Mathematics 122

Quiz #27 Name: Key

You must show your work to get full credit.

For some positive constant k a patient's temperature change, T, is due to a dose, D, of a drug is

$$T = \left(k - \frac{D}{2}\right) D = kD - \frac{D^2}{2}$$

1 pt (1) What is $\frac{dT}{dD}$? $\frac{dT}{dD} =$ $k - D$

$$\frac{dT}{dD} = k - \frac{2D}{2} = k - D$$

2 pt (2) For what value of $D > 0$ is D increasing? $0 \le D \le k$

or $0 < D < k$

1 pt (3) What value of D maximizes T? $D = k$

From the sign chart we see max. at $D = k$

(4) What is the maximum value of T? $\frac{k^2}{2}$

1 pt. Plug back into original formula $T|_{D=k} = \left(k - \frac{k}{2}\right) k$

$$= \frac{k}{2} \cdot k = \frac{k^2}{2}$$