

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:

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

Question 2. (3 marks) Expand and simplify:

$$(x^2 + y^2)(x - y)(x + y)$$

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

$$\frac{x^4 - 6x^2 + 5x + 4}{x - 2}$$

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:

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

Question 8. (3 marks) Factor:

$$16x^5 + 48x^4 + 36x^3$$

Question 9. (5 marks) Simplify:

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

Question 10. (5 marks) Simplify:

$$\frac{x^2 - 11}{x^2 + 7x + 6} - \frac{x}{x + 6} + \frac{2}{x + 1}$$

Question 11. (3 marks) Simplify:

$$\sqrt{\frac{3}{x}} \left(1 + \frac{3}{x} \right) \frac{2x^{3/2}}{\sqrt{3}}$$

Question 12. (2 marks) Solve for x:

$$5(x - 2) = 10 - (x + 2)$$

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

a.

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

b.

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

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

$$4x^2 - 9 = 0$$

Question 15. (2 marks) Solve for x using the quadratic formula:

$$39 = 3(x^2 + 1)$$

Question 16. (4 marks) Solve for x using the quadratic formula(if needed):

$$(x^2 - 8)(4x^2 - 20x + 25) = 0$$

Question 17. (5 marks) Solve for x :

$$x + \frac{14}{x-2} = \frac{7x}{x-2} + 1$$

Bonus

Let $ax^2 + bx + c = 0$ be a quadratic equation.

- a. (1 mark) Define the discriminant Δ in terms of a, b, c .
- b. (1 mark) Rewrite the quadratic formula using the discriminant Δ .
- c. (3 marks) State the conditions on Δ for the number of solution of the quadratic equation, justify.
- d. (1 mark) What is the condition on the discriminant, Δ , for the quadratic equation to be factorable over the integers, justify.