Simplifying Complex Expressions and Solving Equations by Factoring

Answers

1. $5\sin(2x)\left(x^2-6\right)$

2. $2x^2(1.03)^x(x-2)$

3. $5\ln(x)(\cos(x)-\sin(x))$

4. $e^{-0.3x}\left(1-x+x^2\right)$

5. Factor to get $e^{-3x}\left(1-2x+x^2\right)=e^{-3x}(1-x)^2=0$. Since e^{-3x} is never zero, the only solution is $x = 1$.

6. Factor to get $x^2(\ln(x+1)-1)=0$. Either $x^2 = 0$ or $\ln(x + 1) - 1 = 0$. If $x^2 = 0$ then $x = 0$. If $\ln(x + 1) = 1$ then $x + 1 = e$ and $x = e - 1$. The solutions are $x = 0$ and $x = e - 1$.

7. Either $x = 0$ or $\cos(x) = 0$. The solutions are $x = 0$, $x = \pi/2$, and $x = 3\pi/2$.

8. Factor to get $e^x\left(\frac{1}{x}-2\right)=0$. Since e^x is never zero it must be the case that $\frac{1}{x}-2=0$ so that $x = 1/2$.

9. Factor to get $2x^3(x-2)=0$ so $x = 0$ or $x = 2$.

10. Factor to get $e^{-x}(\log_{10}(x)-100)=0$. Since e^{-x} is never zero, it must be that $\log_{10}(x)-100=0$ so that $x = 2$.