

PC 12 LG 3 Worksheet (Exponential Equations)

Solve each of the following exponential equations algebraically.

1. $4^{x-3} = 8^{2x+1}$

2. $16^{3x-1} = 4^{2x+5}$

3. $25^{2x-1} = \left(\frac{1}{5}\right)^{3x-2}$

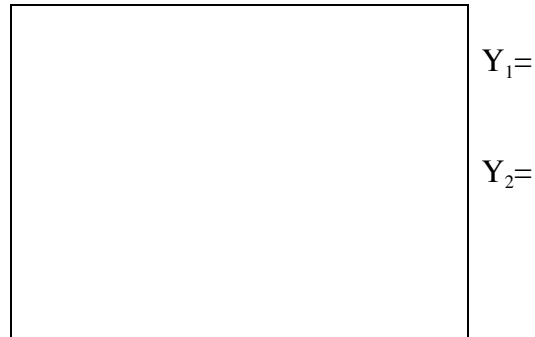
4. $32^{3x-1} = \left(\frac{1}{8}\right)^{2x-2}$

5. $\left(\frac{1}{27}\right)^{2x+1} = \left(\frac{1}{9}\right)^{4x-2}$

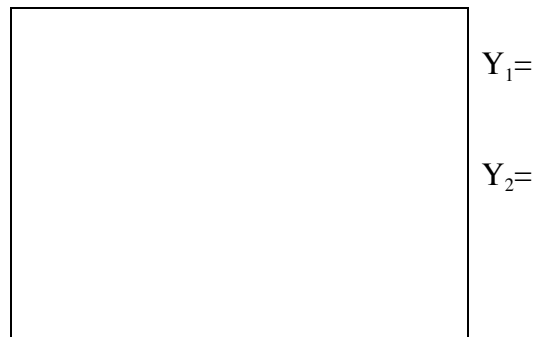
6. $\left(\frac{1}{16}\right)^{2x-1} = \left(\frac{1}{8}\right)^{5x+2}$

Sketch each of the following exponential equations and solve graphically to 2 decimal places.

1. $4^{2x+1} = 5^{3x-4}$



2. $8^{2x+1} = \left(\frac{1}{9}\right)^{4-3x}$



Solve the following problems by creating an exponential equation in the form of $F = S \cdot G^{\left(\frac{t}{p}\right)}$.

9. If a bacteria's population doubles every 10 minutes, what does a population of 500 grow to in 40 minutes?

10. If a city's population increases by 3% per year, find the population in 10 years if the current population is 120,000 people.

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11. If the half-life of I-44 is 8 minutes, how much of a 100 g sample is left after 40 minutes?

12. If a population of 100 bacteria grows to 3200 bacteria in 40 minutes, what is the doubling period of this bacterium?

13. If the tripling period of an insect is 12 days, how long does it take a population of 300 insects to grow to 8100?

14. If a sample of U-275 decays from 320 mg to 20 mg in 5 hours, what is the half-life of U-275?

15. If the half-life of B-127 is 18 seconds, how long does it take a sample of 400 g to decay to 25 g?

16. If a country's current population of 3.5 million people is decreasing at a rate of 1.9% per year, find its population in 20 years.

Answer Key

1. $\frac{-9}{4}$

2. $\frac{7}{4}$

3. $\frac{4}{7}$

4. $\frac{11}{21}$

5. $\frac{7}{2}$

6. $\frac{-10}{7}$

7. 3.81

8. 4.47

9. 8000

10. 161270

11. 3.125 g

12. 8 min

13. 36 days

14. 1.25 hrs or 1 hr 15 min

15. 72 sec

16. 2.38 million