

**A.CED.A.1: Exponential Equations 2**

1 What is the value of  $x$  in the equation  $9^{3x+1} = 27^{x+2}$ ?

- 1) 1   2)  $\frac{1}{3}$    3)  $\frac{1}{2}$    4)  $\frac{4}{3}$

2 What is the value of  $x$  in the equation  $81^{x+2} = 27^{5x+4}$ ?

- 1)  $-\frac{2}{11}$    2)  $-\frac{3}{2}$    3)  $\frac{4}{11}$    4)  $-\frac{4}{11}$

3 Solve for  $x$ :  $9^x = 27$

4 Solve algebraically for  $x$ :  $27^{2x+1} = 9^{4x}$

5 Solve algebraically for  $x$ :  $27^x = 9^{x+2}$

6 Solve for  $x$ :  $27^x = 9^{2x-1}$

7 Solve for  $x$ :  $27^{x+2} = 9^{2x-1}$

8 Solve for  $x$ :  $9^{2x} = 27^{x+1}$

9 If  $9^{x+1} = 27^x$ , what is the value of  $x$ ?

10 Solve algebraically for all values of  $x$ :

$$81^{x^3+2x^2} = 27^{\frac{5x}{3}}$$

## A.CED.A.1: Exponential Equations 2

### Answer Section

1 ANS: 4

$$9^{3x+1} = 27^{x+2}$$

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

$$3^{6x+2} = 3^{3x+6}$$

$$6x + 2 = 3x + 6$$

$$3x = 4$$

$$x = \frac{4}{3}$$

REF: 081008a2

2 ANS: 4

$$81^{x+2} = 27^{5x+4}$$

$$\log 81^{x+2} = \log 27^{5x+4}$$

$$(x+2)\log 81 = (5x+4)\log 27$$

$$\frac{(x+2)\log 81}{\log 27} = 5x+4$$

$$\frac{4}{3}(x+2) = 5x+4$$

$$4x+8 = 15x+12$$

$$11x = -4$$

$$x = -\frac{4}{11}$$

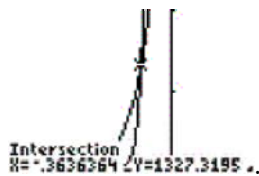
$$81^{x+2} = 27^{5x+4}$$

$$(3^4)^{x+2} = (3^3)^{5x+4}$$

$$4x+8 = 15x+12$$

$$11x = -4$$

$$x = -\frac{4}{11}$$



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-4/11

REF: 060303b

3 ANS:

$$\frac{3}{2}$$

REF: 068515siii

4 ANS:

$$27^{2x+1} = 9^{4x}$$

$$\log 27^{2x+1} = \log 9^{4x}$$

$$(2x+1)\log 27 = 4x \cdot \log 9$$

$$\frac{(2x+1)\log 27}{\log 9} = 4x$$

$$\frac{3}{2} \cdot \frac{3}{2}(2x+1) = 4x$$

$$2x+1 = \frac{8x}{3}$$

$$6x+3 = 8x$$

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

$$27^{2x+1} = 9^{4x}$$

$$(3^3)^{2x+1} = (3^2)^{4x}$$

$$3^{6x+3} = 3^{8x}$$

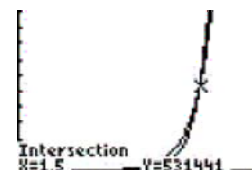
$$6x+3 = 8x$$

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

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Plot1 Plot2 Plot3
Y1=27^(2X+1)
Y2=9^(4X)
Y3=
Y4=
Y5=
Y6=
Y7=

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REF: 060422b

5 ANS:

$$27^x = 9^{x+2}$$

$$\log 27^x = \log 9^{x+2}$$

$$x \log 27 = (x+2) \log 9$$

$$\frac{x \log 27}{\log 9} = x+2$$

$$\frac{3x}{2} = x+2$$

$$3x = 2x+4$$

$$x = 4$$

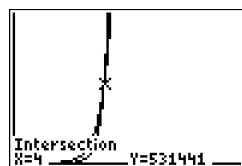
$$27^x = 9^{x+2}$$

$$(3^3)^x = (3^2)^{x+2}$$

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

$$3x = 2x+4$$

$$x = 4$$



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WINDOW
Xmin=0
Xmax=10
Xscl=0
Ymin=0
Ymax=1000000
Yscl=0
Xres=1

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REF: 080922b

6 ANS:

2

REF: 069012siii

7 ANS:

8

REF: 019508siii

8 ANS:

3

REF: 060005siii

9 ANS:

2

REF: 080106siii

10 ANS:

$$81^{x^3+2x^2} = 27^{\frac{5x}{3}}$$

$$\left(3^4\right)^{x^3+2x^2} = \left(3^3\right)^{\frac{5x}{3}}$$

$$3^{4x^3+8x^2} = 3^{5x}$$

$$4x^3 + 8x^2 - 5x = 0$$

$$x(4x^2 + 8x - 5) = 0$$

$$x(2x - 1)(2x + 5) = 0$$

$$x = 0, \frac{1}{2}, -\frac{5}{2}$$

REF: 061239a2