Extra Review Questions Derivatives

1. $f(x) = (x^2 + x)\sqrt{1 - x^2}$

2. $h(x) = \frac{1}{\sqrt[3]{2x^4 - 1}}$

3. $g(t) = \left(\frac{t+1}{t+2}\right)^4$

4. $f(z) = \frac{\sqrt{1+z}}{3+z^2}$

5. $y = cos^3(5x^4 - 3x^2)$

6. $y = \tan(sin4x)$

7. $y = \sin(5x - 3)\cos(x^3 - 4)$

8. $y = x^3 11^{x^4+2x}$

9. $y = (\ln(x^2 - 7x))^4$

10. $y = 4x^5 e^{x^3}$

11. Find the point on the parabola $y = 2x^2 - 3x + 6$ where the tangent line is parallel to the line $7x + y = 1$.

12. Find the points on the curve $y = \frac{1}{2x-1}$ where the tangent line is perpendicular to the line $x - 2y = 1$.

13. Find the equations of both lines that pass through the point (2,-3) and are tangent to the parabola $y = x^2 + x$.

Answers

1. $f'(x) = \frac{-3x^3-2x^2+2x+1}{(1-x^2)^{\frac{1}{2}}}$ 2. $f'(x) = \frac{-8x^3}{3(2x^4-1)^{\frac{4}{3}}}$ 3. $f'(x) = \frac{4(t+1)^3}{(t+2)^5}$

4. $f'(x) = \frac{3-4z-3z^2}{2(3+z^2)^2(1+z)^{\frac{1}{2}}}$ 5. $f'(x) = -6x(10x^2 - 3)sin(5x^4 - 3x^2)cos^2(5x^4 - 3x^2)$

6. $f'(x) = 4cos4xsec^2(sin4x)$

7. $f'(x) = -3x^2sin(5x - 3)sin(x^3 - 4) + 5cos(5x - 3)cos(x^3 - 4)$

8. $f'(x) = x^2 11^{x^4+2x}(x(4x^3 + 2)ln11 + 3)$ 9. $f'(x) = \frac{4(2x-7)\left(ln(x^2-7x)\right)^3}{x^2-7x}$

10. $f'(x) = 4x^4e^{x^3}(3x^3 + 5)$ 11. $(-1,11)$ 12. $(1,1)\&(0,-1)$

13. $y = 11x - 25 \;\&\; y = -x - 1$