Changing the Subject #1

Rewrite the following so that x is the subject.

1. $y = 4x + 2$

2. $3x + 5 = 2y$

3. $y = \frac{x}{5}$

4. $y = \frac{x+2}{5}$

5. $y = \frac{x}{5} + 2$

6. $y = -3x + 2$

7. $2y + 3x > 4$

8. $y = \frac{5}{x}$

9. $y = \frac{5}{x+2}$

10. $\frac{2}{y} = \frac{5}{x+2}$

11. $y + 2x = \frac{x}{5}$

12. $y = x^2 + 5$

13. $y = \sin(2x)$

14. $y = (x - 5)^2$

15. $y = \sqrt{x+2}$

16. $y = \sqrt{\frac{3}{x}}$

Answers for Changing the Subject #1

There are sometimes multiple ways to write the answer – for example $\frac{y+2}{4} = (y + 2) \div 4$

The answers here will use a fraction format, which is the best in most situations.

1) $y = 4x + 2 \quad \Rightarrow \quad y - 2 = 4x \quad \Rightarrow \quad x = \frac{y-2}{4}$ or $x = (y - 2) \div 4$ etc

2) $3x = 2y - 5 \quad \Rightarrow \quad x = \frac{2y-5}{3}$

3) $y = \frac{x}{5} \quad \Rightarrow \quad 5y = x \quad \Rightarrow \quad x = 5y$

4) $y = \frac{x+2}{5} \quad \Rightarrow \quad 5y = x + 2 \quad \Rightarrow \quad x = 5y - 2$

5) $y = \frac{x}{5} + 2 \quad \Rightarrow \quad y - 2 = \frac{x}{5} \quad \Rightarrow \quad x = 5(y - 2)$ or $x = 5y - 10$

6) $y = -3x + 2 \quad \Rightarrow \quad y - 2 = -3x \quad \Rightarrow \quad x = \frac{y-2}{-3}$ or $x = \frac{-y+2}{3}$

7) $2y + 3x > 4 \quad \Rightarrow \quad 3x > 4 - 2y \quad \Rightarrow \quad x > \frac{4-2y}{3}$

8) $y = \frac{5}{x} \quad \Rightarrow \quad xy = 5 \quad \Rightarrow \quad x = \frac{5}{y}$

9) $y = \frac{5}{x+2} \quad \Rightarrow \quad (x + 2)\, y = 5 \quad \Rightarrow \quad x + 2 = \frac{5}{y} \quad \Rightarrow \quad x = \frac{5}{y} - 2$

10) $\frac{2}{y} = \frac{5}{x+2} \quad \Rightarrow \quad 2x + 4 = 5y \quad \Rightarrow \quad 2x = 5y - 4 \quad \Rightarrow \quad x = \frac{5y-4}{2}$ (or $2.5y - 2$)

11) $y + 2x = \frac{x}{5} \quad \Rightarrow \quad 5y + 10x = x \quad \Rightarrow \quad 5y = -9x \quad \Rightarrow \quad x = \frac{-5y}{9}$ (or $\frac{-5}{9}y$)

12) $y = x^2 + 5 \quad \Rightarrow \quad y - 5 = x^2 \quad \Rightarrow \quad x = \pm\sqrt{y-5}$ or $x = \pm(y - 5)^{1/2}$

13) $y = \sin(2x) \quad \Rightarrow \quad 2x = \sin^{-1}(y) \quad \Rightarrow \quad x = \frac{1}{2}\sin^{-1}(y)$ or $x = \frac{\sin^{-1}(y)}{2}$

14) $y = (x - 5)^2 \quad \Rightarrow \quad \pm\sqrt{y} = x + 5 \quad \Rightarrow \quad x = \pm\sqrt{y} - 5$

15) $y = \sqrt{x+2} \quad \Rightarrow \quad y^2 = x + 2 \quad \Rightarrow \quad x = y^2 - 2$

16) $y = \sqrt{\frac{3}{x}} \quad \Rightarrow \quad y^2 = \frac{3}{x} \quad \Rightarrow \quad xy^2 = 3 \quad \Rightarrow \quad x = \frac{3}{y^2}$