1. We want $x^2 + kx + \frac{1}{9} = (x \pm \frac{1}{3})^2$, and factoring this out gives us $\boxed{k = \pm\frac{2}{3}}$

2. (a) $\boxed{(x+7)^2}$

   (b) $\boxed{(x-11)^2}$

   (c) $\boxed{(x+6)^2}$

3. Recall: $a^2 - b^2 = (a+b)(a-b)$.

   (a) $\boxed{(2m+7n)(2m-7n)}$

   (b) $75r^4 - 27g^2 = 3(25r^4 - 9g^2) = 3((5r^2)^2 - (3g)^2) = \boxed{3(5r^2+3g)(5r^2-3g)}$

4. First, notice that $+(b-a) = -(a-b)$. So we can replace the $b-a$ in the equation with $-(a-b)$:

$$\begin{aligned}(a-b)a^2 + (b-a)b^2 &= (a-b)a^2 - (a-b)b^2 \text{ (factor out } a-b\\ &= (a-b)(a^2-b^2) \text{ difference of squares}\\ &= (a-b)(a-b)(a+b)\\ &= \boxed{(a+b)(a-b)^2}\end{aligned}$$

5. Factor $3^8 - 1$: $(3^2-1)(3^2+1)(3^4+1)$. Since $3^2 - 1 = 9 - 1 = 8$, we know that 8 divides the product.

6. $5^{12} - 1 = (5^6+1)(5^3+1)(5^3-1)$. Calculate $5^3+1 = 125+1 = 126$, and $5^3-1 = 125-1 = 124$. So $126 + 124 = \boxed{250}$

7. $a^3b - ab^3 = ab(a^2-b^2) = \boxed{ab(a+b)(a-b)}$

8. $\boxed{40,000}$

9. $(x+y)(x-y) + y^2 - 1 = x^2 - y^2 + y^2 - 1 = x^2 - 1 = \boxed{(x+1)(x-1)}$

10. Factor by grouping: $x^3 + 2x^2 - 16x - 32 = x^2(x+2) - 16(x+2) = (x+2)(x^2-16) = \boxed{(x+2)(x+4)(x-4)}$