

$$12. a) Dx^3(x^2 + 4)(x - 2) = 2x^2(3x^3 - 5x^2 + 8x - 12);$$

$$b) D(x^2 + a^2)(x^2 - a^2)(x^2 - 2) = 2x(3x^4 - 4x^2 - a^4).$$

$$13. a) D(x^2 + 1)^5 = 10x(x^2 + 1)^4;$$

$$b) D(2x^2 - 3)^2 = 8x(2x^2 - 3).$$

$$14. a) D(x^2 + 2\sqrt{x})^5 = 5(x^2 + 2\sqrt{x})^4 \left(2x + \frac{1}{\sqrt{x}} \right); \quad b) D(5x^3 + x^2 - 4)^5 = 5(15x^2 + 2x)(5x^3 + x^2 - 4)^4$$

$$15. a) D(x^2 + a^2)^5 = 10x(x^2 + a^2)^4;$$

$$b) D\left(\frac{ax + b}{c}\right)^3 = \frac{3a}{c} \left(\frac{ax + b}{c}\right)^2.$$

$$16. a) D\frac{x+1}{x-1} = -\frac{2}{(x-1)^2};$$

$$b) D\frac{x^3}{4-x} = \frac{2x^2(6-x)}{(4-x)^2}.$$

$$17. a) D\frac{2x^2 - 3x + 1}{x+1} = \frac{2x^2 + 4x - 4}{(x+1)^2};$$

$$b) D\frac{3x^2 + 2x - 1}{2x+1} = \frac{6x^2 + 6x + 4}{(2x+1)^2}.$$

$$18. a) D\frac{x^2 - x + 2}{x^3 - 1} = \frac{-x^4 + 2x^3 - 6x^2 - 2x + 1}{(x^3 - 1)^2};$$

$$b) D\left(-\frac{1+3x}{x(1+x)}\right) = \frac{3x^2 + 2x + 1}{x^2(1+x)^2}.$$

$$19. a) D(\sqrt{x} + 1)\left(\frac{1}{\sqrt{x}} - 1\right) = \frac{-1}{2\sqrt{x}} \left(1 + \frac{1}{x}\right);$$

$$b) D\left(\frac{\pi}{x} + \log 2\right) = -\frac{\pi}{x^2}.$$

$$20. a) D(2x+1)(3x+2)\sqrt[3]{3x+2} = \frac{2(21x^2 + 26x + 8)}{\sqrt[3]{(3x+2)^2}}; \quad b) D\frac{1-\sqrt{x}}{1+\sqrt{x}} = -\frac{1}{\sqrt{x}(1+\sqrt{x})^2}.$$

$$21. a) D\frac{a-x}{a+x} = -\frac{2a}{(a+x)^2};$$

$$b) D\left(\frac{a+bx}{c+dx}\right) = \frac{bc-ad}{(c+dx)^2}.$$

$$22. a) D\left(\frac{x}{a} + \frac{a}{x} + \frac{x^2}{b^2} + \frac{b^2}{x^2}\right) = \frac{1}{a} - \frac{a}{x^2} + \frac{2x}{b^2} - \frac{2b^2}{x^3}; \quad b) D\left(\frac{x+\sqrt{x}}{\sqrt{x}}\right) = \frac{\sqrt{x}}{2x}.$$

$$23. a) D\frac{2x^4}{a^2-x^2} = \frac{4x^3(2a^2-x^2)}{(a^2-x^2)^2};$$

$$b) D\frac{x^p}{x^m-a^m} = \frac{x^{p-1}[(p-m)x^m - pa^m]}{(x^m-a^m)^2}.$$

$$24. a) D\frac{2\sqrt{x}}{x^2-2\sqrt{x}} = -\frac{3x\sqrt{x}}{(x^2-2\sqrt{x})^2};$$

$$b) D\frac{x^2+2\sqrt{x}}{x^2-2\sqrt{x}} = -\frac{6x\sqrt{x}}{(x^2-2\sqrt{x})^2}.$$

$$25. D\left[\frac{x^2+1}{3(x^2-1)} + (x^2-1)(1-x)\right] = 1 + 2x - 3x^2 - \frac{4x}{3(x^2-1)^2}.$$

$$26. a) D\frac{3}{(1-x^2)(1-2x^3)} = \frac{6x(1+3x-5x^3)}{(1-x^2)^2(1-2x^3)^2}.$$

$$b) D\left(\frac{1+x^2}{1+x}\right)^5 = \frac{5(x^2+2x-1)(1+x^2)^4}{(1+x)^6}.$$

$$27. a) D\left(\sqrt{x} + \frac{1}{\sqrt{x}}\right)^{10} = \frac{5(x-1)}{x\sqrt{x}} \left(\sqrt{x} + \frac{1}{\sqrt{x}}\right)^9.$$

$$b) Dx\sqrt{\frac{1-x}{1+x^2}} = \frac{2-3x-x^3}{2(1-x)(1+x^2)} \sqrt{\frac{1-x}{1+x^2}}.$$