7. [8 points] Suppose $p(t) = t\sqrt{1/(t+1)}$ gives the position of an object moving along a straight line, in meters east of a fixed starting point, t seconds after it begins moving. Note that the derivative $p'(t)$ outputs both positive and negative values for t-values in the interval $[0, 20]$. Match each expression on the right below with the letter (a) – (e) that it represents, or else write (f) if it does not represent any of (a) – (e). *Note: each letter (a) – (f) may appear more than once, or not at all.*

(a) the object's instantaneous velocity at $t = 20$

(b) the object's average velocity over the time interval $[0, 20]$

(c) the amount of time it takes for the object to travel 20 meters

(d) the total distance the object traveled over the time interval $[0, 20]$

(e) the distance between the object's location at $t = 0$ and its location at $t = 20$

(f) none of (a) – (e)

i. _____ $\dfrac{20\sqrt{1/21} - 0\sqrt{1/1}}{20 - 0}$

ii. _____ $\displaystyle\int_0^{20} t\sqrt{1/(t+1)}\, dt$

iii. _____ $\dfrac{(20+h)\sqrt{1/(21+h)} - 20\sqrt{1/21}}{h}$

iv. _____ $\displaystyle\int_0^{20} p'(t)\, dt$

v. _____ $\displaystyle\int_0^{20} |p'(t)|\, dt$

vi. _____ $\displaystyle\lim_{h\to 0} \frac{(20+h)\sqrt{1/(21+h)} - 20\sqrt{1/21}}{h}$

vii. _____ $\dfrac{t\sqrt{1/21} - 20\sqrt{1/21}}{t - 20}$

viii. _____ $20\sqrt{1/21} - 0\sqrt{1/1}$