4 pts each

20-pt scale 24 pts poss.

1. 1.2 #1 If the value of y can be determined from the value of x, then y is a _____ of $\underline{x}$.

2. 1.2 #27 Cameron and his buddy purchased a used circus carousel for $69,733, including sales tax. If the sales tax rate is 7%, what was the price of the carousel, before the sales tax?

Let x = price of carousel, before tax (in $)

Then $x + .07x = 69733$

$1.07x = 69733$

$x = \frac{69733}{1.07} \approx \boxed{\$ 65,171.03}$

3. 1.2 #47 After one year, Johnny's two mutual funds earned a total of $5300. The first fund had a 6% rate of return. The second, in which he invested $7,000 more than the first, had a 7% rate of return. What was the amount of Johnny's total mutual fund investment?

Let x = amt invested @ 6% ($)
    y = "   "   @ 7% ($)

$y = x + 7000$ and

$.06x + .07y = 5300$

$.06x + .07(x+7000) = 5300$

$.06x + .07x + 490 = 5300$

$.13x = 4810$

$x = \frac{4810}{.13} \approx \boxed{37000 \approx x}$

$\Longrightarrow \boxed{y = 44,000}$

$\boxed{\begin{array}{l} TOTAL: \\ \$81,000 \end{array}}$

4. 1.2 #50 How many ounces of 30% alcohol solution must be mixed with 40 ounces of 80% alcohol solution to obtain a mixture that is of 70% alcohol solution?

	30%	80%	70%
TOTAL VOL	X	40	X+40
PURE ALC	.3x	.8(40)	.7(x+40)

$.3x + 32 = .7(x+40)$

$.3x + 32 = .7x + 28$

$-.4x = -4$

$x = \frac{-4}{-.4} = 10$

x = amt of 30% alcohol solution (in ounces).

Bonus What's the total volume of the final 70% alcohol solution?

5. 1.2 #51 The old combine can harvest the crop in 72 hours, but the new combine can do the same job in 48 hours. How long does it take to harvest the crop with *both* combines working together?

Let t = time to get done, working together (hrs)

Then $\frac{1}{72}t + \frac{1}{48}t = 1$

$\frac{5}{144}t = 1$

$$t = \frac{144}{5} = 28.8 \text{ hrs}$$

```
2|72      2|48
2|36      2|24
2|18      2|12
3|9       2|6
  3         3
```

LCD $= 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 = 144$

6. 1.2 #53 Batman can clean up Gotham City in 8 hours. Robin can do the job in 12 hours. If Robin starts fighting crime at 8 a.m. and Batman joins in at 10 a.m., at what time will Gotham be crime-free?

Let t = amt of time Robin puts in (hrs)

Then　　Batman starts 2 hrs later.

$\frac{1}{12}t + \frac{1}{8}(t-2) = 1$

$\underset{2 \cdot 2 \cdot 3}{\frac{1}{12}}\qquad \underset{2 \cdot 2 \cdot 2}{\frac{1}{8}}$

LCD $= 2 \cdot 2 \cdot 2 \cdot 3 = 24$

$\underset{2 \cdot 2 \cdot 3}{\frac{t}{}} \cdot \frac{2}{2} + \underset{2 \cdot 2 \cdot 2}{\frac{1}{}} \cdot \frac{3}{3} = \frac{24}{24}$

$2t + 3t = 24$

$5t = 24$

$t = \frac{24}{5} = 4.8 \text{ hrs}$

4.8 hrs after 8 am is

4 hrs 48 mins after 8am = $\boxed{12:48 \text{ pm}}$

7. 1.3 #19 Find the distance between and the midpoint of the two points $P(1, 3)$ and $Q(4, 7)$.

$d(P,Q) = \sqrt{(4-1)^2 + (7-3)^2} = \sqrt{25+16} \boxed{= \sqrt{41}}$

$\text{Mid}(P,Q) = \left(\frac{1+4}{2}, \frac{3+7}{2}\right) = \boxed{\left(\frac{5}{2}, 5\right)}$

8. 1.3 #51 Find the center and radius of the circle and sketch it: $x^2 + y^2 + 6y = 0$

$x^2 + y^2 + 6y = 0$

$x^2 + y^2 + 6y + 3^2 = 3^2$

$x^2 + (y+3)^2 = 9$

$(h, k) = (0, -3)$

$r = 9$

$(0,0)$
$(-3,3)$
$(0,-3)$
$(3,-3)$
$(0,-6)$