

**A2.A.27: Exponential Equations 3: Solve exponential equations with and without common bases**

- 1 Solve for  $x$ :  $2 = 2^{2x+1}$
- 2 Solve for  $x$ :  $3^{x^2+4x} = 3^{-4}$
- 3 If  $4^{2x} = 2^{3x+2}$ , find the value of  $x$ .
- 4 Solve for  $x$ :  $4^{3x} = 2^{x+5}$
- 5 If  $4^x = 2^{3x+1}$ , find the value of  $x$ .
- 6 If  $8^{2x} = 2^{x+5}$ , what is the value of  $x$ ?
- 7 Solve for  $x$ :  $8^{x-2} = 2^x$
- 8 Solve for  $x$ :  $2^{3x} = 4^{x-1}$
- 9 Solve for  $x$ :  $4^4 = 2^{3x-1}$
- 10 Solve for  $x$ :  $2^{x+3} = 64$
- 11 Solve for  $x$ :  $2^{2x} = 8^{5-x}$
- 12 Solve for  $x$ :  $8^x = 2^{(x+6)}$
- 13 Solve for  $x$ :  $2^{x+2} = 4^{x-1}$
- 14 Solve for  $x$ :  $4^{(3x+5)} = 16$
- 15 If  $25 - 3^2 = 2^x$ , what is the value of  $x$ ?
- 16 Solve for  $x$ :  $2^{4x-1} = 4^x$

17 Solve for  $x$ :  $4^{2x} = 2^{(6x-8)}$

18 Solve for  $m$ :  $3^{m+1} - 5 = 22$

19 Solve the equation  $9^{(x^2+x)} = 3^4$  for all values of  $x$ . [*Only an algebraic solution will be accepted.*]

20 Solve for  $y$ :  $3^{y+1} = 9^{y-1}$

21 Solve for  $x$ :  $3^{2x+1} = 27^x$

22 Solve algebraically for  $x$ :  $9^{3x} = 3^{3x+1}$

23 Solve for  $x$ :  $3^{2x-1} = 27$

24 Solve for  $x$ :  $3^x = 9^{x-1}$

25 Solve algebraically for  $x$ :  $5^{4x} = 125^{x-1}$

26 If  $7^{(x^2+x)} = 49$ , find the positive value of  $x$ .

27 Solve for  $x$ :  $8^{\frac{1}{3}} = 2^{x+1}$

28 Solve for  $x$ :  $\frac{1}{16} = 2^{3x-1}$

29 Solve for  $y$ :  $2^{(y-3)} = \frac{1}{16}$

30 Solve for  $x$ :  $3^x = 27^{\frac{2}{3}}$

31 If  $5^{x^2-2x} = 1$ , find the positive value of  $x$ .

**A2.A.27: Exponential Equations 3: Solve exponential equations with and without common bases**  
**Answer Section**

1 ANS:  
0

REF: 018706siii

2 ANS:  
-2

REF: 088902siii

3 ANS:  
2

REF: 018415siii

4 ANS:  
1

REF: 068416siii

5 ANS:  
-1

REF: 088410siii

6 ANS:  
1

REF: 088506siii

7 ANS:  
3

REF: 088608siii

8 ANS:  
-2

REF: 089309siii

9 ANS:  
3

REF: 018906siii

10 ANS:  
3

REF: 068901siii

11 ANS:  
3

REF: 019406siii

12 ANS:  
3

REF: 069607siii

13 ANS:  
4

REF: 089609siii

14 ANS:  
-1

REF: 069704siii

15 ANS:  
4

REF: 010101siii

16 ANS:  
 $\frac{1}{2}$

REF: 060107siii

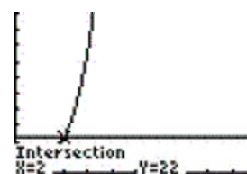
17 ANS:  
4

REF: 080204siii

18 ANS:

$$\begin{aligned}
 3^{m+1} - 5 &= 22 \\
 3^{m+1} &= 27 \\
 \log 3^{m+1} &= \log 27 \\
 2. (m+1)\log 3 &= \log 27 \\
 m+1 &= \frac{\log 27}{\log 3} \\
 m+1 &= 3 \\
 m &= 2
 \end{aligned}$$

Plot1 Plot2 Plot3  
 $\sqrt{Y_1} = 3^{(X+1)} - 5$   
 $\sqrt{Y_2} = 22$   
 $\sqrt{Y_3} =$   
 $\sqrt{Y_4} =$   
 $\sqrt{Y_5} =$   
 $\sqrt{Y_6} =$   
 $\sqrt{Y_7} =$



REF: 060522b

19 ANS:  
-2,1

REF: 019541siii

20 ANS:

$$3^{y+1} = \left(3^2\right)^{y-1}$$

$$3^{y+1} = 3^{2y-2}$$

$$y+1 = 2y-2$$

$$3 = y$$

REF: 019706siii

21 ANS:

$$1$$

REF: 010004siii

22 ANS:

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

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

$$3^{6x} = 3^{3x+1}$$

$$\frac{1}{3} \cdot 6x = 3x + 1$$

$$3x = 1$$

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

REF: 060923b

23 ANS:

$$2$$

REF: 068801siii

24 ANS:

$$2$$

REF: 089014siii

25 ANS:

$$5^{4x} = \left(5^3\right)^{x-1}$$

$$4x = 3x - 3$$

$$x = -3$$

REF: 061528a2

26 ANS:

$$1$$

REF: 089702siii

27 ANS:  
0

REF: 068707siii

28 ANS:  
 $2^{-4} = 2^{3x-1}$   
 $-4 = 3x - 1$   
 $-3 = 3x$   
 $-1 = x$

REF: 081529a2

29 ANS:  
-1

REF: 019810siii

30 ANS:  
2

REF: 019604siii

31 ANS:  
2

REF: 069412siii