Comprehensive Review #10

Topics:

Lesson 82 - Exponential Equations

Lesson 88 - Exponential Functions (Growth and Decay)

Solve:

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

$$2. \quad 3^{x+6} = 4^{2x+5}$$

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

4.
$$5^{x-6} = 4^{2x-5}$$

- 5. Find the number of grams of carbon-14 remaining after 17,190 yrs if 37 grams of the isotope were initially present. The half-life of carbon-14 is 5730 yrs.
- 6. Find the number of grams of polonium remaining after 276 days if 55 grams of the isotope were initially present. The half-life of polonium is 138 days.

7. The amount of a substance initially present in an experiment was 500 grams, and after 100 hours only 300 grams remained. Assuming exponential decay, write the exponential equation describing the amount of substance present as a function of time and determine the half life of the substance. Sketch the graph.

8. The amount of a substance initially present in an experiment was 380 grams, and after 100 hours only 220 grams remained. Assuming exponential decay, write the exponential equation describing the amount of substance present as a function of time and determine the half life of the substance. Sketch the graph.

- 9. Under the onslaught of the College Algebra second period class, a pile of homework problems decreased exponentially. It decreased from 900 to 700 problems in only 30 minutes. How long would it take until only 400 problems remained?
- 10. The half-life of P_{33} (phosphorus) is approximately 25 days and its decay is approximated by the model $Q(t) = Q_0 e^{-0.02773t}$ where t is time in days, Q(t) is the quantity at time t, and Q_0 is the initial quantity. What percentage of a given amount remains after 42 days?

[A] 31.2%

[B] 50%

[C] 0.3%

[D] 32%