Dawson College: **Functions and Trigonometry**: 201-009-50-C02: Fall 2008

Name: _____
Student ID: _____

Test 1

This Test is graded out of 50. No books, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work.

Question 1. *(3 marks)* Simplify:

$$\frac{(-3xy^{-2}z^0)^{-3}}{(2x^2y^{-1}(xy)^{-1}z^2)^2}$$

Question 2. *(3 marks)* Expand and simplify:

$$x^2(3x-1)^2$$

Question 3. *(3 marks)* Use long division to find the quotient and remainder:

$$\frac{x^3+2x^2-4}{x-3}$$

Question 4. *(1 mark)* Factor:

$16 - 9x^2$

Question 5. *(2 marks)* Factor:

$4x^2 - 12x + 9$

Question 6. *(1 mark)* Factor:

$x^2 - 13x + 42$

Question 7. *(2 mark)* Factor (hint: first by grouping):

$x^3 - 3x^2 - 4x + 12$

Question 8. *(3 marks)* Factor:

$3x^3 - 24x^2 + 48x$

Question 9. *(5 marks)* Simplify:

$$\frac{x^2-1}{2x-4} \times \frac{x^2-4}{x^2-x-2} \times \frac{3x-6}{x^2+x-2}$$

Question 10. *(5 marks)* Simplify:

$$\frac{x}{x-2} + \frac{4+2x}{x^2-4}$$

Question 11. *(3 marks)* Simplify:

$$\sqrt{20} + \sqrt{45} + \sqrt{80}$$

Question 12. *(2 marks)* Solve for x:

$$4(x-1) = x+17$$

Question 13. *(2 marks each)* Rationalize the denominator:

a.

$$\frac{1}{\sqrt{2}}$$

b.

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

Question 14. *(2 marks)* Solve for x by factoring:

$$2x^2 = 8x$$

Question 15. *(3 marks)* Solve for x using the quadratic formula:

$$x^2 = 10x+5$$

Question 16. *(3 marks)* Find the quadratic equation such that 2 and 3 are its solution:

Question 17. *(5 marks)* Solve for x:

$$\frac{5x^2}{x^2-4}+\frac{3}{2-x}=\frac{5x-1}{x+2}$$

Bonus

Prove that $x^3 - 8 = 0$ has exactly one real solution. Follow the following steps:

a. *(1 mark)* Find r_1: the real solution of $x^3 - 8 = 0$.

b. *(2 marks)* Using long division divide the factor $x - r_1$ from $x^3 - 8$.

c. *(1 marks)* Rewrite the equation $x^3 - 8 = 0$ in factored form using the divisor and quotient obtained above.

d. *(2 marks)* Show that $x^3 - 8 = 0$ only has one real solution using the discriminant.