MATH 120
SPRING 2012
EXAM 1

NAME:

1. [10 pts.] Evaluate $p^2 - q$, given that $p = -3$ and $q = 7$.

2. [10 pts. each] Find the sum or product.
   (a) $(w^3 - 2w^2 + 5) + (-7w^3 + 11w^2)$
   (b) $(3t - 2)(2t + 5)$
   (c) $(3z - a)^2$

3. [10 pts.] Divide: $\dfrac{6z^3 + 7z^2 - 4z + 2}{3z + 2}$

4. [10 pts. each] Fully factor each polynomial.
   (a) $x^2 + xy - 5x - 5y$
   (b) $8h^2 - 2h - 21$
   (c) $27y^9 + 8z^3$
   (d) $6v^4 + 7v^2 - 3$

5. [10 pts.] Divide: $\dfrac{3r^3 - 9r^2}{r^2 - 9} \div \dfrac{8r^3}{r + 3}$

6. [10 pts.] Simplify $\dfrac{\dfrac{1}{p} + \dfrac{1}{q}}{1 - \dfrac{1}{pq}}$

7. [10 pts.] Simplify, writing the answer using only positive exponents: $\dfrac{8y^6p^{-3}}{2y^{-4}p^{-1}}$.

8. [10 pts. each] Simplify each radical expression.
   (a) $\sqrt[3]{72}$
   (b) $\sqrt{18x^5z^8}$
   (c) $\sqrt{\dfrac{2}{3x}}$
   (d) $2\sqrt[3]{3} + 4\sqrt[3]{24}$

9. [10 pts.] Is $8(x + 7) = 4(x + 12) + 4(x + 1)$ an identity, a conditional equation, or a contradiction? Show your work, and give the solution set.

10. [10 pts.] Solve $S = 2\pi rh + 2\pi r^2$ for $h$.

11. [15 pts.] The perimeter of a rectangle is 310 cm. The length is 10 cm less than twice the width. What are the length and width?

12. [15 pts.] Danforth gets to work in 20 minutes when he drives his car. Riding his bike (by the same route) takes him 45 minutes. His average driving speed is 4.5 mph greater than his average speed on his bike. How far does he travel to work?

13. [10 pts.] Find the product of the complex numbers $(-2 + 3i)(4 - 2i)$ and write the answer in standard form.

14. [10 pts.] Find the quotient of the complex numbers $\dfrac{1 + 2i}{1 - 3i}$ and write the answer in standard form.