1. [10 pts. each] Evaluate each.

   (a) $p^2 - 2q + r$, given that $p = -4$, $q = 7$, and $r = -9$.

   (b) $|3x - 5y|$, given that $x = -3$ and $y = 2$.

2. [10 pts. each] Find the sum, difference, or product.

   (a) $(w^3 - 2w^2 + 5) + (-7w^3 + 11w^2 - 6)$

   (b) $2(12y^2 - 8y + 6) - 4(3y^2 - 4y + 2)$

   (c) $(3t - 2)(2t + 5)$

   (d) $(4m + 2p)^2$

   (e) $(2r - 3s + h)(2r - s + h)$

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

4. [10 pts. each] Fully factor each polynomial.

   (a) $24x^2y^3 + 30x^4y$

   (b) $6st + 9t - 10s - 15$

   (c) $20p^2 - 100pq + 125q^2$

   (d) $27y^9 + 125z^6$

   (e) $6v^4 + 7v^2 - 3$

5. [10 pts. each] Find the product or quotient.

   (a) $\dfrac{3r^3 - 9r^2}{r^2 - 9} \div \dfrac{8r^3}{r + 3}$

   (b) $\dfrac{3m - 15}{4m - 20} \cdot \dfrac{m^2 - 10m + 25}{12m - 60}$

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.] Factor $x^{-3/4} - 2x^{-7/4}$ using the common factor $x^{-7/4}$.

9. [10 pts. each] Simplify each radical expression.

   (a) $\sqrt[3]{250}$

   (b) $\sqrt{8x^5z^8}$

   (c) $\sqrt{\dfrac{2}{3x}}$

   (d) $2\sqrt[3]{3} + 4\sqrt[3]{24} - \sqrt[3]{81}$

   (e) $\dfrac{\sqrt{3}}{\sqrt{5} + \sqrt{3}}$

10. [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.

11. [10 pts.] Solve $ax + b = 3(x - a)$ for x.

12. [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?

13. [15 pts.] An excursion boat travels upriver to a landing and then returns to its starting point. The trip upriver takes 1.2 hr, and the trip back takes 0.9 hr. If the average speed on the return trip is 5 mph faster than on the trip upriver, what is the boat's speed upriver?

14. [10 pts.] Multiply $\sqrt{-3} \cdot \sqrt{-8}$, and simplify the answer.

15. [10 pts.] Find the product of the complex numbers $(-2 + 3i)(4 - 2i)$ and write the answer in standard form.

16. [10 pts.] Find the quotient of the complex numbers $\dfrac{6 + 2i}{1 + 2i}$ and write the answer in standard form.