

## Math Stretch:

\* Let  $s(t)$  = position  $v(t)$  = velocity  $a(t)$  = acceleration  
 $t$  = seconds  $s(t)$  = meters

### What do each of the following represent?

#### Math Statement

#### Words

- |                                     |   |  |
|-------------------------------------|---|--|
| 1) $v'(2)$                          | → | 1) Acceleration at $t=2$ seconds $a(2)$            |
| 2) $\int_0^3 v(t) dt$               | → | 2) Change in position from 0 to 3<br>$s(3) - s(0)$ |
| 3) $\int_0^3  v(t)  dt$             | → | 3) Total distance travelled from 0 to 3            |
| 4) $\frac{1}{3-0} \int_0^3 v(t) dt$ | → | 4) Average value of the velocity from 0 to 3       |
| 5) $\frac{s(3) - s(0)}{3-0}$        | → | Same   |
| 6) $\frac{v(3) - v(0)}{3-0}$        | → | Average acceleration on $[0, 3]$                   |
| 7) $s'(t) = 0$                      | → | time when velocity is 0.                           |

- ① Oil is flowing into a tank at a rate of  $r(t)$  in gallons per hour.  $t=0$  represents 12:00 pm.

Write a math statement for each of the following using  $r(t)$

- a) The change in amount of oil from 2:00pm to 5:00 pm.

$$\int_2^5 r(t) dt$$

\*Integrating rate gives you change in amount

- b) The average amount of oil in the tank from 2:00pm to 5:00 pm.

$$\frac{1}{5-2} \int_2^5 s(t) dt$$

~~$\frac{1}{5-2} \int_2^5 r(t) dt$~~   $s(t) = \text{amount}$

- c) The total amount of oil entering and leaving the tank.

$$\int_2^5 |r(t)| dt$$

- ② The number of words that a person types is given by  $s(t)$  where  $t$  is in minutes.

Write a math statement for each of the following using  $s(t)$

- a) The rate that the person is typing at 20 minutes.

$$s'(20) =$$

- b) The average rate that the person is typing from 4 to 8 minutes.

$$\frac{1}{8-4} \int_4^8 s'(t) dt$$

- c) The time at which the person is not typing.

$$s'(t) = 0$$