Trig and Chain Rule Competition

One Point Questions:

1. $f(x) = (x^2 - 5)^8$ Find $f'(x)$

2. $f(x) = \cos(2x + 7)$ Find $f'(x)$

3. $f(x) = \dfrac{\cot x}{x^3 - 3}$

4. $f(x) = (\sin x)(x^3 + 2x)$ Find $f'(x)$

5. $f(x) = 4\tan x - 3\csc x$ Find $f'(x)$

Two Point Questions:

6. $f(x) = \sec^2 x$ Find $f'(x)$

7. $f(x) = \sin(2x)$ Find $f'\left(\dfrac{\pi}{6}\right)$

8. $f(x) = 3\sin^2(4x)$ Find $f'(x)$

9. Find the equation of the tangent line to the function $f(x) = \sqrt{x^2 - 9}$ at x = 5

10. $f(x) = \tan(\sqrt{3x - 1})$ Find $f'(x)$

Three Point Questions:

11. $y = x\sqrt{2x + 1}$ Find $\dfrac{dy}{dx}$

12. $f(x) = \dfrac{x\sec x}{x^2 - 3}$ Find $f'(0)$

13. $f(x) = x\sin x - 3\cos x$
Find $f''(x)$ (the second derivative of $f(x)$)

Answers:

1. $f'(x) = 16x(x^2 - 5)^7$

2. $f'(x) = -2\sin(2x + 7)$

3. $f(x) = \dfrac{(x^2 - 3)(-csc^2 x) - cotx(2x)}{(x^3 - 3)^2}$

4. $f'(x) = (\sin x)(3x^2 + 2) + (x^3 + 2x)(\cos x)$

5. $f'(x) = 4\sec^2 x + 3\csc x \cot x$

6. $f'(x) = 2\sec^2 x \tan x$

7. 1

8. $f'(x) = 24\sin(4x)\cos(4x)$

9. $y - 4 = \dfrac{5}{4}(x - 5)$ or $y = \dfrac{5}{4}x - \dfrac{9}{4}$

10. $f'(x) = \dfrac{3\sec^2(\sqrt{3x - 1})}{2\sqrt{3x - 1}}$

11. $\dfrac{dy}{dx} = x(2x + 1)^{\frac{-1}{2}} + \sqrt{2x + 1}$

12. $\dfrac{-1}{3}$

13. $f''(x) = -x\sin x + 5\cos x$