

Factor by Grouping

Factor each completely.

$$1) 4p^3 - 20p^2 - 5p + 25$$

$$\underline{4p^2}(p-5) - \underline{5}(p-5)$$

$$\boxed{(4p^2 - 5)(p - 5)}$$

$$2) 8x^3 - 16x^2 - x + 2$$

$$8x^2(x-2) - 1(x-2)$$

$$\boxed{(8x^2 - 1)(x - 2)}$$

$$3) 3k^3 - 4k^2 - 9k + 12$$

$$4) 32n^6 + 8n^5 - 48n^4 - 12n^3$$

$$5) 4n^3 + 12n^2 - 20n - 60$$

$$4(n^3 + 3n^2 - 5n - 15)$$

$$n^2(n+3) - 5(n+3)$$

$$\boxed{4(n^2 - 5)(n + 3)}$$

$$6) 9b^3 - 9b^2 - 3b + 3$$

$$7) 15r^4 - 75r^3 + 12r^2 - 60r$$

$$3r(5r^3 - 25r^2 + 4r - 20)$$

$$5r^2(r-5) + 4(r-5)$$

$$\boxed{3r(5r^2 + 4)(r - 5)}$$

$$8) 30x^3 - 18x^2 - 45x + 27$$

$$9) 50a^2b^4 - 40a^2b^3 + 125ab^4 - 100ab^3$$

$$5ab^3(10ab - 8a + 25b - 20)$$

$$2a(5b-4) + 5(5b-4)$$

$$\boxed{5ab^3(2a+5)(5b-4)}$$

$$10) 30xy - 12xb - 10by + 4b^2$$