What Do You Call 3 Toucans?

#4

1)

	r * t = d		
with	x+y	3	45
against	x-y	5	45

x = rate in still water
y = rate of current

$3(x+y) = 45 \rightarrow x+y = 15$

$5(x-y) = 45 \rightarrow +x-y = 9$

$2x = 24$

$x = 12$

$12+y = 15$

$y = 3$

The rate in still water is 12 mi/hr. The rate of the current is 3 mi/hr.

2)

	r * t = d		
with	x+y	5	3000
against	x-y	6	3000

x = rate in still air
y = rate of wind

$5(x+y) = 3000 \rightarrow x+y = 600$

$6(x-y) = 3000 \rightarrow +x-y = 500$

$2x = 1100$

$x = 550$

$550+y = 600$

$y = 50$

The rate in still air is 550 mi/hr. The rate of wind is 50 mi/hr.

3)

	r * t = d		
with	x+y	2	10
against	x-y	2	8

y = rate in still water
y = rate of current

$2(x+y) = 10 \rightarrow x+y = 5$

$2(x-y) = 8 \rightarrow +x-y = 4$

$2x = 9$

$x = 4.5$

$4.5+y = 5$

$y = .5$

ate in still water is 4.5 km/hr. ate of current km/hr

④

	r	*	t	=	d
with	x+y		2.5		1500
against	x-y		2.5		1200

x = rate in still air
y = rate of wind

$2.5(x+y)=1500 \rightarrow x+y=600$
$2.5(x-y)=1200 \rightarrow +\ x-y=480$
$2x=1080$
$x=540$

$540+y=600$
$y=60$

The rate in still air is 540 km/hr. The rate of wind is 60 km/hr.

⑤

	r	*	t	=	d
with	x+y		3.5		35
against	x-y		7		35

x = rate in still water
y = rate of current

$3.5(x+y)=35 \rightarrow x+y=10$
$7(x-y)=35 \rightarrow +\ x-y=5$
$2x=15$
$x=7.5$

$7.5+y=10$
$y=2.5$

The rate in still water is 7.5 mi/hr. The rate of the current is 2.5 mi/hr.

⑥

	r	*	t (min)	=	d
with	x+y		10		1800
against	x-y		10		1200

x = rate in still air
y = rate of wind

$10(x+y)=1800 \rightarrow x+y=180$
$10(x-y)=1200 \rightarrow +\ x-y=120$
$2x=300$
$x=150$

$150+y=180$
$y=30$

The rate in still air is 150 m/min. The rate of the wind is 30 m/min.

	r	t	d
with	x+y	6	1780
against	x-y	2	440

x = rate in still air
y = rate of wind

$6(x+y)=1780 \rightarrow x+y=296\frac{2}{3}$
$2(x-y)=440 \rightarrow +\ x-y=220$
$2x = 516\frac{2}{3}$
$x = 258\frac{1}{3}$

$258\frac{1}{3}+y=296\frac{2}{3}$
$y=38\frac{1}{3}$

The rate in still air is $258\frac{1}{3}$ mi/hr. The rate of the wind is $38\frac{1}{3}$ mi/hr.

8.

	r	t (sec)	d (steps)
with	x+y	6	30
against	x-y	15	30

x = rate on still escalator
y = rate of moving escalator (up)

$6(x+y)=30 \rightarrow x+y=5$
$15(x-y)=30 \rightarrow +\ x-y=2$
$2x = 7$
$x=3.5$

$3.5+y=5$
$y=1.5$

His rate on a still escalator is 3.5 steps/sec.

Wind & Current Problems

#5

	r	t	d
with	x+y	6	3000
against	x-y	5	3000

x = rate in still air
y = rate of wind

$6(x+y)=3000 \rightarrow x+y=500$
$5(x-y)=3000 \rightarrow +\ x-y=600$
$2x = 1100$
$x=550$

$550+y=500$
$y=50$

The rate in still air is 550 km/hr. The rate of the wind is 50 km/hr.

(2)

	r	t	d
with	132+y	5	2d
against	132-y	3	d

x = rate in still air
y = rate of the wind
d = distance against wind

$5(132+y) = 2d \rightarrow 660 + 5y = 2d$
$3(132-y) = d \rightarrow 396 - 3y = d$

$660 + 5y = 2(396 - 3y)$
$660 + 5y = 792 - 6y$
$-660 + 6y = -660 + 6y$
$11y = 132$ $\quad y = 12$

The wind speed is 12 km/hr.

