Problem Solving with Linear, Quadratic, and Exponential Functions

Directions: Use the four functions provided to find each combined function for questions 1 – 3.

$f(x) = 3x - 8$	$g(x) = 2 * 3^x - 1$	$h(x) = x^2 - 5x + 4$	$j(x) = x + 2$

1) $f(x) - h(x)$

2) $3*h(x)$

3) $j(x) * f(x)$

Directions: Identify the transformation of the function.

4) $m(x) + 5$

5) $2m(x)$

6) $m(x + 1)$

7) $m(x) - 3$

8) $m(x - 4)$

9) $-\frac{1}{2} m(x)$

Directions: Given f(x) = 3x, g(x) = 3ˣ, and r(x) = x² write the function rules for h(x), j(x), k(x), and m(x) based on the given descriptions.

10) The graph h(x) is a vertical stretch of f(x) by a scale factor of 4 and a vertical translation down 2 units.

11) The graph j(x) is a reflection of r(x) over the x-axis, and it has a horizontal translation of 2 units left.

12) The graph k(x) is a horizontal translation of g(x) of 3 units right and a vertical translation of 1 unit up.

Directions: Determine whether the function is linear, exponential, or quadratic. Write an appropriate equation and solve.

13) Johnny rents a car to go on vacation. CarRentals, in Marietta, GA, charges Johnny $125 for the car and $0.12 per mile. How much would it cost Johnny to drive the car to Destin and back for spring break (if Destin is 336 miles from Marietta)?

14) A tennis ball is thrown from 3 yards above the ground. It is thrown with a velocity of 14 yd/s. After how much time will the tennis ball hit the ground? (Use $h(t) = -16t^2 + v_0t + h_0$)

15) A new car is bought for $20,000. It is depreciating by 5% each year. How much would the car cost after 8 years?

16) A glass jar of jelly beans starts with 3,072 jelly beans. Each day, 25% of the jelly beans disappear from the previous day's amount. After how many days will there be less than 3 jelly beans left?

17) A library has 8000 books. The library loses 60 books per year, due to people forgetting to return their books. How many books will the library have in 15 years?

18) Margie got $1,000 from her grandmother to start her college fund. She is opening a new savings account and finds out that her bank offers a **2**% annual interest rate, compounded monthly. How much money will be in the account after 6 years?

19) A ball is shot from a cannon into the air with an upward velocity of 40 ft/sec. The equation that gives the height, h(t), of the ball at any time, t, is: $h(t) = -16t^2 + 40t + 1.5$. Find the maximum height attained by the ball.