Derivative - Quotient rule - Answers

For questions 1 – 5, Use the quotient rule of derivative to find the derivative of the following functions.

1. $W(x) = \frac{3x+9}{2-x}$ $W'(x) = \frac{15}{(2-x)^2}$

2. $f(t) = \frac{4\sqrt{t}}{t^2-2}$ $f'(t) = \frac{-6t^{\frac{3}{2}}-4t^{-\frac{1}{2}}}{(t^2-2)^2}$

3. $g(z) = \frac{6z^2}{2-z}$ $g'(z) = \frac{24z-6z^2}{(2-z)^2}$

4. $R(w) = \frac{3w+w^4}{2w^2+1}$ $R'(w) = \frac{4w^5+4w^3-6w^2+3}{(2w^2+1)^2}$

5. $h(y) = \frac{\sqrt{y}+2y}{7y-4y^2}$ $h'(y) = \frac{-\frac{7}{2}\sqrt{y}+6\sqrt{y^3}+8y^2}{(7y-4y^2)^2}$

6. Find the equation of the tangent line to $f(x) = \frac{x^2-4}{5-x}$ at $x = 3$

$y = \frac{17}{4}x - \frac{41}{4}$

7. Suppose that the amount of air in a balloon at any time t is given by $v(t) = \frac{6\sqrt[3]{t}}{4t+1}$

Determine if the balloon is being filled with air or being drained of air at $t = 8$.

Derivative at t = 8 is $-\frac{7}{242}$ so, the rate of change is negative, therefore air is being drained out of the balloon at t = 8

8. A herring swimming along a straight line has travelled $s(t) = \frac{t^2}{t^2+2}$ feet in t seconds.

Determine the velocity of the herring when it has travelled 3 seconds.

The rate of change at t = 3 is $\frac{12}{121}$ feet/second or 0.0992 feet/second