Exam 1
Chapters P and 1

Answer the following questions. *Answers without proper evidence of knowledge will not be given credit.* Make sure to make reasonable simplifications. Do not approximate answers. Give exact answers. **No calculators are allowed on this exam.**

True or False (3 points each)

_____ **1.** $\sqrt{4+4} = \sqrt{4} + \sqrt{4}$

_____ **2.** $(a \cdot b)^2 = a^2 \cdot b^2$

_____ **3.** $(5+7)^2 = 5^2 + 7^2$

_____ **4.** $\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd}$

_____ **5.** $\frac{a}{b} + \frac{c}{d} = \frac{a+c}{b+d}$

_____ **6.** $\frac{x+4}{x-4} + \frac{x+5}{x+4} = \frac{(x+4)+(x+5)}{(x-4)+(x+4)}$

_____ **7.** If the quadratic equation $ax^2 + bx + c = 0$ has a negative **discriminant** then there are no solution

_____ **8.** $(x^4)^2 = (x^2)^4$

Show your work!

1. (9 points)
Which of these is a representation of the line $y - 3 = \frac{1}{3}(x - 4)$? (Mark all that apply and explain your reasoning.)
(a) $y = \frac{1}{3}x + 3$ (b) The line determine by the two points $(0, \frac{13}{3}), (-13, 0)$ (c)

2. Consider the rational expression $\frac{(x^2+8x+15)}{(x^2-9)(x^2-3x-10)}$.

a) Find the domain of the above rational expression. (8 points)

b) Simplify the above rational expression and put it into lowest terms. (4 points)

3. Boudreaux is going out fishing on this beautiful sunny day we are having. So he takes his canoe out and the strong tide makes his trip down river 4 mph faster than his trip back up the river at the end of the day. If it takes him 10 min(1/6 hour) to get down to his fishing spot and 30 min (1/2 hour) to get back up then how far away is Boudreaux's fishing spot?(10 points)

	Rate	Time	Distance
downriver			
upriver			

4. Find all solutions to the following absolute value equations.

a) $|x| = 3$ (3 points)

b) $5|3x + 2| - 4 = 6$ (7 points)

5. Solve the following equation of **quadratic type** $(u^2 + 2u)^2 - 2(u^2 + 2u) - 3 = 0$.

a) Substitute x in for the correct expression of u. (2 points)

b) Solve the quadratic equation you get for x. (5 points)

c) Given your solutions from b), solve the equation of quadratic type in terms of u. (5 points)

6. The Pythagorean Theorem can be used to do which of the following: (3 points)

a) Find the hypotenuse of a triangle

b) Find the radius of a circle

c) Determine distance in the plane

d) All of the above

7. Find the distance between each given pair of points.

a) (4,3) and (0,0) (5 points)

b) (2,6) and (-3,-6) (5 points)

8. Let l_1 be the line defined by the equation $4y - \frac{16}{3} = 12x$. Find the line perpendicular to l_1 which goes through the origin (i.e. the point (0,0)). Write your final answer in **slope-intercept** form. (10 points)

Extra Credit Problem: Write the following equation of a circle in standard form $x^2 + 10x + y^2 - 8y = -40$. (5 points)