Show all work on a separate sheet of paper.

1. For each of the following, y varies inversely as x. Write the appropriate inverse-variation equation, and find y for the given x.
a)   Y = 40 when x = 10; x=13
b)   Y = 45 when x = -10; x = -4
	2. For each of the following, z varies jointly as x and y and inversely as w. . Write the appropriate combined-variation equation, and find z for the given x, y and w.
	a) z = 3 when x = -2, y = 6, and w= 12;
	    x = 5, y = -4, and w = $\frac{1}{2}$
	
	b) z = 6 when x = -6, y = -9, and w = 3;
	    x = -3, y = 6, and w = 5
		3. Identify all asymptotes and holes in the graph of each rational function.
		
		a) $f(x) = \dfrac{x+7}{x^2+4x-21}$
		
		b) $f(x) = \dfrac{4x^4-1}{x^2+6x+8}$

4. Find the domain of each rational function. Identify all asymptotes and holes in the graph of each rational function. Then graph. a) $f(x) = \dfrac{x^2+2x+1}{x^2-3x-4}$ b) $f(x) = \dfrac{x^2+4}{4x^2-1}$ c) $f(x) = \dfrac{x+2}{x^2-3x-10}$	5. Multiply a) $\dfrac{x^2+4x-5}{18} \cdot \dfrac{6}{x^2-x}$ b) $\dfrac{x^4+2x^3}{x^2+3x+2} \cdot \dfrac{x^2-1}{5x-5}$ c) $\dfrac{x^{12}}{5} \cdot \dfrac{15}{x^4} \cdot \dfrac{x^3}{9}$	6. Divide a) $\dfrac{x^4}{x^2+15x+54} \div \dfrac{x^2}{x+9}$ b) $\dfrac{6x^2-24x+24}{14x-28} \div \dfrac{3x-6}{x+1}$ c) $\dfrac{\frac{x^2+x-6}{x+5}}{\frac{3x^2-12}{3x+15}}$
7. Add a) $\dfrac{5x}{x+5} + \dfrac{x+5}{x-3}$ b) $\dfrac{4x}{x^2-16} + \dfrac{6}{x-4}$ c) $\dfrac{x+1}{x+4} + \dfrac{x-2}{x-5}$	8. Subtract. a) $\dfrac{4x-2}{10} - \dfrac{3x-2}{6}$ b) $\dfrac{x}{x+7} - \dfrac{x+4}{x^3-3x^2}$ c) $\dfrac{5}{x^2+7x+10} - \dfrac{4}{x^2-x-6}$	9. Solve a) $\dfrac{x-2}{3x} = \dfrac{1}{4}$ b) $\dfrac{2}{x} + \dfrac{1}{x+2} = \dfrac{1}{4}$
10. Solve each inequality. Check your solution. a) $\dfrac{x+1}{x} > -3$ b) $-4 > \dfrac{x}{x-2}$ c) $\frac{1}{2}x < 2x - 2$	11. Find the domain of each radical function. a) $f(x) = \sqrt{3x-1}$ b) $f(x) = \sqrt{x^2-9}$	12. Find the inverse of the quadratic function. Then graph the function and its inverse on the same coordinate plane. a) $y = x^2+1$ b) $y = x^2-4$
13. Evaluate each expression. Give exact answers. a) $\sqrt[3]{\dfrac{125}{27}}$ b) $\sqrt[3]{\dfrac{-8}{64}}$ c) $3\sqrt[4]{81}$	14. For the function, describe the transformation applied to $f(x) = \sqrt{x}$. $g(x) = \sqrt{x+3} - 2$	15. Simplify each radical expression by using the Properties of the nth Roots. a) $\sqrt[4]{32x^5y^6}$ b) $(-64x^9y^6)^{\frac{1}{3}}$
16. Simplify each product or quotient. Assume that the value of each variable is positive. a) $\sqrt{3x^5} \cdot \sqrt{4x^7}$ b) $(\sqrt{5x^3y})^2$	17. Simplify. Leave your answers in simplest radical form. a) $(\sqrt{3}+2)(\sqrt{6}-3)$ b) $(25+5\sqrt{3})+(13-8\sqrt{3})$ c) $5\sqrt{3}(\sqrt{6}-4\sqrt{8})$	18. Rationalize each denominator. a) $\dfrac{5}{\sqrt{3}}$ b) $\dfrac{2}{4+\sqrt{2}}$
19. Solve each radical equation by using algebra. If the equation has no solution, write *no solution*. (Remember to check your answers so you do not have extraneous solutions) a) $2\sqrt{x+4} = 10$ b) $\sqrt{x+2} = x-6$	20. Solve each radical inequality by using algebra. If the inequality has no solution, write *no solution*. a) $\sqrt{x+2} \geq 5$ b) $\sqrt{3x+1} \geq 2x$ c) $\sqrt{x-2} > \sqrt{x+3}$	