

DIRECTIONS: Show all your work clearly on a separate paper. No calculators allowed!

Arithmetic

1. Perform the indicated operations and simplify.

(a) $\frac{5}{3} \cdot \frac{9}{10}$	(d) $2[8 - 3(4 + 2)] - 3$	(g) $-9^{1/2}$
(b) $\frac{3/4}{5/8}$	(e) $1 - 2^2 - 3^{-2}$	(h) $\left(-\frac{8}{27}\right)^{2/3}$
(c) $\frac{5}{6} + \frac{3}{10}$	(f) $8^{4/3} - \sqrt{9 + 16}$	(i) $8^{2/3} \cdot 8^{-2}$

Algebra

2. Compute the following expressions if $x = -5$ and $y = 7$.

(a) $\frac{4x}{x+y}$	(b) $4 2x - 3y $	(c) $3x^2y^{-2}$	(d) $3y - 2x^2$
----------------------	------------------	------------------	-----------------

3. Perform the indicated operations and simplify:

(a) $(x^3 + 8x^2 - 3x) - (4x^3 - 7x^2 - 2x)$	(e) $\frac{x^2-4}{x^2+2x-8} \cdot \frac{x^2+x-6}{2x^2-4x}$
(b) $\frac{5}{2x} + \frac{3}{x^2}$	(f) $(2x^3 - 3x^2 + x + 1) \div (x - 2)$
(c) $\frac{x-2}{x+2} - \frac{x}{x-1}$	(g) $\frac{1+\frac{1}{x+3}}{3-x}$
(d) $\frac{3x+4}{x^2-4} - \frac{2x-3}{x^2+4x+4}$	(h) $\frac{\frac{x^2-1}{x^2-5x+6}}{\frac{x+1}{x-2}}$

4. Factor the following expressions completely.

(a) $4 - 25x^2$	(c) $2x^3 + 18x^2 + 28x$
(b) $9p^2 - q^2r^2$	(d) $x^2(2y - 1)^2 - 4x(2y - 1)^2 + 4(2y - 1)^2$

5. Simplify the following using only positive exponents. Assume all variables are positive.

(a) $\frac{(3a^{-2}bc)(8^{2/3}a^3b^3c^{-3/2})}{24ab^{-1/2}\sqrt{c}}$	(b) $(27x^{-3/2}y^{5/2})^{-2/3}$
--	----------------------------------

6. Rationalize the numerator of $\frac{\sqrt{x}-5}{x-25}$ and simplify.