The midterm covers the topics of week 1 to 6 included (chapters 1 to 8 and 10). This is a sample midterm so you have an idea of the length and difficulty.

1. Factor completely:

   a. $2x^2 - 10x + 8$
   b. $x^2y^2 - 36y^4$
   c. $a^3 - 27$

2. Simplify (use only positive exponents in the final expression):

   a. $\frac{(-3a)^3 \ 3a^{-2/3}}{(2a)^{-2} \ a^{1/3}}$

   b. $\frac{3^{-1}x^2y^{-4}}{2^{-2}x^{-3}y^3}$

3. Show that:

   a. $\frac{x-25}{\sqrt{x}+5} = \sqrt{x} - 5$

   b. $\sqrt{3} + \sqrt[3]{81} - \sqrt{27} + 5\sqrt[3]{3} = -2\sqrt{3} + 8\sqrt[3]{3}$

   c. $\frac{x-\frac{1}{x}}{1+\frac{1}{x}} = x - 1$

   d. $\frac{2x^2-5x+2}{\left(\frac{2x-1}{3}\right)} = 3(x-2)$

4. Rationalize the denominator and simplify:

$$\frac{2\sqrt{3}-1}{\sqrt{3}+2}$$

5. Are the following values a solution to the give equations? Clearly explain your answers.

   a. $\frac{x^2+6x}{x+2} = 3x - 2$ values: $x = 2, x = -1, x = -2$

   b. $\sqrt{2x-4} = 6$ values: $x = 20, x = -17$

6. Solve for the indicated letter:

$$\frac{1}{a} = \frac{1}{b} + \frac{1}{c}$$ for b.

7. Find the value of a given the values of v, m and t.

$$v = m + at \qquad v = 20,\ m = 30,\ t = 5.$$

8. Find the value of d given the values of S, n and a.

$$S = \frac{n}{2}(a + d) \qquad S = 570,\ n = 20,\ a = 40.$$