

MATH 115 Test 1 (Sec. 7.1 - 8.1)

Show all work. No work no credit

1. (2 each) Factor completely, or state that the polynomial is prime.

a) $x^2 - 256$

b) $4x - 20 + 3x^3 - 15x^2$

c) $x^3 + 8y^3$

d) $-15y^3 + 25y^2$

e) $2x^2 - 288$

f) $-4a^3 - 9a + 12a^2$

g) $15 - x^2 - 2x$

h) $y^4 - 13a^2 + 42$

i) $h^2 - 8hk + 15k^2$

j) $5a^3 - 625$

2. (4 each) graph each equation.

a) $y = -2x$

b) $-2x - 3y = 6$

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3. (3 each) Simplify the complex fraction:

a) $\frac{\frac{y}{2} - \frac{x}{2}}{\frac{x}{y} - \frac{y}{x}}$

b) $\frac{x - y^{-2}}{x + y^{-2}}$

4. (3 each) Solve the linear equation. If the equation is an identity or a contradiction, so indicate.

a) $2(a - 5) - 3(a + 1) = 7$

b) $2(x - 3) = \frac{3}{2}(x - 4) + \frac{x}{2}$

5. (4 each) Solve the inequality. Give the result in interval notation and graph the solution set.

a) $3(x - 4) - 5(x - 2) \leq 4$

b) $-6 \leq -3(x - 4) < 24$

6. (4 pts.) Solve for r : $ra = rb - bc$

7. (4 pts) Given the points $P(3, -4)$ and $Q(-3, 7)$. Find the midpoint of PQ

8. (4 pts) If $M(2.5, 1.5)$ is the midpoint of line segment AB and if the coordinates of A are $A(2, 5)$, find the coordinates of B .

9. (4 each) Use **Synthetic Division** to divide:

a) $(x^2 - 5x + 14) \div (x + 2)$

b) $(x^4 - 3x^3 + x - 2) \div (x - 1)$

10. (3 each) Simplify the rational expression.

a) $\frac{-24x^7y^8}{36x^9y^3}$

b) $\frac{x^3 + 8}{x^2 - 2x + 4}$

11. (4 each) Solve each equation.

a) $|x - 3| + 1 = 4$

b) $|x + 2| = |-x + 3|$

12. (4 each) Solve each inequality. Write the solution set in interval notation and graph it.

a) $|2x - 6| \leq 8$

b) $|2x - 3| + 5 > 6$

13. (3 each) Do the operations and simplify.

a) $\frac{x^2 - 1}{x^2 - 4} \cdot \frac{x^2 - 5x + 6}{x^2 - 2x - 3}$

b) $\frac{y^2 - 4y - 21}{y^2 - 10y + 25} \div \frac{y^2 + 2y - 3}{y^2 - 6y + 5}$

c) $\frac{b - a}{a + b} - \frac{a - b}{a + b}$

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

14. (BONUS 5 pts.) Factor Completely: $x^{27} - y^{27}$