

Name KEY

Solve #!!!!

1. Can Doris Downhill fit her skis of 6 ft. into a cubic box, 3.5 ft. on each side?

$$d = \sqrt{3.5^2 + 3.5^2 + 3.5^2}$$

$$d = \sqrt{36.75}$$

$$d > 6 \text{ ft}$$

yes, will be able to.

2. Mrs. Werner's relatives (aunts, uncles and cousins) were gathered at a restaurant. If their number can be represented by consecutive even integers respectively, find the number of each if the total number of her relatives at the restaurant was 54.

x = # aunts
 $x+2$ = # uncles
 $x+4$ = # cousins

$$3x+6=54$$

$$3x=48$$

$$x=16$$

16 aunts
18 uncles
20 cousins

3. Martin can paint a room in 4 days. Bob can paint the same room in 6 days. How long would it take them if they painted the room together?

Let x = # of days for job

$$\left. \begin{array}{l} \frac{1}{4}x + \frac{1}{6}x = 1 \\ \frac{1}{4}x = \text{amt of job in 1 day} \\ \frac{1}{6}x = \text{amt of job in 1 day} \end{array} \right\} \begin{array}{l} 3x + 2x = 12 \\ x = \frac{12}{5} \end{array}$$

$2\frac{2}{5}$ days

KEY

Solve:

1. Traveling by highways, Carrie Brattle's speed on her way to work is 60 km/h. If she uses local streets to drive the same distance, the trip takes 30 minutes longer and her speed is 36 km/h. How long does it take her to drive to work by the highways.

Let x = time on highway
 $x + 30$ = time local
 $60x = 36(x + 30)$
 $60x = 36x + 1080$

$24x = 1080$
 $x = 45$

CK
 $60(45) \stackrel{?}{=} 75(36)$
 $2700 = 2700$

45 min.

2. The fuel efficiency rating for a certain car is 28 mi./gal. on the highway and 20 mi./gal. in the city. During one week the car traveled 220 miles and used 9 gallons of fuel. How much fuel was used for city driving? How many miles were driven on the highway?

Let x = gal. fuel for Hwy
 $9 - x$ = gal " " City
 $28x + 20(9 - x) = 220$
 $28x + 180 - 20x = 220$
 $8x = 40$

$x = 5$

5 gal. highway
 4 gal. City

CK
 $5(28) = 140$ miles
 $4(20) = 80$
 220 ✓

3. Harry Gilmore rode his bike the length of a new bike trail and then rode an extra 8 km, all in 5 hours. The next day it took him 3 hours to ride just the new bike trail. His speed on the second day was 1.5 times the speed of the first day. How long is the bike trail?

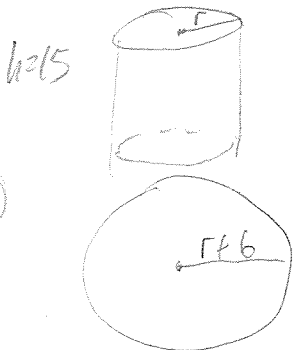
Let x = km of bike trail
 $1.5 \text{ rate} = \text{rate}$
 $1.5 \left(\frac{x + 8}{5} \right) = \frac{x}{3}$
 $3(1.5x + 12) = 5x$
 $4.5x + 36 = 5x$

$36 = .5x$
 $72 = x$

72 miles

CK
 $D = tr$
 $\frac{D}{t} = r$
 Day 1
 $\frac{72 + 8}{5} = 16 \text{ mph}$
 Day 2
 $\frac{72}{3} = 24 \text{ mph}$
 $1.5(16) = 24$ ✓

4. A cylinder with height 15 has a total surface area that is twice the area of a circle whose radius is 6 more than the radius of the cylinder. What is the radius of the cylinder?



SA of cylinder
 $2\pi rh + 2\pi r^2 = 2\pi r^2$
 $2\pi r(15) + 2\pi r^2 = 2\pi(r + 6)^2$
 $30\pi r + 2\pi r^2 = 2\pi(r^2 + 12r + 36)$
 $30\pi r + 2\pi r^2 = 2\pi r^2 + 24\pi r + 72\pi$
 $6\pi r = 72\pi$
 $r = \frac{72\pi}{6\pi}$
 $r = 12$

CK
 Cyl:
 $SA = 24\pi(15) + 2\pi(12)^2$
 $= 648\pi$
 Circle: $r = 18$
 $A = \pi(18)^2$
 $= 324\pi$ ✓

Chap 2

Problem Solving 2

① Let $x = \#$ of jeweled
 $25 - x = \#$ of enameled
 $3x = \#$ of jeweled
 $2(25 - x) = \#$ enameled

$$3x + 2(25 - x) = 65$$

$$3x + 50 - 2x = 65$$

$$x = 15$$

Then: 15 Jeweled
 10 enameled

Now: 45 jeweled
 20 enameled

② Let $x = \#$ one BR
 $50 - x = \#$ two BR

28 one BR
 22 two BR

$$185,900x + 195,900(50 - x) = 9,515,000$$

$$185,900x + 9,795,000 - 195,900x = 9,515,000$$

$$10,000x = 280,000$$

$$x = 28$$

③ a) $x = \text{speed}$
 $24x = 2000$
 $x = 83\frac{1}{3} \text{ mph (wind)}$

b) $36x = 2000$
 $x = 55\frac{20}{36} = 55\frac{5}{9} \text{ mph}$ or ≈ 55.6

④ Let $x = \text{principal at } 9\%$
 $6400 - x = \text{principal at } 8\%$

\$4000 at 9%
 \$2400 at 8%

$$.09(2.5)x + .08(2.5)(6400 - x) = 1380$$

$$.225x + 1280 - .2x = 1380$$

$$.025x = 100$$

$$x = \$4000$$

KEY

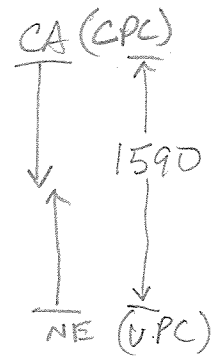
Name _____

Advanced Algebra (H)

Problem Solving Strategies

1. In 1862, two railroad companies were given the rights to build a railroad connecting Omaha, Nebraska, with Sacramento, California. The Central Pacific Company began building eastward from Sacramento in 1863. Twenty-four months later the Union Pacific Company began building westward from Omaha. The Central Pacific Company averaged 75 miles of track per month. The Union Pacific Company averaged 20 miles of track per month. The two companies met in Promontory, Utah, as the 1590 miles of track were completed. How long, from the time the Central Pacific Company began, did it take the construction of the railroad line? How many miles of track did each company build?

let $x = \# \text{ months (UPC)}$
 $x + 24 = \# \text{ month (CPC)}$
 $8.75(x + 24) + 20x = 1590$
 $8.75x + 210 + 20x = 1590$
 $28.75x = 1380$
 $x = 48$



How long a time?
 $48 + 24 = 72 \text{ months}$

miles of CPC
630 miles
miles of UPC
960 miles

2. You have started a small business making papier-mache sculptures. Your cost per sculpture is only \$0.50. Your pieces sell for \$12.50 at an arts-and-crafts shop, and you receive 50% of the selling price. Each sculpture takes about 2 hours to complete. If you spend 16 hours a week working on the sculptures, how many weeks will you work to earn a profit of \$400?