Exponential Functions

You are given these functions:

- $f(x) = 4^x$
- $g(x) = 1.25^x$
- $h(x) = 2^{x-5}$
- $k(x) = 5^{2x+1}$
- $m(x) = 2 \cdot 3^x$

Find these values.

_____ 1. $f(3)$

_____ 2. $f(5)$

_____ 3. $f(0)$

_____ 4. $f(-2)$

_____ 5. $f(-1)$

_____ 6. $f(0.5)$

_____ 7. $g(2)$

_____ 8. $g(9)$

_____ 9. $g(-4)$

_____ 10. $h(7)$

_____ 11. $h(10)$

_____ 12. $h(6)$

_____ 13. $h(4)$

_____ 14. $h(5)$

_____ 15. $h(3)$

_____ 16. $k(1)$

_____ 17. $k(0)$

_____ 18. $k(4)$

_____ 19. $k(-1)$

_____ 20. $m(3)$

_____ 21. $m(4)$

_____ 22. $m(1.5)$

_____ 23. $m(-2)$

_____ 24. $m(-2)$

Remember the exponential growth formula $A = P(1 + r)^t$.

25. Since the year 2000, the city of Waukee has been growing at a rate of about 6.5% per year. The city currently has about 25,000 people. If this growth rate continues, how many people will Waukee have five years from now?

    a. Write the equation for this problem.

    b. Find the answer.

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26. A colony of bacteria starts with 9 bacteria at noon. If the number of bacteria triples every 20 minutes, how many bacteria will be present at 2:40 pm that afternoon?

_____a. How many 20-minute periods are there between noon and 2:40pm ("t" in the formula)?

    b. Write the equation for this problem.

    c. Find the answer.

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27. Suppose you inherit some land that is was purchased for $30,000 in the year 1960. For the past 60 years the land has increased in value at a rate of 5% per year. How much is the land worth in 2020?

    a. Write the equation for this problem.

    b. Find the answer.

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28. The drug ibuprofen dissipates so that the amount in a person's body decreases at a rate of 29% per hour. If you take 400 mg of ibuprofen, how much will be left in your body after 6 hours?

    a. Write the equation for this problem.

    b. Find the answer.

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29. In the 21st Century the city of Des Moines has been growing at a rate of 0.9% per year. There are currently about 220,000 people in Des Moines. According to this model, how many people did Des Moines have in the year 2000?

    a. Write the equation for this problem.

    b. Find the answer.