2.7-16   On a road trip, five friends drove at 50 miles per hour to California. On the way home, they took the same route but drove 65 miles per hour. How many miles did they drive on the way to California if the round trip took 10 hours? Round to the nearest tenth of a mile if necessary.

○A.   2,166.7 miles

○B.   565.2 miles

○C.   5.7 miles

○D.   282.6 miles

Same distance both directions

$$D = R \cdot T$$

	D	R	T
to CA	D	50	D/50
home	D	65	D/65
			Total 10 hrs

If $\dfrac{D}{R} = \dfrac{R \cdot T}{R}$

gives

$\dfrac{D}{R} = T$

* See handout in class *
This is the harder set-up   where $T = \dfrac{D}{R}$.

Add times $\dfrac{D}{50} + \dfrac{D}{65} = 10$ LCD = 650

$650 \cdot \dfrac{D}{50} + 650 \cdot \dfrac{D}{65} = 650 \cdot 10$

$13D + 10D = 6500$

$\dfrac{23D}{23} = \dfrac{6500}{23}$

$D = 282.6086957\ldots$

Round to nearest tenth (instructions)

$\boxed{D = 282.6 \text{ miles}}$

2.7-26 An airplane flies 410 miles with the wind and 330 against the wind in the same length of time. If the speed of the wind is 20 mph, what is the speed of the airplane in still air?
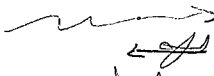
A. 175 mph

B. 185 mph

C. 82.5 mph

D. 190 mph

$$D = R \cdot T$$

	D	=	R	·	T	
with wind	410		R+20		$\frac{410}{R+20}$	} Same time
against wind	330		R-20		$\frac{330}{R-20}$	

wind increases speed
"with wind" add 20 to rate

wind decreases speed
"against wind"
subtract 20 from rate

see class handout

* use $T = \frac{D}{R}$ set up

same time $\Rightarrow$ set times equal

$$\frac{410}{R+20} = \frac{330}{R-20}$$

proportion: cross-multiply

$$410(R-20) = 330(R+20)$$
$$410R - 8200 = 330R + 6600$$
$$-330R \qquad\qquad -330R$$

$$80R - 8200 = 6600$$
$$+8200 \quad +8200$$

$$\frac{80R}{80} = \frac{14800}{80}$$

$$\boxed{R = 185 \text{ mph}}$$

2.7-28 Adam and David were both driving east on the same highway. At 4:00 P.M., Adam, traveling at 55 miles per hour, was 20 miles east of David. A little later, David, traveling at 65 miles per hour, passed Adam. At what time did David pass Adam?

A. 10:00 P.M.

B. 8:00 P.M.

C. 6:00 P.M.

D. 6:30 P.M.

Adam |← 20miles →| 4PM ——————→| later

David | ———————————→|
4PM

$$D = R \cdot T$$
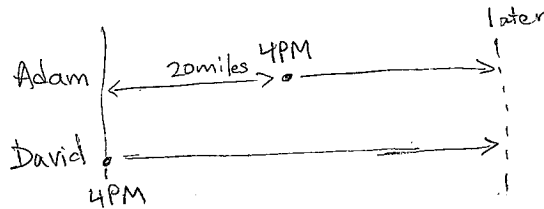
	D	R	T
Adam	55T	55	T
David	65T	65	T

Same direction
⇒
Subtract

$$65T - 55T = 20$$
$$10T = 20$$
$$T = \frac{20}{10} = 2 \text{ hrs}$$

$$4:00 \text{ PM} + 2 \text{ hrs} = \boxed{6:00 \text{ PM}}$$