

## Changing the Subject #2

Rewrite the following so that  $x$  is the subject.

1.  $y = 3x - 2$

2.  $4x + y + 2 = 0$

3.  $y - 5x = 2$

4.  $y = \frac{3x + 4}{5}$

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

6.  $2x + 3a \leq 4$

7.  $3(x - y) = z$

8.  $y = x^2 - z$

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

10.  $y + 2 = 3x^2$

11.  $y = \frac{z + 5}{3x}$

12.  $k + 2 = \frac{4}{\sqrt{x}}$

13.  $\sqrt{y} = \sqrt{x + 1} - 5$

14.  $p = \sqrt{\frac{x + 2}{3}}$

15.  $k = \frac{3 \sin^{-1}(x)}{2}$

16.  $b = 5a - 2x^2$

## Answers for Changing the Subject #2

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.

$$1) \quad y = 3x - 2 \quad \Rightarrow \quad y + 2 = 3x \quad \Rightarrow \quad x = \frac{y+2}{3}$$

$$2) \quad 4x + y + 2 = 0 \Rightarrow 4x = -y - 2 \Rightarrow x = \frac{-y-2}{4}$$

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

$$4) \quad y = \frac{3x+4}{5} \quad \Rightarrow \quad 5y = 3x+4 \quad \Rightarrow \quad 5y-4 = 3x \quad \Rightarrow \quad x = \frac{5y-4}{3}$$

$$5) \quad y = \frac{x}{8} - 5 \quad \Rightarrow \quad y + 5 = \frac{x}{8} \quad \Rightarrow \quad x = 8(y+5) \quad \text{or} \quad x = 8y + 40$$

$$6) \quad 2x + 3a \leq 4 \quad \Rightarrow \quad 2x \leq 4 - 3a \quad \Rightarrow \quad x \leq \frac{4-3a}{2}$$

$$7) \quad 3(x-y) = z \quad \Rightarrow \quad 3x - 3y = z \quad \Rightarrow \quad x = \frac{z+3y}{3} \quad \text{or} \quad x = \frac{z}{3} + y$$

$$8) \quad y = x^2 - z \quad \Rightarrow \quad y + z = x^2 \quad \Rightarrow \quad x = \pm\sqrt{y+z}$$

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

$$10) \quad y + 2 = 3x^2 \quad \Rightarrow \quad \frac{y+2}{3} = x^2 \quad \Rightarrow \quad x = \pm\sqrt{\frac{y+2}{3}} \quad \text{or} \quad x = \pm\left(\frac{y+2}{3}\right)^{1/2}$$

$$11) \quad y = \frac{z+5}{3x} \quad \Rightarrow \quad 3xy = z+5 \quad \Rightarrow \quad x(3y) = z+5 \quad \Rightarrow \quad x = \frac{z+5}{3y}$$

$$12) \quad k + 2 = \frac{4}{\sqrt{x}} \quad \Rightarrow \quad \sqrt{x}(k+2) = 4 \quad \Rightarrow \quad \sqrt{x} = \frac{4}{k+2} \quad \Rightarrow \quad x = \left(\frac{4}{k+2}\right)^2$$

$$13) \quad \sqrt{y} = \sqrt{x+1} - 5 \Rightarrow \sqrt{y} + 5 = \sqrt{x+1} \Rightarrow (\sqrt{y} + 5)^2 = x + 1 \Rightarrow x = (\sqrt{y} + 5)^2 - 1$$

$$14) \quad p = \sqrt{\frac{x+2}{3}} \quad \Rightarrow \quad p^2 = \frac{x+2}{3} \quad \Rightarrow \quad 3p^2 = x+2 \quad \Rightarrow \quad x = 3p^2 - 2$$

$$15) \quad k = \frac{3 \sin^{-1}(x)}{2} \quad \Rightarrow \quad 2k = 3 \sin^{-1}(x) \quad \Rightarrow \quad \frac{2k}{3} = \sin^{-1}(x) \quad \Rightarrow \quad x = \sin\left(\frac{2k}{3}\right)$$

$$16) \quad b = 5a - 2x^2 \quad \Rightarrow \quad 2x^2 = 5a - b \quad \Rightarrow \quad x^2 = \frac{5a-b}{2} \quad \Rightarrow \quad x = \pm\sqrt{\frac{5a-b}{2}}$$

$$\text{but also} \quad \Rightarrow \quad b - 5a = -2x^2 \quad \Rightarrow \quad x^2 = \frac{b-5a}{-2} \quad \Rightarrow \quad x = \pm\sqrt{\frac{b-5a}{-2}}$$