1) $D \sin 3x = 3 \cdot \cos 3x$

2) $D \tan(x^2+1) = \frac{1}{\cos^2(x^2+1)} \cdot 2x = \frac{2x}{\cos^2(x^2+1)}$

3) $D \cos(x^3) = -\sin(x^3) \cdot 3x^2 = -3x^2 \cdot \sin(x^3)$

4) $D(1+\sin x)^3 = 3(1+\sin x)^2 \cdot D(1+\sin x)$
$= 3 \cdot \cos x \, (1+\sin x)^2$

5) $D \sin\left(\frac{1}{x}\right) = \cos\left(\frac{1}{x}\right) \cdot \frac{-1}{x^2} = -\frac{\cos\left(\frac{1}{x}\right)}{x^2}$

6) $D \cos^3(6x) = 3\cos^2(6x) \cdot D\cos(6x)$
$= 3 \cdot \cos^2(6x) \cdot (-\sin(6x))$
$= 3 \cdot \cos^2(6x) - 6 \cdot \sin(6x)$
$= -18 \cdot \cos^2(6x) \cdot \sin(6x)$

7) $D \frac{1}{\sin x} = \frac{-1}{\sin^2 x} \cdot D\sin x = -\frac{\cos x}{\sin^2 x}$

8) $D(\cot 9x + \tan 3x) = \frac{-1}{\sin^2(9x)} \cdot D9x + \frac{1}{\cos^2 3x} \cdot D(3x)$
$= \frac{-9}{\sin^2(9x)} + \frac{3}{\cos^2(3x)}$

9) $D \cot^2 4x = 2\cot 4x \cdot D\cot 4x$
$= 2 \cdot \cot 4x \cdot \frac{-1}{\sin^2 4x} \cdot 4$
$= -8 \cdot \frac{\cot 4x}{\sin^2 4x} = \frac{-8\cos 4x}{\sin^3 4x}$

10) $D\left(\frac{2x}{x-5}\right)^3 = 3\left(\frac{2x}{x-5}\right)^2 \cdot D\left(\frac{2x}{x-5}\right)$
$= 3 \cdot \left(\frac{2x}{x-5}\right) \cdot \frac{(x-5)\cdot 2 - 2x \cdot 1}{(x-5)^2}$
$= \frac{6x \cdot (\cancel{2x} - 10 \cancel{-2x})}{(x-5)^2} = \frac{-60x}{(x-5)^2}$

11) $D \cos 3x = -\sin(3x) \cdot 3 = -3\sin(3x)$

12) $D \cos x^2 = -\sin x^2 \cdot Dx^2 = -2x \cdot \sin(x^2)$

13) $D\cos^2 x = 2\cos x \cdot D\cos x$

$= -2\cos x \cdot \sin x$

14) $D\cot(2-x) = -\frac{1}{\sin^2(2-x)} \cdot D(2-x)$

$= \frac{1}{\sin^2(2-x)}$

15) $D\left(\frac{x^2+5}{(x+7)^2}\right) = \frac{(x+7)^2 \cdot 2x - (x^2+5)\cdot 2(x+7)}{(x+7)^4}$

$= \frac{2x^2+14x-2x^2-10}{(x+7)^3}$

$= \frac{14x-10}{(x+7)^3} = \frac{2(7x-5)}{(x+7)^3}$

16) $D(x+x\cdot\cos x) = D(x\cdot\cos x)$

$\cos x \cdot 1 + x\cdot(-\sin x) = \cos x - x\cdot\sin x$

17) $D\left(\frac{2x}{(x-6)^2}\right) = \frac{(x-6)^2\cdot 2 - (2x)\cdot 2(x-6)}{(x-6)^4}$

$= \frac{2x-12-4x}{(x-6)^3} = \frac{-2x-12}{(x-6)^3}$

$= \frac{-2(x+6)}{(x-6)^3}$

18) $D\cos^2 4x = 2\cdot\cos 4x \cdot D\cos 4x$

$= 2\cdot\cos 4x\,(-\sin 4x)\cdot 4$

$= -8\cdot\cos 4x\cdot\sin 4x$

19) $D[(3x+2)^2\cdot(x-1)] = (x-1)\,2\cdot(3x+2)\cdot 3 + (3x+2)^2\cdot 1$

$= (3x+2)(6x-6+3x+2) = (3x+2)(9x-4)$

20) $D(\sin^5 x\cdot\cos^3 x) = \cos^3 x\, D\sin^5 x + \sin^5 x\, D\cos^3 x$

$= \cos^3 x\cdot 5\sin^4 x\cdot \underbrace{D\sin x}_{\cos x} + \sin^5 x\cdot 3\cos^2 x \underbrace{D\cos x}_{-\sin x}$

$= 5\cos^4 x\cdot\sin^4 x - 3\cos^2 x\cdot\sin^6 x$