1. You take one 1200mg dose of the medicine your doctor prescribed. Assume that your kidneys can filter out 30% of a drug every day.
	1. Make a table showing the amount of the drug remaining at various times.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Number of Days | 0 | 1 | 2 | 3 | 4 | 5 |
| Amount of Medicine  | 1200 |  |  |  |  |  |

 2. The sequence below shows the total number of bacteria in a Petri dish after n number of hours that started with 7 bacteria.

$$7, 14, 28, 56, …$$

Assuming the pattern continued, which function could be used to find the total number of bacteria at the end of *n* number of hours?

A. $f\left(n\right)=n+7$ B. $f\left(n\right)=2n$ C. $f\left(n\right)=7^{n}$ D. $f\left(n\right)=7\left(2\right)^{n}$

**For problems 3-7**, use the following scenario. Each year the local country club sponsors a tennis tournament. Play starts with 128 participants. During each round, half of the players are eliminated.

 3. If we were going to express the number of teams remaining in the tournament in a NOW-NEXT equation, what would that equation be?

 A. $NEXT= NOW∙2$ B. $NEXT= NOW-32$

C. $NEXT= NOW÷\frac{1}{2}$ D. $NEXT= NOW∙\frac{1}{2}$

 4. What would the explicit equation be to predict the number of teams remaining, $y$, after a specific number of rounds,$x$?

A. $y=128\left(2\right)^{x}$ B. $y=\frac{1}{2}x+1280$ C. $y=128\left(\frac{1}{2}\right)^{x}$ D. $y=128x+\frac{1}{2}$

 5. If the numbers of teams remaining at the end of each round were represented as a sequence, would the sequence be arithmetic, geometric, or neither?

A. arithmetic B. geometric C. neither D. $x^{0}$

 6. How many rounds does it take to get a winner of the entire tournament, meaning there is 1 team remaining?

A. 5 rounds B. 6 rounds C. 7 rounds D. 8 rounds

 7. In the context of the problem, does it make sense to have 10 rounds?

A. yes because you can continue the pattern forever if you wanted to get the # of teams

B. yes because you can put 10 into the equation and get an answer for the # of teams

C. no because the answer you get represents the # of teams and it isn’t possible

D. no because it is too hard

\_\_\_\_\_8. Which of the following sequences is created from the following information: $a\_{1}=-2, d=4$?

A. $-2, -8, -32,-128, -512$ B. $-2, -6, -10, -14, -18$

C. $-2, 2, 6, 10, 14$ D. $-2, -6, -18, -54, -162$

 9. Jimmy conducted an experiment on the change in the population of a colony of bacteria based on a change in its surrounding temperature. He modeled the change in the population using the function $y=1000\left(0.80\right)^{x}$. Which of these statements is *true*?

A. The population decreases at a rate of 20%.

B. The population increases at a rate of 20%.

C. The population decreases at a rate of 80%.

D. The population increases at a rate of 80%.

 10. Identify the correct characteristics of the following geometric sequence. $2,\frac{4}{3},\frac{8}{9},\frac{16}{27},\frac{32}{81}$

A. geometric, $d=3$ B. geometric, $r=3$ C. geometric, $d=\frac{2}{3}$ D. geometric, $r=\frac{2}{3}$

 11. When Diana was born, $5000 was put it into an account that gains 3.75% interest compounded monthly. Using the form$ y=P\left(1+\frac{r}{n}\right)^{(nt)}$, how much would she have in her account after 18 years.

A. $14,203,676.34 B. $5,288.85 C. $5,190.76 D. $9,809.83

 12. Samaj didn’t finish his homework assignment last night. He was supposed to write the first 2 terms of a geometric sequence that starts at 2. He wrote 2, 4 and did not finish. What are the next 3 terms of the sequence he was writing?

A. $6, 8, 10$ B. $8, 16, 32 $ C. $2, 4, 2$ D. $16, 256, 65536$

 13. Whitney wrote a compound interest equation for her sister, Rachel, to explain how their inheritance was growing in their account. Rachel understood most of the numbers in the equation but didn’t understand what the 2 meant. What does the number 2 mean in the equation$ y=25000\left(1+\frac{0.08}{2}\right)^{2t}$?

 A. compounded semiannually B. 2% interest C. initially had $2 D. 2 years

 14. May bought a home for $125,000 in 2000. She learned that the area around her home increased the value of her home at a rate of 0.25% per year. Determine the value of her home in 2010.

A. $\$125,312.50$ B. $\$128,160.39$ C. $\$1,164,153.22$ D. $160,010.57

**For #15 – 20**, use the following equation: $f(x)=5\left(0.25\right)^{x}$

 15. Does the equation represent growth/decay?

A. growth B. decay

 16. What is the initial value?

A. $5$ B. $0.75$ C. $0.25$ D. $1$

 17. What is the growth/decay factor?

 A. $5$ B. $0.75$ C. $0.25$ D. $1$

 18. What is the rate of growth/decay?

A. $500\%$ B. $75\%$ C. $25\%$ D. $100\%$

 19. Find $f\left(3\right)$?

A. $7.8125$ B. $.78125$ C. $ .078125$ D. $781.25$

 20. For what value of x is the function equal to $0.3$?

 A. $x=1$ B. $x=2$ C. $x=3$ D. $x=4$

 21. The half-life of a radioactive substance is the length of time it takes for one half of the substance to dacay into another substance. To treat some forms of cancer, doctors use radioactive iodine. The half-life of iodine-131 is 8 days. A patient receives a 12-mCi (millicuries, a measure of radiation) treatment. How much iodine-131 is left in the patient 16 days later?

 A. $1$ B. $2$ C. $3$ D. $4$

 22. Cesium-137 has a half-life of 30 years. Suppose a lab stored a 30-mCi sample in 1973. How much of the sample will be left in 2063?

 A. $7.5$mCi B. $15mCi $ C. $3.75$mCi D. $30$mCi

 23. The half-life of iodine-124 is 4 days. A technician measures a 40-mCi sample of iodine-124. How many half-lives of iodine -124 occur in 16 days?

 A. $4$ B. $3$ C. $2$ D. $1$

 24. The half-life of carbon-11 is 20 minutes. A sample of carbon-11 has 25mCi. How much carbon-11 is in the sample 1 hour after the original sample is measured?

 A. $3.125mCi$ B. $24.14$mCi C. $23.33$mCi D. $3$mCi

 25. Find the perimeter of the following triangle.

