26\right)\, dy$$

6. $$\int \left(25y - 1\right)\, dy$$

7. $$\int \left(-23y\right)\, dy$$

8. $$\int \left(16z^3 - 12z\right)\, dz$$

9. $$\int \left(8z + 6\right)\, dz$$

10. $$\int 5\, dz$$

5 Compute the integral

Compute the integral of the powers.

1. $$\int \left(8y^{\frac{5}{3}} - \frac{23y^{\frac{4}{3}}}{15}\right)\, dy$$

2. $$\int \left(-\frac{7}{9z^{\frac{3}{2}}}\right)\, dz$$

3. $$\int \left(\frac{\sqrt{z}}{6} + \frac{7}{\sqrt[4]{z}} - \frac{7}{2z^{\frac{5}{4}}} \right) dz$$

4. $$\int \frac{13}{9y^{\frac{3}{2}}} \, dy$$

5. $$\int \frac{7}{z^{\frac{5}{3}}} \, dz$$

6. $$\int \frac{51z^{\frac{3}{5}}}{20} \, dz$$

7. $$\int \frac{5y^{\frac{5}{2}}}{4} \, dy$$

8. $$\int \left(-\frac{5z^{\frac{5}{4}}}{3} \right) dz$$

9. $$\int \left(-6z^{\frac{2}{5}} - \frac{7}{\sqrt[5]{z}} \right) dz$$

10. $$\int \left(-\frac{z^{\frac{5}{2}}}{4} + \frac{5z^{\frac{3}{2}}}{4} \right) dz$$

6 Compute the integral

Compute the integral of the powers.

1. $$\int \frac{1}{z} \tan\left(\log\left(z\right)\right) dz$$

2. $$\int \left(-24z - 11\right) \sqrt{-12z^2 - 11z - 10} \, dz$$

3. $$\int \left(-\frac{14}{z} \log\left(z\right) \right) dz$$

4. $$\int \left(19e^{3y} - 2\right) e^y \, dy$$

5. $$\int \frac{1}{y} \tan\left(\log\left(y\right)\right) dy$$

6. $$\int \left(-38z + 22\right) \left(-247z^2 + 286z + 6\left(-19z^2 + 22z - 18\right)^3 - 234\right)$$

7. $$\int e^{2y} \, dy$$

8. $$\int \sqrt{e^y} e^y \, dy$$

9. $$\int \frac{\sin\left(\sqrt{y}\right)}{2\sqrt{y}} \, dy$$

10. $$\int 20 \sin^2\left(z\right) \cos\left(z\right) dz$$