Show all work and circle/box your final answer. All answers must be simplified unless stated otherwise.

1. Use intervals to describe the real numbers satisfying the following inequalities:

   (a) $2 \le x < 3$

   (b) $x < 3$

2. If $g(t) = t^3 - 3t^2 + t$, find $g(2)$, $g(a)$, and $g(t+h)$

3. Let $f(x) = \begin{cases} \pi x^2 & , x < 2 \\ 1 + x & , 2 \le x \le 2.5 \\ 4x & , x > 2.5 \end{cases}$

   Find $f(1)$, $f(2)$, and $f(3)$.

4. Factor the following:

   (a) $x^2 + 8x + 15$

   (b) $x^2 - 16$

   (c) $3x^2 + 12x + 12$

   (d) $3x - x^2$

5. Solve the following equations:

   (a) $x^2 - 14x + 49 = 0$

   (b) $x^3 - 4x = 0$

   (c) $3x^2 - 12x + 10 = 0$

6. Simplify the following expressions:
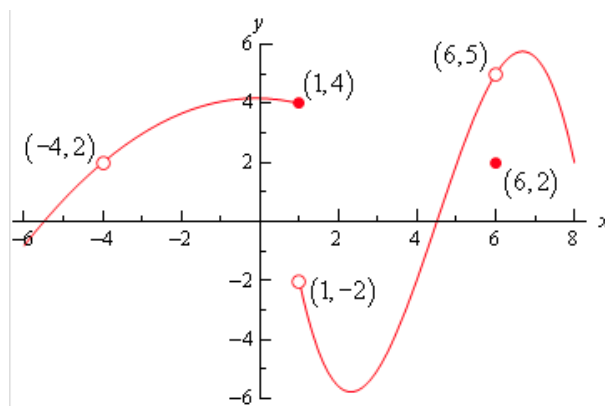
   (a) $8^{4/3}$

   (b) $16^{1/2}$

7. Find the equations of the lines satisfying the following properties: $(0,0)$ and $(1,0)$ is on the line.

8. In 2010, a patient paid $700 per day for a semiprivate hospital room and $1900 for an appendectomy operation. Express the total amount paid for an appendectomy as a function of the number of days of hospital confinement.

9. For shipping and handling, an online bookstore charges $5 plus 3% of the price of the books purchased. Find a function $C(x)$ that expresses the shipping and handling charge for a book order that costs x dollars.

10. For a particular company to sell x units of goods, the price must be $y = 0.2x + 7$ dollars. Interpret the slope and y-intercept of this line.

11. Using the graph of $f(x)$ below, find the following limits:

(a) $\lim\limits_{x\to 1^+} f(x)$

(b) $\lim\limits_{x\to -4} f(x)$

(c) $\lim\limits_{x\to 6} f(x)$