Name: _____

Signature: _____

Show all work clearly and in order, and box your final answers. Justify your answers algebraically whenever possible. You have 20 minutes to take this 10 point quiz. Please, no calculators and no cellular phones.

1. Factor. $4x^2 - 12x$ 2 points

   Work: Factor out the GCF.

   $$4x^2 - 12x = \boxed{4x\,(x - 3)}$$

2. Factor. $2x^2 y - 6x^2 y^2 + 12xy$ 2 points

   Work: Factor out the GCF.

   $$2x^2 y - 6x^2 y^2 + 12xy = \boxed{2xy\,(x - 3xy + 6)}$$

3. Factor. $x^2 - 3x + 4ax - 12a$ 2 points

   Work: Factor by grouping.

   $$
   \begin{aligned}
   x^2 - 3x + 4ax - 12a &= \left(x^2 - 3x\right) + (4ax - 12a) \\
   &= x\,(x - 3) + 4a\,(x - 3) \\
   &= \boxed{(x - 3)\,(x + 4a)}
   \end{aligned}
   $$

4. Factor. $x^2 + 5x + 6$ 2 points

   Work: Trial and error.

   $$x^2 + 5x + 6 = \boxed{(x + 3)\,(x + 2)}$$

5. Factor. $3y^4 + 54y^3 + 135y^2$ $\boxed{\text{2 points}}$

Work: First factor out the GCF, then trial and error.

$$
\begin{aligned}
3y^4 + 54y^3 + 135y^2 &= 3y^2\left(y^2 + 18y + 45\right) \\
&= \boxed{3y^2\left(y + 15\right)\left(y + 3\right)}
\end{aligned}
$$