Show all work for problems 3–5; use the back of the sheet if necessary.

1. **(4 points)** *Answer the following form-conversion problems.*

   (a) **(2 points)** *Express the interval* $(-2, 5]$ *in terms of inequalities.*

   The parenthesis indicates a non-inclusive inequality; the square bracket indicates an inclusive inequality, so this interval can be ddescribed as $-2 < x \leq 5$.

   (b) **(2 points)** *Express the inequality* $x > -1$ *in interval notation.*

   Since this interval does not include its lower bound, we would use a parenthesis for the left boundary. Since there is no bound on the right, we use the peculiar infinite-boundary notation to give interval $(-1, \infty)$ or $(-1, +\infty)$.

2. **(2 points)** *Evaluate the expression* $4^{-3/2}$.

   Since this has a negative exponent, we might start by rewriting it as $\frac{1}{4^{3/2}}$. This can be decomposed as $\frac{1}{(4^{1/2})^3} = \frac{1}{\sqrt{4}^3}$, or as $\frac{1}{[}(4)^3]^{1/2} = \frac{1}{\sqrt{4^3}}$. Both will give you the same answer, but the former is much easier to evaluate:

$$\frac{1}{\sqrt{4}^3} = \frac{1}{2^3} = \frac{1}{8}$$

$$\frac{1}{\sqrt{4^3}} = \frac{1}{\sqrt{64}} = \frac{1}{8}$$

3. **(3 points)** *Simplify the rational expression* $\frac{x}{x+2} - \frac{3}{2x-1}$.

$$\frac{x}{x+2} - \frac{3}{2x-1} = \frac{x(2x-1)}{(x+2)(2x-1)} - \frac{3(x+2)}{(x+2)(2x-1)} = \frac{x(2x-1) - 3(x+2)}{(x+2)(2x-1)} = \frac{2x^2 - 4x - 6}{2x^2 + 3x - 2}$$

4. **(3 points)** *Expand the polynomial* $2x^3 - (x^2 - x)(x + 2)$.

$$\begin{aligned} 2x^3 - (x^2 - x)(x+2) &= 2x^3 - (x^3 + 2x^2 - x^2 - 2x) \\ &= 2x^3 - x^3 - 2x^2 + x^2 + 2x \\ &= x^3 - x^2 + 2x \end{aligned}$$

5. **(3 points)** *Using any method you like, solve the equation* $x^2 - 3x = 6$.

   We start by writing the entire quadratic on a single side of the equation, as $x^2 - 3x - 6 = 0$. Then, using the quadratic formula:

$$x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4 \cdot 1(-6)}}{2} = \frac{3 \pm \sqrt{33}}{2}$$