1. Put the following lines in slope-intercept form, and find two points on the line.

   (a) $3x - 7y = 12$
   $y = 12 + \frac{3}{7}x$, possible points $(0, \frac{12}{7}), (1, \frac{15}{7})$

   (b) $\frac{1}{5}y + x - 10 = 0$
   $y = 50 - 5x$, $(0, 50)$, $(10, 0)$

   (c) $\frac{2}{3}x + \frac{1}{3}y = 2$
   $y = 6 - 2x$, $(0, 6), (1, 4)$

2. Find a line parallel to $y = 3x + 4$ passing through the origin.
   $y = 3x$

3. Find a line perpendicular to $y - 4 = 3(x + 1)$ that passes through the point $(2, 2)$.
   $y = -\frac{1}{3}x + \frac{7}{3}$

4. Put the following expressions in set notation using absolute value signs.

   (a) $-2 < x < 0$
   $\{x : |x + 1| < 1\}$

   (b) $-7 < x + 3 < 3$
   $\{x : |x + | < 5\}$

   (c) $3 \leq x - 2 \leq 9$
   $\{x : |x - 8| < 3\}$

5. Solve by factoring.

   (a) $x^2 - 2x - 3$
   $(x - 3)(x + 1) \Rightarrow x = 3, -1$

   (b) $2x^2 + 7x - 4$
   $(2x - 1)(x + 4) \Rightarrow x = \frac{1}{2}, -4$

   (c) $10x^2 - 11x - 6$
   $(5x + 2)(2x - 3) \Rightarrow x = \frac{3}{2}, -\frac{2}{5}$

6. Solve the following rational expressions.

   (a) $\frac{1}{x} = \frac{2x-4}{x-1}$
   $$x = \frac{5 \pm \sqrt{17}}{4}$$

   (b) $\frac{3x}{2} = \frac{3x+1}{x-1}$
   $$x = \frac{9 \pm \sqrt{105}}{6}$$

   (c) $\frac{x+2}{5} - \frac{x}{x-4} = 0$
   $\{8, -1\}$

7. Solve using key number method.

   (a) $\dfrac{(x+1)x}{x+4} \leq 0$
   $(-\infty,-4) \cup [-1,0]$

   (b) $\frac{(x+2)^2}{(x-3)} > 0$
   $(3,\infty)$

   (c) $\frac{(x-3)(x+3)}{2x} \geq 0$
   $(-\infty,-3) \cup (0,3)$

8. Solve by completing the square

   (a) $x^2+8x+7=0$
   $\{1,7\}$

   (b) $2x^2-12x+12=0$
   $3\{\pm\sqrt{3}\}$

9. Find the center and radius of the circle.

   (a) $x^2+y^2-x+2y-5=0$
   Center: $(-\frac{1}{2},-1)$, $r=\frac{5}{2}$

   (b) $x^2+y^2-4x-8y=0$
   Center: $(2,4)$, $r=\sqrt{20}$

10. Simplify.

    (a) $\frac{(xy)^6}{(x^{-2}y^{-4})^{-1}}$
    x^4y^2

    (b) $(xy^2)^2-(x^{-1})^{-2}$
    $x^2(y^4-1)$

    (c) $\left(\frac{(x^{\frac{1}{2}}y^3)^{\frac{1}{3}}}{(xy)}\right)^{\frac{3}{2}}$
    $\frac{1}{x^{\frac{5}{4}}}$

    (d) $(\sqrt{4}+32^{\frac{1}{5}})^2$
    16

11. Rationalize the denominator and simplify.

    (a) $\frac{1}{\sqrt{x}-2}$
    $\dfrac{\sqrt{x}+2}{x-4}$

(b) $\frac{2x}{x+\sqrt{3}}$
$\frac{2x(x-\sqrt{3})}{x^2-3}$

(c) $\frac{2}{x^{\frac{3}{4}}}$
$\frac{2x^{\frac{1}{4}}}{x}$

(d) $\frac{4}{\sqrt{x-3}+2}$
$\frac{4\sqrt{x-3}-8}{x+1}$

12. Let $f(x) = x^3 - 2$ and $g(x) = x - 1$. Compute the following. (No need to simplify for e,f)

(a) $(f+g)(0)$
-3

(b) $(fg)(a)$
$a^4 - a^3 - 2a + 2$

(c) $\frac{f(x+h)-f(x)}{h}$
$\frac{(x+h)^3 - x^3}{h}$ This is as far as you need to go since its Cubed. If squared I expect you to simplify as much as possible.

(d) $\frac{g(x+h)-g(x)}{h}$
1

(e) $(f \circ g)(x)$
$(x-1)^3 - 2$

(f) $(f \circ g)^{-1}(x)$
$\sqrt[3]{x+2} + 1$

13. Find the inverse of each function (if possible), and the domain and range of both f and f^{-1}. (If there is no inverse find the domain of the function.)

(a) $f(x) = 3x - 4$
$f^{-1}(x) = \frac{1}{3}x + \frac{4}{3}$, Domain $=$ Range $= (-\infty, \infty)$

(b) $f(x) = \sqrt[3]{x} + 2$
$f^{-1}(x) = (x-2)^3$, Domain $=$ Range $= (-\infty, \infty)$

(c) $f(x) = \frac{1}{x-5}$
$f^{-1}(x) = \frac{1}{x} + 5$ Domain (of f) $= (-\infty, 5) \cup (5, \infty)$

(d) $f(x) = (x+2)^2$
Inverse function only exists on restricted domain of $[0, \infty)$, where the Range is $[0, \infty)$. Inverse is $f^{-1}(x) = \sqrt{x} - 2$