Section 4.2b – Practice Problems

PROFICENT LEVEL QUESTIONS

1. The sum of two numbers is six, and the difference is 10. Find the numbers.

$x+y=6 \quad x-y=10$

$y=6-x \rightarrow x-(6-x)=10$

$x-6+x=10$

$2x=16$

$x=8$

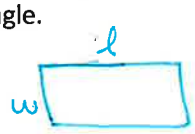
$x+y=6$

$8+y=6$

$y=-2$

The two numbers are 8 and -2

2. The perimeter of a rectangle is 96cm. The length of the rectangle is 10cm more than the width. Find the length and width of the rectangle.



$2l+2w=96$

$l \; 10=w$

$2l+2(l-10)=96$

$2l+2l-20=96$

$4l=116$

$l=29 \rightarrow l-10=w$

$29-10=w$

$19=w$

$l=29, w=19$

3. Two angles add up to 90°. The larger angle is 12° more than five times the measure of the smaller angle. Find the measure of the two angles.

$a+b=90 \rightarrow 5b+12+b=90$

$a=5b+12 \quad 6b=78$

$b=13$

$a+13=90$

$a=77$

77° and 13°

4. A cafeteria has a special: one hamburger and one order of fries is $5.49, and one hamburger and two orders of fries is $6.99. Determine the price of the hamburger.

$h+f=5.49 \rightarrow f=5.49-h$

$h+2f=6.99$

$h+2(5.49-h)=6.99$

$h+10.98-2h=6.99$

$-h=-3.99$

the price of the hamburger is 3.99

5. Ellie is twice as old as her sister Kate. In seven years, the sum of their ages will be 20. How old are they now?

$E = 2k$

$(E+7)+(k+7) = 20$

$2k+k+14 = 20$

$3k = 6$

$k = 2 \longrightarrow E = 2(k)$

$E = 2(2)$

$E = 4$

Ellie is 4 years old, and kate is 2 years old now

6. A car rental company charges x dollars to rent a truck, plus y dollars per kilometer. Find x *and* y if the rental charge is \$90 for 100km, and \$110 for 150km.

Let x be rental fee

y be \$/km

$(x + 100y = 90)^{-1} \rightarrow -x - 100y = -90$

$x + 150y = 110$

$x + 150y = 110$

$50y = 20$

$y = \frac{2}{5}$

$y = 0.40$ \$/km

$x + 100(0.4) = 90$

$x + 40 = 90$

$x = 50$

\$50 rental fee

\$0.40/km fee

EXTENDING LEVEL QUESTIONS

7. The cost of making pizzas includes a fixed cost, plus a cost per pizza. On Friday, 200 pizzas cost \$800 to make. On Saturday, 250 pizzas cost \$950 to make. Determine the daily cost, and the cost per pizza.

Let x be fixed cost

Let y be cost per pizza

$x + 200y = 800$

$(x + 250y = 950)^{-1}$

$x + 200y = 800$

$-x - 250y = -950$

$-50y = -150$

$y = 3$

$y = 3$ means \$3/pizza

$x + 200(3) = 800$

$x = 200$

Fixed cost: \$200

Price per pizza: \$3

8. The sum of five times one number plus three times a second number is eight. The sum of three times the first number plus five times the second number is 24. Find the numbers.

Let n be the 1st number

Let t be the 2nd number

$(5n + 3t = 8)^{-3}$ $(3n + 5t = 24)^{5}$

$-15n - 9t = -24$

$15n + 25t = 120$

$16t = 96$

$t = 6$

$5n + 3(6) = 8$

$5n + 18 = 8$

$5n = -10$

$n = -2$

9. A bottle of wine has 8% alcohol, another bottle has 15% alcohol. How much of each must be mixed to have 100 litres of 12.2% alcohol wine?

Let x be the 8% alcohol
Let y be the 15% alcohol

$x + y = 100 \leftarrow y = 100 - x$

$8\%x + 15\%y = 12.2\%(100)$

$0.08x + 0.15y = 0.122(100)$

$0.08x + 0.15(100 - x) = 0.122(100)$

$0.08x + 15 - 0.15x = 12.2$

$-0.07x = -2.8$

$x = 40$

$40 + y = 100$

$y = 60$

40L of 8%

60L of 15%

10. A plane travels 2835km with a tailwind, but only 1827km with a headwind in the same time. Find the speed of the plane and the speed of the wind, if time is 7 hours.

Let x be speed of plane
Let y be speed of wind

Headwind: $x - y$
Tailwind: $x + y$

$\text{speed} = \frac{d}{t}$

$\left[x - y = \frac{1827}{7}\right]^7$

$\left[x + y = \frac{2835}{7}\right]^7$

$7x - 7y = 1827$
$7x + 7y = 2835$

$14x = 4662$

$x = 333$

$7(333) - 7y = 1827$

$2331 - 7y = 1827$

$-7y = -504$

$y = 72$

Plane: 333km/hr

Wind: 72km/hr

Section 4.2b – Answer Key

1. −2 and 8
2. 19 and 29
3. 13° and 77°
4. $3.99 and $1.50
5. 2 and 4
6. $50; $0.40/km
7. $200; $3/pizza
8. −2 and 6
9. 40L of 8%
   60L of 15%
10. Plane: 333km/hr
    Wind: 72km/hr