NAME _____ DATE _____

5–9 *Fractional Equations* (continued)

Vocabulary

Work rate The fractional part of a job done in a given unit of time.
Example: Lenny can paint a room in 3 h. His work rate is $\frac{1}{3}$ job per hour.

Special rate formulas work rate × time = work done rate × time = distance

$d = r \cdot t$

Complete each table and solve.

13. Stan can load his truck in 24 min. If Chris helps him, it takes 15 min to load the truck. How long does it take Chris alone? → together time

Stan $r \cdot t$ + chris $r \cdot t = 1$ job

$\frac{1}{24} \cdot \frac{15}{1} + \frac{1}{c} \cdot 15 = 1$ → $\left(\frac{15}{24} + \frac{15}{c} = \frac{1}{1}\right)\frac{24c}{1}$

$15c + 360 = 24c$

$360 = 9c$

$c = 40$ min.

, if Chris worked alone

14. Bonnie can complete her paper route in 45 min. When her sister Jean helps her it takes them 18 min to complete the route. How long would it take Jean alone?

$\frac{18}{45} + \frac{18}{x} = 1$

$x = 30$ min.

$18x + 810 = 45x$

15. An express train travels 150 km in the same time that a freight train travels 100 km. The average speed of the freight train is 20 km/h less than that of the express train. Find the speed of each train.

E F
60 | 40

$\frac{150}{x} = \frac{100}{x-20}$

16. Helen can ride 15 km on her bicycle in the same time it takes her to walk 6 km. If her rate riding is 6 km/h faster than her rate walking, how fast does she walk?

	D	r	t
BIKE Helen	15	r+6	t
WALK	6	r	t

$(r+6) \cdot t = 15 \rightarrow t = \frac{15}{r+6}$

$r \cdot t = 6 \rightarrow t = \frac{6}{r}$

$\frac{6}{r} = \frac{15}{r+6}$

$r = 4$ km/h.

Mixed Review Exercises

Simplify.

1. $\frac{x^2 - 4}{2 - x}$

2. $\frac{72m^2n^3}{27mn^4}$

3. $\frac{1 + a^{-1}}{a^{-2} - 1}$

4. $\frac{k^2 - k - 6}{k^2 - 2k - 8}$

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5.8 Word Problems

1. An old conveyor belt takes 21 hours to move one day's coal output from the mine to a rail line. A new belt can do it in 15 hours. How long does it take when both are used at the same time?

work rate = $\frac{1}{21}$

work rate = $\frac{1}{15}$

WORK

old r · t + new r · t = 1 job

$\frac{1}{21} \cdot t + \frac{1}{15} \cdot t = 1$

$\frac{315}{1}\left(\frac{t}{21} + \frac{t}{15} = 1\right)$

$15t + 21t = 315$

$36t = 315$

$t = 8.75$ hours.

2. Pam jogged up a hill at 6 km/h and then jogged back down at 10km/h. How many kilometers did she travel in all if her total jogging time was 1 h 20 min?

3. Nile can do the laundry in 120 minutes. Harry can do it in 80 minutes. How many minutes are needed to do the laundry?

rate = $\frac{1}{120}$

rate = $\frac{1}{80}$

$\frac{240}{1}\left(\frac{1}{120} \cdot t + \frac{1}{80} \cdot t = 1\right)$

$2t + 3t = 240$

$5t = 240$

$t = 48$ minutes

4. A cyclist travels 100 miles, part at 15 mi/h and the rest at 20 mi/h. How far does the cyclist travel at each speed if the trip takes 5.5 hours?