

Exam 1 Review
MAC1105 Summer B 2012
Exam 1 covers L1-L6

1. Consider the set $\{-2, \frac{-4}{9}, 0, \frac{\pi}{6}, -\sqrt{16}, 12.2, 0.\bar{8}, 3^3, \sqrt{5}\}$. List all members of the set that belong to the following sets.
a) integers b) whole numbers c) rational numbers d) irrational numbers
e) natural numbers f) real numbers
2. Determine whether the statement is true or false.
a) $x^4 \cdot x^2 = x^8$ b) $2x^3y + x^2y - 4xy + 6$ is a polynomial of degree 4.
c) $-2^4 = -16$ d) $\frac{5}{0} = 5$ e) $xy^{-1} + 3xy^3 - y + 4$ is a polynomial of degree 4.
3. Write an absolute value expression for the distance between 1 and -3 and then evaluate the distance.
4. Evaluate.
a) $3^{-1} + 2^{-2}$ b) $12 + |-2^0 - 12|$ c) $3.6 - 8.2$ d) $0.54 \div 1.2$ e) $\left(\frac{-2}{5}\right)^3$
5. Assume all variables represent positive real numbers. Simplify the expression and write your answer with positive exponents only.
a) $\frac{9(-3xy^{-2})^{-3}}{x^2y^4}$ b) $\left(\frac{6x^{-2}y^3}{8xy^5}\right)^{-2}$
6. Simplify.
a) $|\pi - 5|$ b) $|\sqrt{2} - 1|$ (Hint: $\sqrt{2} \approx 1.414$)
7. Use order of operations to simplify.
a) $\frac{12 \div 2 \cdot 3 - 4^2}{-3^2 + 1^5 - |-6|}$ b) $17 + 2^3 - 4[3 - 6(1 - 2)]$ c) $\frac{3}{4} \div \left(\frac{5}{4} - \frac{6}{5} \cdot \frac{1}{2}\right)$
8. Consider the sets $A = \{-3, -1, 0, 2, 5\}$ and $B = \{-2, -1, 0, 2, 4, 7, 9\}$.
a) Find $A \cup B$. b) Find $A \cap B$.
9. State the properties of real numbers illustrated by the following:
a) $4(2 - x) = 8 - 4x$ b) $(zy)x = z(yx)$ c) $3 + 4z = 4z + 3$

10. Suppose you know x is an integer. Which of the following sets can you be sure that x belongs to: natural numbers, whole numbers, rational numbers, irrational numbers, and/or real numbers? (There could be more than one.)
11. Express the following in interval notation and graph the solution on the number line.
 a) $(-\infty, 2) \cup (0, 4]$ b) $(-3, 1] \cap (-7, -1]$
12. Perform the operations. Write your answer in standard form.
 a) $(3x^4 - 5x^2 + 3x - 1) + (4x^4 - x^3 + 2x^2 - 6)$ b) $(2y + 9)(y - 3) - y(3y - 2)$
 c) $-2x^2(4x^3 + 5)$ d) $(x^2 - 3y)^2$
13. Factor completely, if possible. If not possible, what is the polynomial called?
 a) $9x^2y^3 - 15x^4y^5$ b) $16x^2 + 8x + 1$ c) $3x^2 - 2x - 5$
 d) $y^4 - 11y^3 + 30y^2$ e) $x^2 + 4$ f) $(x - 1)^2 - 2(x - 1)$ g) $4x^3 + 8x^2 - 36x - 72$
 h) $27x^3 - y^3$ i) $8x^3 + 125$ j) $9x^2 - 25$ k) $x^4 - 16$
14. Perform the indicated operation and simplify completely.
 a) $\frac{24x^2y^2}{12xy - 36xy^2}$ b) $\frac{3y^2 - y - 2}{3y^2 + 5y + 2}$ c) $\frac{3x - 6}{5x^2} \cdot \frac{x}{x^2 - 4}$
 d) $\frac{x^3 - 25x}{4x^2} \cdot \frac{2x^2 - 2}{x^2 - 6x + 5} \div \frac{x^2 + 5x}{8x + 8}$
15. Perform the indicated operation and simplify completely.
 a) $\frac{4}{x - 2} + \frac{x}{2 - x}$ b) $\frac{x + 4}{x^2 - x - 2} - \frac{2x + 3}{x^2 + 2x - 8}$ c) $\frac{1 - \frac{4}{x^2}}{1 - \frac{2}{x}}$ d) $\frac{1 - \frac{x}{x + 1}}{2 - \frac{x - 1}{x}}$
16. Perform the long division. Indicate the quotient and any remainder. Check your answer using the appropriate formula.
 a) $(2x^3 - 6x^2 + 8) \div (x - 4)$ b) $(3x^3 - x^2 + x - 2) \div (x + 2)$