Answers to Worksheet 10 - Quotient and Chain Rule

1) $h'(t) = -\dfrac{5 \cdot \dfrac{25}{3}t^{\frac{2}{3}}}{\left(5t^{\frac{5}{3}} - 3\right)^2}$

2) $\dfrac{dr}{dx} = \dfrac{\left(3 - 2x^{-5}\right)\left(5x^4 + 8x^3\right) - \left(x^5 + 2x^4\right) \cdot 10x^{-6}}{\left(3 - 2x^{-5}\right)^2}$

3) $h'(s) = -\dfrac{6s^{-4}}{\left(4 - 2s^{-3}\right)^2}$

4) $f'(w) = \dfrac{\left(2w^{\frac{2}{5}} + 3\right) \cdot 8w - 4w^2 \cdot \dfrac{4}{5}w^{-\frac{3}{5}}}{\left(2w^{\frac{2}{5}} + 3\right)^2}$

5) $f'(s) = \dfrac{1}{3}\left(2s^5 + 1\right)^{-\frac{2}{3}} \cdot 10s^4$

$= \dfrac{10s^4}{3\left(2s^5 + 1\right)^{\frac{2}{3}}}$

6) $f'(r) = 4(-4r + 5)^3 \cdot -4$

$= -16(-4r + 5)^3$

7) $\dfrac{df}{dt} = \dfrac{1}{2}\left(t^3 + 3\right)^{-\frac{1}{2}} \cdot 3t^2$

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

8) $\dfrac{dh}{dt} = \dfrac{1}{3}\left(-3t^2 + 2\right)^{-\frac{2}{3}} \cdot -6t$

$= -\dfrac{2t}{\left(-3t^2 + 2\right)^{\frac{2}{3}}}$

9) $\dfrac{dr}{dt} = e^{3t^3} \cdot 9t^2$

10) $g'(w) = e^{4w^5} \cdot 20w^4$

11) $\dfrac{df}{ds} = \dfrac{1}{4s^3} \cdot 12s^2$

$= \dfrac{3}{s}$

12) $\dfrac{dt}{dx} = \dfrac{1}{x^4} \cdot 4x^3$

$= \dfrac{4}{x}$

13) $f'(t) = \cos t^8 \cdot 8t^7$

$= 8t^7 \cos t^8$

14) $f'(w) = -\sin 3w^9 \cdot 27w^8$

$= -27w^8 \sin 3w^9$

15) $\dfrac{dh}{ds} = \sec 3s^6 \cdot \tan 3s^6 \cdot 18s^5$

$= 18s^5 \sec 3s^6 \cdot \tan 3s^6$

16) $h'(s) = \sec^2 s^4 \cdot 4s^3$

$= 4s^3 \cdot \sec^2 s^4$

17) $f'(1) = -2$

18) $g'(-2) = -\dfrac{1}{4}$