Algebra II

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1)	12 – $20 bills 3 – $50 bills	7)	165 mph 15 mph	13)	60 km/hr 105 km
2)	16 singles 56 couples	8)	275 mph 25 mph	14)	15 mi/hr 300 mi
3)	55°, 55°, 70°	9)	$2.80 1st min $1.20 each add.	15)	$v_0 = 8$ m/s $a = 5$ m/s^2
4)	5×9×9 cm 5×18×18 cm	10)	$100 Fixed $8 cost/guest	16)	4km/hr swimming 18 km/hr running
5)	9 jeans 12 shirts	11)	$5000 at 15% $3000 at 6%	17)	$120 weekly $0.25 /mile
6)	12 – 20 ton bins 18 – 15 ton bins	12)	$168 plumber $45 apprentice		

1) Kerry asked a bank teller to cash a $390 check using $20 bills and $50 bills. If the teller gave her a total of 15 bills, how many of each type of bill did she receive?

2) Tickets for the homecoming dance cost $20 for a single ticket or $35 for a couple. Ticket sales totaled $2280, and 128 people attended. How many tickets of each type were sold?

Let x = # of singles — 16

$\frac{1}{2}(128 - x)$ = # of doubles. — 56

$$20(x) + 35\left(\tfrac{1}{2}(128 - x)\right) = 2280$$

$$20x + 35\left(64 - \tfrac{1}{2}x\right) = 2280$$

$$20x + 2240 - 17.5x = 2280$$

$$\frac{2.5x}{2.5} = \frac{40}{2.5}$$

$$x = 16$$

4) Two isosceles triangles have the same base length. The legs of one of the triangles are twice as long as the legs of the other. Find the lengths of the sides of the triangles if their perimeters are 23 cm and 41 cm.

5) On Friday, the With-It Clothiers sold some jeans at $25 a pair and some shirts at $18 each. Receipts for the day totaled $441. On Saturday, the store priced both items at $20, sold exactly the same number of each item and had receipts of $420. How many pairs of jeans and how many shirts were sold each day?

Let x = # jeans — 9

y = # shirts — 12

$$-4(25x + 18y = 441)$$
$$5(20x + 20y = 420)$$

$$-100x - 72y = -1764$$
$$100x + 100y = 2100$$

$$28y = 336$$
$$y = 12$$

$$20x + 20(12) = 420$$
$$20x + 240 = 420$$
$$20x = 180$$
$$x = 9$$

6) A grain-storage warehouse has a total of 30 bins. Some hold 20 tons of grain each, and the rest hold 15 tons each. How many of each type of bin are there if the capacity of the warehouse is 510 tons?

Let x = # 20T bins

$30 - x$ = # 15T bins

$$20(x) + 15(30 - x) = 510$$

7) With a tail wind, a helicopter traveled 300 mi in 1 h and 40 min. The return trip against the same wind took 20 min longer. Find the wind speed and also the air speed of the helicopter.

	r	t	= d
with	x+y	$1\frac{2}{3} = \frac{5}{3}$	300
against	x−y	2	300

Let x = chopper speed
y = wind speed

$\frac{3}{5}\left[\frac{5}{3}(x+y)=300\right] \rightarrow x+y=180$

$\left(2(x-y)=300\right)\frac{1}{2} \rightarrow x-y=150$

8) With a head wind, a plane traveled ~~100~~ 1000 mi in 4 h. With the same wind as a tail wind, the return trip took 3 h and 20 miin. Find hte plane's air speed and the wind speed.

	r	× t	= d
against wind	275 mph, 25 mph; x−y	4	1000
with wind	x+y	$3\frac{1}{3} = \frac{10}{3}$	1000

Let x = plane's speed
y = wind speed

$\left(4(x-y)=1000\right)\div 4$

$\frac{3}{10}\left(\frac{10}{3}(x+y)=1000\right)$

$x-y=250$
$x+y=300$
$2x=550$
$x=275$

9) An overseas phone call is charged at one rate (a fixed amount) for the first minute, and at a different rate for each additional minute. If a 7 min call costs $10, and a 4 min call costs $6.40, find each rate.

10) A caterer's total cost for catering a party includes a fixed cost, which is the same for every party. In addition, the caterer charges a certain amount for each guest. If it cost $300 to serve 25 guests and $420 to serve 40 guests, find the fixed cost and the cost per guest.

11) A financial planner wants to invest $8000, some in stocks earning 15% annually and the rest in bonds earning 6% annually. How much should be invested at each rate to get a return of $930 annually from the two investments?

12) For a recent job, a plumber earned $28/h, and the plumber's apprentice earned $15/h. The plumber worked 3 hours more than the apprentice. If together they were paid $213, how much did each earn?

14) A plane whose air speed is 150 mph flew from Abbot to Blair in 2 h with a tail wind. On the return trip against the same wind, the plane was still 60 mi from Abbot after two hours. Find the wind speed and the distance between Abbot and Blair.

15) If a particle starting with initial speed v_0 has constant acceleration a, then its speed after t seconds is given by $v = at + v_0$. Find v_0 and a if $v = 28$ m/s when $t = 4$ s and $v = 43$ m/s when $t = 7$ s.

Let x = rate swimming
y = rate running

$\frac{3}{4}x + \frac{1}{3}y = 9$

$\frac{1}{2}x + \frac{2}{5}y = 14$

16) While training for a biathlon race, Kevin covered a total distance of 9 km by swimming for 45 min and running for 20 min. The next day he swam for 30 min and ran for 40 min, covering 14 km. Find his rates (in km/h) for swimming and running.

17) Davis Rent-A-Car charges a fixed amount per weekly rental plus a charge for each mile driven. A one-weeek trip of 520 mi costs \$250, and a two week trip of 800 mi costs \$440. Find the weekly charge and the charge for each mile driven.

Let x = Fixed
Let y = rate/mile

$250 = x + 520y$
$440 = 2x + 800y$