1. Simplify each of the following.

   a) -3^2 b) $(-3)^2$ c) $(3x)^2$ d) $\left(\frac{3}{4}\right)^3$

   e) $2^n + 2^n$. (Hint: if you do not know in general, try $n = 1, 2, 3, 4, \ldots$, and the idea will come!)

2. Completely factor each of the following.

   a) $7x^2 + 7x$ b) $7x^2 + 28$ c) $8x^3 - 50x$ d) $3x^4 - 3$

3. Factor each of the follwing by completing the square.

   a) $30x + 5x^2 - 2160$ b) $20x + 2x^2 - 2542$

4. Given that $f(x) = -5x + 3$, find a) $f(-7)$ b) $f(2a)$

5. Given that $f(x) = \sqrt{2x - 1}$, find

   a) $f(5)$ b) $f(25)$ c) $f(x + h)$

6. Given $f(x) = \sqrt{x + 10}$ and $g(x) = 2x^2 + 7$, find

   a) $f(g(4))$ b) $g(f(6))$ c) $f(g(x))$ d) $g(f(x))$

7. Consider the straight line that passes through the points $(3, -1)$ and $(1, 5)$.

   a) Find the equation of the line. c) Find the $x-$intercept of the line.

   b) Find the $y-$intercept of the line.

8. Fifteen percent of the town's population are students. If there are 1800 students living in the town, how many people live there?

9. Paul earned $ 128 this week in his part time job. If this was a sixty percent increase from last week, how much money did he make last week?

10. A TV went on a 14% sale. The sale price is $ 412. 8. Find the original price of the TV.

11. Overnight, the number of bacteria increased by one hundred sixty percent. There are now 650 000 bacteria. How many was there yesterday?

12. Lisa took 5 exams. The first 4 received scores of 72, 93, 86, and 82. How much did she score on the fifth exam if her average score is 74 points?

13. A stock loses 60% of its value. What must the percent of increase be to recover all of its lost value? (Hint: if no value for the stock is given, make up a few different numbers.)

14. Susan has a new job to distribute flyers. Every day she earns $ 10 and an additional 5 cents per flyers distributed.

    a) Express Susan's daily income as a function f of n, where n is the number of flyers she distributes a day.

    b) How much money does she make a day if she distributes 500 flyers?

    c) How many flyers does she need to distribute a day in order to make $50?

15. We are standing on the top of a 720 ft tall building and throw a small object upward. The object's distance, measured in feet, after t seconds is

$$h(t) = -16t^2 + 192t + 720$$

a) How high is the object after 3 seconds? (In short, find $h(3)$.)

b) How high is the object after 5 seconds? (In short, find $h(5)$.)

c) Compute the average velocity of the object between $t = 3$ seconds and $t = 7$ seconds.

d) Compute the average velocity of the object between $t = 8$ seconds and $t = 11$ seconds.

e) How long does it take for the object to hit the ground?

f) What is the highest point that the object reaches?