

# Breakpoint Problems Solutions

1. Let  $c$  represent the total cost to rent a snow blower  
Let  $h$  represent the number of hours.

First company:  $C = 8h + 20$

second company:  $C = 10h + 12$

$$8h + 20 = 10h + 12$$

$$8h - 10h = 12 - 20 \quad C = 10(4) + 12$$

$$\frac{-2h}{-2} = \frac{-8}{-2}$$

$$h = 4$$

$$C = 40 + 12$$

$$\boxed{C = 52}$$

$$\boxed{h = 4}$$

- ∴ If they rent the snow blowers for 4 hours, the cost is \$52 for both companies.

2. Let  $c$  represent the total cost to mail a package

Let  $k$  represent the kg/weight of the package.

First company:  $C = 1k + 5$

second company:  $C = 1.25k + 3.5$

$$1k + 5 = 1.25k + 3.5$$

$$1k - 1.25k = 3.5 - 5 \quad C = 1(6) + 5$$

$$\frac{-0.25k}{-0.25} = \frac{-1.5}{-0.25}$$

$$k = 6$$

$$C = 6 + 5$$

$$\boxed{C = 11}$$

$$\boxed{k = 6}$$

- ∴ If they ship a package that weighs 6kg, the cost is \$11 for both companies.

3. Let  $c$  represent the total cost to rent movies

Let  $v$  represent the number of videos

First store:  $C = 4.5v + 10$

second store:  $C = 5v$

$$4.5v + 10 = 5v$$

$$4.5v - 5v = -10 \quad C = 5(20)$$

$$\frac{-0.5v}{-0.5} = \frac{-10}{-0.5}$$

$$v = 20$$

$$\boxed{C = 100}$$

$$\boxed{v = 20}$$

- ∴ If they rent 20 videos, the cost is \$100 for both stores.

4. Let  $c$  represent the total cost to rent a truck.

Let  $k$  represent the amount of kilometers driven.

Plan 1:  $c = 0.2k + 30$

Plan 2:  $c = 65$

$0.2k + 30 = 65$

$0.2k = 65 - 30$

$\frac{0.2k}{0.2} = \frac{35}{0.2}$

$k = 175$     $c = 65$

$65 - 1 = 64$

$64 = 0.2k + 30$

$64 - 30 = 0.2k$

$34 = 0.2k$

$\frac{34}{0.2} = \frac{0.2k}{0.2}$

$k = 170$     $c = 64$

4a) A customer would choose plan 1 if they drove under 175km.

4b) A customer would choose plan 2 if they drove more than 175km.

5. Let  $c$  represent the total cost of repairs

Let  $h$  represent the number of hours.

First company:  $c = 40h + 50$

Second company:  $c = 45h + 30$

$40h + 50 = 45h + 30$

$40h - 45h = 30 - 50$

$\frac{-5h}{-5} = \frac{-20}{-5}$

$h = 4$

$c = 40(4) + 50$

$c = 160 + 50$

$c = 210$

$c = 45(5) + 30$

$c = 225 + 30$

$c = 255$

$c = 40(5) + 50$

$c = 200 + 50$

$c = 250$

5a) If they have a 4 hour repair, the cost is \$210 for both companies.

5b) I would hire the first company (that charges \$56 for a service call plus \$40/h).