

Exponential Equations

Feb 4th

Review: Solve equations of an exponential nature

1) Unknown as answer

$$16^{\frac{1}{2}} = x$$

$$\sqrt{16} = x$$

$$4 = x$$

$$9^{-\frac{3}{2}} = x$$

$$\frac{1}{9^{3/2}} = x$$

$$\frac{1}{(\sqrt{9})^3}$$

$$\frac{1}{27} = x$$

'bottom out'

$$4^{3/2} = x$$

$$(\sqrt{4})^3 = x$$

$$\sqrt{4^3} = x$$

$$x = 8$$

$$2^{-4} = x$$

$$\frac{1}{2^4} = x$$

$$\frac{1}{16} = x$$

2) Unknown as base

$$2x^3 = -54$$

$$\sqrt[3]{x^3} = \sqrt[3]{\frac{-54}{2}}$$

$$x = -3$$

$$4\sqrt{x^4} = \frac{1}{81}$$

$$x = \pm \frac{1}{3}$$

3) Unknown as exponent

$$2^x = 64$$

$$2^{\textcircled{x}} = 2^{\textcircled{6}}$$

$$x = 6$$

$$4^x = \frac{1}{32}$$

$$2^{2x} = \frac{1}{2^5}$$

$$\frac{1}{2^{-2x}} = \frac{1}{2^5}$$

$$-2x = 5$$

$$x = -\frac{5}{2}$$

$$2^{2x} = 2^{-5}$$

$$2x = -5$$

$$x = -\frac{5}{2}$$

$$3^x = 27^{2x+1}$$

$$3^{\textcircled{x}} = 3^{\textcircled{3(2x+1)}}$$

$$x = 6x + 3$$

$$-6x - 6x$$

$$-5x = 3$$

$$\frac{-5x}{-5} = \frac{3}{-5}$$

$$x = -\frac{3}{5}$$

Blue WS key

1. $x = 5$

2. $x = 3$

3. $x = \frac{5}{2}$

4. $x = -3, -1$

5. $x = -3$

6. $x = 6$

7. $x = -\frac{1}{2}$

8. $x = \frac{14}{15}$

9. $x = \pm 2$

10. $x = \frac{1}{2}$

11. $x = -1$

12. $x = 3$