Instructions: Solve each problem on the paper provided, showing work *with* answers. Do this neatly, with the problem number clearly visible. Do not cram answers onto the exam paper itself. Failure to follow these instructions may incur a substantial loss of points.

Formulas:
$$A^3 + B^3 = (A + B)(A^2 - AB + B^2)$$
$$A^3 - B^3 = (A - B)(A^2 + AB + B^2)$$

1. [10 pts.] Add $(2z^2 + 3z - 1) + (4z^2 - 5z - 6)$

2. [10 pts.] Subtract $4y^2 - 3y$ from $9y^2 - 11y - 5$

3. [10 pts. each] Find each product.

   (a) $(2w + 5)(3r - 4)$

   (b) $(2h - 3k)^2$

   (c) $[(c - p) + 3][(c - p) - 3]$

4. [10 pts. each] Divide by long division.

   (a) $\dfrac{x^2 + 11x + 16}{x - 5}$

   (b) $\dfrac{4y^4 + 6y^3 + 3y - 1}{2y^2 + 1}$

5. [10 pts. each] Factor out the greatest common factor, simplifying the factors if possible.

   (a) $16s^3 - 24s$

   (b) $15y^3z^3 + 27y^2z^4 - 36yz^5$

6. [10 pts. each] Factor by grouping.

   (a) $20 + 5w + 12n + 3wn$

   (b) $8 + 9y^4 - 6y^3 - 12y$

7. [10 pts. each] Factor each fully.

   (a) $r^2 - 2r - 35$

   (b) $z^2 + 13zw + 40w^2$

   (c) $18c^2 - 98d^2$

   (d) $8v^3 - 125$

   (e) $x^2 - 4p^2 - 4pq - q^2$

8. [10 pts. each] Solve each equation by factoring.

   (a) $2y^2 = 5y + 7$

   (b) $2x^3 - x^2 = 28x$