2.3-2.4 Review WS #3 – Power Rule, Particle Motion, Product & Quotient Rule

No negative exponents in answer.

1. Find $\frac{dy}{dx}$ if $y = 7x^3(x-1)^2 - \frac{3x^2}{\sqrt{11}} + 2\pi x - 5e^4 + 2\sqrt[5]{x^4} + \frac{2}{3\sqrt{x^7}}$

2. Find $\frac{dy}{dx}$ if $y = \frac{4x(\sqrt{x}+3x-1)}{5(\sqrt{x^9})}$

3. If $f(x) = \frac{x}{x^2-2}$ find $f'(x)$ (simplify fully). Then write the equation of the line tangent to $f(x)$ at $x = 1$ in point-slope form.

4. Particle moves along the x-axis so that its position at time t is given $x(t) = t^3 - 6t^2 - 15t + 1$ where x(t) is in meters per minute and $t \geq 0$.   Use this to answer the questions below. **Include units with your answers**

a) Find the velocity and acceleration function	b) What is its velocity at $t = 1$ seconds?
	c) What is its acceleration at t = 2 seconds?
d) Find the average velocity of particle in [1, 2]	e) When is the particle at rest?

f) Find the average acceleration of particle in [1, 3]

g)   When is the particle moving right? When does particle change directions? (Create Sign Line) Give justification.

h) What is displacement of particle from t = 1 to t = 4? Show work.	i) What is the total distance of particle from t =3 to t = 6? Show work.
j) Is the speed increasing or decreasing at t = 1? Justify.	k) Is velocity increasing or decreasing at t = 3? Justify.