Find the derivative of each expression and simplify.

1. $(4x^2 + 1)^2$

2. $(x^5 + 3x)^2$

3. $11x^7$

4. $18x^3 + 12x + 11$

5. $\frac{1}{2}(x^{12} + 17)$

6. $-\frac{1}{3}(x^9 + 2x^3 - 9)$

7. π^5

8. $-8x^{-8} + 12\sqrt{x}$

9. $6x^{-7} - 4\sqrt{x}$

10. $x^{-5} + \frac{1}{x^8}$

11. $(6x^2 + 3)(12x - 4)$

12. $(3 - x - 2x^3)(6 + x^4)$

13. $e^{10} + \pi^3 - 7$

14. $\left(\frac{1}{x} + \frac{1}{x^2}\right)\left(\frac{4}{x^3} - \frac{6}{x^4}\right)$

15. $\sqrt{x} + \frac{1}{\sqrt{3}}$

16. 0

17. $(x + 1)^3$

18. $\sqrt{x} + \sqrt[3]{x} + \sqrt[3]{x^2}$

19. $x(2x + 7)(x - 2)$

20. $\sqrt{x}\left(\sqrt[3]{x} + \sqrt[5]{x}\right)$

Simplify when possible.

1. Find $f'(x)$ if $f(x)=\left(\dfrac{4x^3-3x^2}{5x^7+1}\right)$.

2. Find $f'(x)$ if $f(x)=\left(x^2-4x+3\right)(x+1)$.

3. Find $f'(x)$ if $f(x)=\left(x+\dfrac{1}{x}\right)\left(x^2-\dfrac{1}{x^2}\right)$.

4. Find $f'(x)$ at $x=2$ if $f(x)=\dfrac{(x+4)(x-8)}{(x+6)(x-6)}$.

5. Find $f'(x)$ at $x=1$ if $f(x)=\dfrac{x^6+4x^3+6}{\left(x^4-2\right)^2}$.

6. Find $f'(x)$ if $f(x)=\dfrac{x^2-3}{(x-3)}$.

7. Find $f'(x)$ at $x=1$ if $f(x)=\left(x^4-x^2\right)\left(2x^5+x\right)$.

8. Find $f'(x)$ at $x = 2$ if $f(x) = \dfrac{x^2 + 2x}{x^4 - x^3}$.