Homework Set 1

Review Topics

Simplify the following expressions:

1. $\left(\frac{xx^{-3}y^5z^2}{x^2y^3zz^{-2}}\right)^2$

2. $\frac{2}{1+\frac{x}{x-3}}$

3. $\frac{4x^2+x-6}{x^2+3x+2} - \frac{3x}{x+1} + \frac{5}{x+2}$

4. Use rules for logarithms to expand: $\ln(\frac{(x-1)^2}{x\sqrt{x}})$

5. Use an appropriate method to compute: $\lim_{x\to\infty}(1+3x)^{1/x}$

Use Trig identities to simplify the following epressions:

6. $\frac{\sin(x)}{\csc(x)} + \frac{\cos(x)}{\sec(x)}$

7. $3\tan^2(\theta) - 3\sec^2(\theta)$

8. Rewrite the following angles in degrees in radians:
   (a) 30°
   (b) 45°
   (c) 60°
   (d) 90°
   (e) 135°

Compute the derivative for each of the given functions:

9. $y = 2x^{35} - 13x^{11} + 2x^3 - 5$

10. $f(x) = 4e^{1-x^2}$

11. $g(t) = \arctan(5t)$

12. $y = \ln(x^7 - 3x^4 + 6x)$

13. $h(u) = u \cdot \sin(u)$

14. $y = \frac{t^5-1}{t^5+1}$

15. $k(x) = \cos(2x)\left(\frac{2x-1}{x+3}\right)^7$