

**Part 1: Algebra Skills**

1. Simplify:  $(5x^2 - 6x - 9) + (8x + 2x^2 + 3)$

2. Multiply:  $(5y^3z^5)(-3xy^3z^4)$

3. Multiply:  $(3a + 5)(3a - 7)$

4. Solve the following system of equations for x.

$$\begin{aligned}x + 3y &= 1 \\5x - 3y &= -25\end{aligned}$$

5. Solve the following system of equations for y.

$$\begin{aligned}4x + 3y &= 9 \\2x + 5y &= 8\end{aligned}$$

6. Simplify:  $(-3x^{-3})^{-2}$

7) Subtract:  $(5x^2 + 7x) - (3x^2 - x + 9)$

8) Find a factor of  $4x^2 - 25x - 21$ .

9) Multiply.  $\frac{15x^2y^3}{8xy} \cdot \frac{24x^2}{5xy^5}$

**Use  $f(x) = 3x^2 - 2x + 5$  and  $g(x) = 4x - 2$  for problems 10-13.**

10) Find  $f(2) - g(4)$ .

11) Find  $g(f(x))$ .

12) Find  $g(f(-4))$

13) Find  $f(g(x))$

14. What is the vertex of  $y = x^2 - 4x + 3$ ?

15. Solve  $2x^2 + 5x - 12 = 0$ .

16. Write in lowest terms:  $\frac{x^2 - 4x - 12}{x^2 - 9x + 18}$

17. Graph. Is  $(1,0)$  a solution to this system of linear inequalities?

$$3x + 4y < 12$$

$$y < \frac{1}{2}x + 5$$

$$y > -3$$

18. Find the solution(s) of  $y = 2x^2 - 3x - 35$

## Part II: Compound Interest

19. After 6 months of investing, your portfolio has a value of \$10,600. You started with \$9,000. What is the percentage increase in your portfolio?
  
20. You bought 600 shares of Microsoft Corporation 5 weeks ago at \$25.15 per share. Today the share price is \$20.65. How much money have you lost?
  
21. An amount of \$1,750.00 is deposited in a bank paying an annual interest rate of 5.7 % compounded quarterly. Find the balance after 4 years.
  
22. An amount of \$5,000.00 is deposited in a bank paying an annual interest rate of 6% compounded daily. Find the balance after 3 years.
  
23. An amount of \$4,500.00 is deposited in a bank paying an annual interest rate of 3.7%, compounded **continuously**. Find the balance after 4 years.
  
24. Give an example of converting an exponential form equation to logarithm form.  
$$a^x = b$$
  
25. How long would it take to double \$600 at 6.2% annual interest compounded annually?
  
26. You are purchasing a car for \$18,000 at 5.2% interest and financing this purchase over a period of 5 years. What would be your monthly payment?

### Part III: Investing and Budgeting

27. GloboGym Corporation has a stock price of \$3 on 1/1/2000 . On 1/1/2012, the price was \$9.  
Find an **equation of the line** in **slope-intercept form** that represents a linear progression of the stock price.
28. You bought a new car 6 years ago. This car loses all marketable value after 10 years. If the purchase price was \$17,000, how much is it worth today? (*Assume straight-line depreciation*)
29. What would be the monthly payment on a car that costs \$18,500 plus 7.6% sales tax financed over 5 years at 4% interest?
30. How much would you be financing (borrowing) on a car purchase of \$16,600 plus 6.9% tax, followed by a \$3,000 cash down payment?
31. You go to breakfast with friends and pay the bill. The check comes to \$49.50 plus 6.6% sales tax. You give an 14% tip. How much does the meal cost you?
32. Factor  $2x^2 - 7x - 9$
33. Factor and Solve:  $y = 4x^2 + 19x - 5$
34. You bought a car 5 years ago. This car loses historically has depreciated at a rate of 10.5% per year (*assuming exponential depreciation*). If the purchase price was \$15,000, how much is it worth today?

35. You are purchasing a 3 year-old used car. If the current price is \$16,500 and has historically depreciated at a rate of 8% per year, how much did the car cost when it was new? (*assume exponential depreciation*).
36. You have a 5 year old car that is worth \$12,400. It originally sold for \$16,600 when it was new. What is the average rate of depreciation for this vehicle? (*assume exponential depreciation*).
37. You bought a new car for \$17,500. The historical depreciation rate for this particular car has been 11% per year (*assume exponential depreciation*). In how many years will this car be worth \$10,000?
38. Conduct a breakeven analysis on the following functions to determine a pricing structure.

$$\text{Cost Function: } C(x) = 4x + 600$$

$$\text{Revenue Function: } R(x) = -x^2 + 81x - 80$$

*You bought a new car for \$18,500. There is 6.9% sales tax and you can get a 4.1% interest rate to finance this car over a 4 year period. You have decided to include a \$2000 down payment (after taxes). The car historically depreciates at a rate of 10% per year.*

39. How much tax will you be paying on this car?

40. What is your monthly payment?