This is material from most algebra classes. You should know how to do all of these problems. Some may be more challenging, but they show up throughout the course.

1. Expand and Simplify

 (a) $-5y + 38$

 (b) $2x^2 + 1x - 15$

 (c) $9x^2 - 24x + 16$

2. Factor each expression

 (a) $(2x - 5)(2x + 5)$

 (b) $(2x - 3)(x + 4)$

 (c) $(x - 8)(x - 6)$

 (d) $x^{-2/3}(x - 4)^4 \left(\dfrac{16}{3}x - \dfrac{4}{3} \right)$ or $\dfrac{4(x - 4)^4(4x - 1)}{3x^{2/3}}$

3. Simplify

 (a) $\dfrac{x + 2}{x - 2}$

 (b) $\dfrac{x - 1}{x - 3}$

4. Rationalize the expression and simplify

 (a) $\sqrt{x} + 4$

 (b) $\dfrac{1}{\sqrt{4 + h} + 2}$

5. Solve each equation

 (a) $\dfrac{-2 \pm \sqrt{2}}{2}$ (use quadratic formula)

 (b) $x = -1, 1$

 (c) $x = 6$

6. Solve the inequality: $x^2 - 2x - 8 < 0 \rightarrow Interval \rightarrow (-2, 4)$

7. Find the slope between the following points
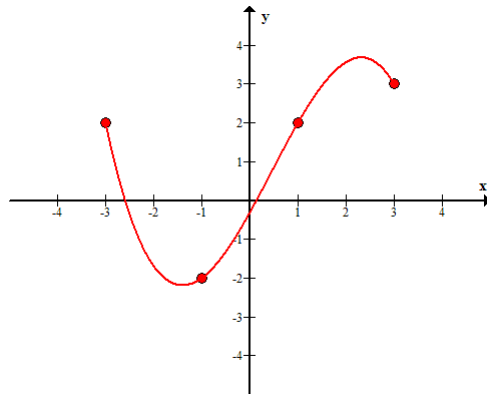
 (a) $m = 1$

 (b) $m = -5$

8. Find the equation of each line that passes through the point $(2, -5)$ and

 (a) $y = 3x - 11$

 (b) $y = 5x - 15$

 (c) $y = -5$

9. The graph of a function f is given below. Answer the following questions

(a) State the value of $f(-1)$: $f(-1) = -2$

(b) Estimate the value of $f(2)$: $f(2) \approx 3.75$

(c) For what values of x is $f(x) = 2$? $x = -3, 1$

(d) Estimate the values of x such that $f(x) = 0$. $x \approx -2.6, 0.1$

(e) Increasing: $(-1.3, 2.25)$ Decreasing: $(-3, -1.3) \cup (2.25, 3)$

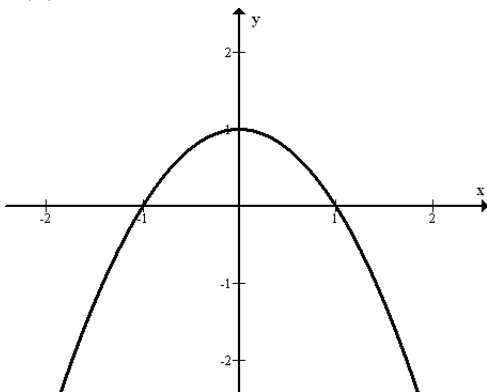(f) Domain: $[-3, 3]$. Range: $(-2.2, 3.9)$

10. If $f(x) = x^2 - 1$,

(a) $f(-2) = 3$

(b) $f(2 + h) = 3 + 4h + h^2$

(c) $\dfrac{f(2 + h) - f(2)}{h} = 4 + h$
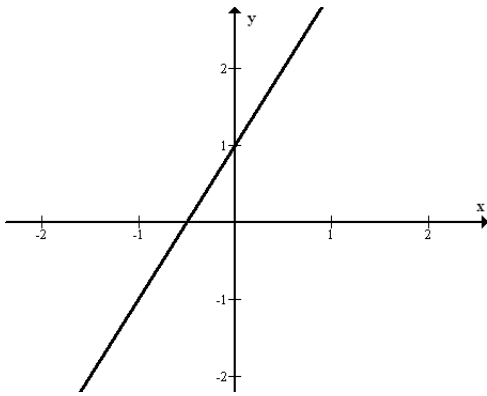
11. State the domain of the following functions

(a) $f(x) = \dfrac{2x + 1}{x^2 + x - 2}$. Domain: $(-\infty, -2) \cup (-2, 1) \cup (1, \infty)$

(b) $\sqrt{5 - 3x}$. Domain: $x \leq \dfrac{5}{3}$

12. Graph the following functions

(a) $f(x) = 1 - x^2$

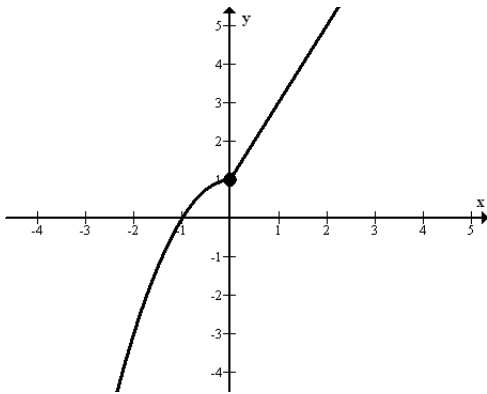(b) $f(x) = 2x + 1$

13. Graph the following piecewise function.

(a) $f(x) = \begin{cases} 1 - x^2, & x \le 0 \\ 2x + 1, & x > 0 \end{cases}$

(b) $f(-2) = -3$, $f(0) = 1$, and $f(1) = 3$

14. If $f(x) = x^2 + 2x - 1$ and $g(x) = 2x - 3$, find each of the following

(a) $f \circ g = (2x - 3)^2 + 2(2x - 3) - 1 = 4x^2 - 8x + 2$

(b) $g \circ f = 2(x^2 + 2x - 1) - 3 = 2x^2 + 4x - 5$

(c) $(f \circ g)(4) = 34$