Integration by Parts Concept Questions

1. $\int (x-2)^8 dx$ *(integration by parts not required here)*

2. $\int x(x-2)^7 dx$

3. $\int x^2(x-2)^6 dx$

4. $\int x^3(x-2)^5 dx$

5. $\int x(x-3)^5 dx$

6. $\int x(2x-3)^5 dx$

7. $\int x(3-x)^5 dx$

8. $\int x^2(x-3)^5 dx$

9. $\int x^3(3-2x)^5 dx$

10. $\int \ln x \, dx$

Integration by Parts Concept Answers

1. $\dfrac{(x-2)^9}{9}$

2. $\dfrac{x(x-2)^8}{8} - \dfrac{1}{8}\cdot\dfrac{(x-2)^9}{9} = \dfrac{9x(x-2)^8}{72} - \dfrac{(x-2)^9}{72}$

3. $\dfrac{x^2(x-2)^7}{7} - \dfrac{2}{7}\cdot\left[\dfrac{9x(x-2)^8}{72} - \dfrac{(x-2)^9}{72}\right] = \dfrac{72x^2(x-2)^7}{504} - \dfrac{18x(x-2)^8}{504} + \dfrac{2(x-2)^9}{504}$

4. $\dfrac{x^3(x-2)^6}{6} - \dfrac{1}{2}\cdot\left[\dfrac{72x^2(x-2)^7}{504} - \dfrac{18x(x-2)^8}{504} + \dfrac{2(x-2)^9}{504}\right]$

$$= \dfrac{84x^3(x-2)^6}{504} - \dfrac{36x^2(x-2)^7}{504} + \dfrac{9x(x-2)^8}{504} - \dfrac{(x-2)^9}{504}$$

$$= \dfrac{(x-2)^7}{504}[36x^2 - 9x(x-2) + (x-2)^2] = \dfrac{(x-2)^7(14x^2 + 7x + 2)}{227}$$

5. $\dfrac{x(x-3)^6}{6} - \dfrac{(x-3)^7}{42}$

6. $\dfrac{x(2x-3)^6}{12} - \dfrac{(2x-3)^7}{168}$

7. $\dfrac{-x(3-x)^6}{6} - \dfrac{(3-x)^7}{42}$

8. $\dfrac{x^2(x-3)^6}{6} - \dfrac{x(x-3)^7}{21} + \dfrac{(x-3)^8}{168}$

9. $\dfrac{-x^3(3-2x)^6}{12} - \dfrac{x^2(3-2x)^7}{56} - \dfrac{x(3-2x)^8}{448} - \dfrac{(3-2x)^9}{8064}$