(3)

	r	t	d
with	x+y	.75	240
against	x-y	.8	240

x = rate in still air
y = rate of wind

$.75(x+y) = 240 \rightarrow x + y = 320$
$.8(x-y) = 240 \rightarrow x - y = 300$
$2x = 620$
$x = 310$

$310 + y = 320$
$y = 10$

The rate in still air is 310 km/hr. The rate of the wind is 10 km/hr.

(4)

	r	t	d
with	x+y	$\frac{1}{3}$	4
against	x-y	$\frac{2}{5}$	4

x = rate in still water
y = rate of current

$\frac{1}{3}(x+y) = 4 \rightarrow x + y = 12$
$\frac{2}{5}(x-y) = 4 \rightarrow x - y = 10$
$2x = 22$
$x = 11$

$11 + y = 12$
$y = 1$

The rate in still water is 11 km/hr. The rate of the current is 1 km/hr.

	r	*	t	=	d
with	x+y		.5		3
against	x-y		1.5		3

x = rate in still water
y = rate of current

$.5(x+y)=3 \rightarrow x+y=6$
$1.5(x-y)=3 \rightarrow +x-y=2$
$2x=8$
$x=4$

$4+y=6$
$y=2$

The rate in still water is 4 km/hr. The rate of current is 2 km/hr.

(6)

	r	*	t	=	d
with	x+y		.45		18
against	x-y		.6		18

x = rate in still water
y = rate of current

$2.5(x+y)=18 \rightarrow x+y=40$
$.6(x-y)=18 \rightarrow x-y=30$
$2x=70$
$x=35$

$35+y=40$
$y=5$

The rate in still water is 35 km/hr. The rate of the current is 5 km/hr.)

(7)

	r	*	t	=	d
with	x+y		.5		3
against	x-y		2		4

x = rate in still water
y = rate of current

$.5(x+y)=3 \rightarrow x+y=6$
$2(x-y)=4 \rightarrow x-y=2$
$2x=8$
$x=4$

$4+y=6$
$y=2$

The rate in still water is 4 km/hr. The rate of the current is 2 km/hr.

8)

	r	*	t	=	d
with	x+y		2.5		10
against	x-y		5		10

x = rate in still wat
y = rate of current

$2.5(x+y)=10 \rightarrow x+y=4$

$5(x-y)=10 \rightarrow x-y=2$

$2x=6$

$x=3$

$3+y=4$

$y=1$

Her rate in still water is 3 times faster than the current.

9)

	r	*	t	=	d
with	x+y		.75		56.25
against	x-y		1.25		56.25

x = rate in still air
y = rate of wind

$.75(x+y)=56.25 \rightarrow x+y=75$

$1.25(x-y)=56.25 \rightarrow x-y=45$

$2x=120$

$x=60$

$60+y=75$

$y=15$

The wind speed is 15 km/hr.

10)

	r	*	t (sec)	=	d
with	x+y		25		75
against	x-y		75		75

x = rate on still escalator
y = rate of escalator

$25(x+y)=75 \rightarrow x+y=3$

$75(x-y)=75 \rightarrow x-y=1$

$2x=4$

$x=2$

$2+y=3$

$y=1$

The speed of the escalator is 1 m/sec.

I do you call a cow...

#6

	r	* t	= d
with	x+y	3	60
against	x-y	5	60

x = rate of boat in still water
y = rate of current

$3(x+y)=60 \rightarrow x+y=20$
$5(x-y)=60 \quad +x-y=12$
$2x=32$
$x=16$

$3(16+y)=60$
$16+y=20$
$y=4$

The rate in still water is 16 km/hr.
The rate of the current is 4 km/hr.

(2)

	r	* t	= d
with	x+y	5	3000
against	x-y	6	3000

x = rate of plane in still air
y = rate of wind

$5(x+y)=3000 \rightarrow x+y=600$
$6(x-y)=3000 \quad +x-y=500$
$2x=1100$
$x=550$

$5(550+y)=3000$
$550+y=600$
$y=50$

The rate in still air is 550 km/hr.
The rate of the wind is 50 km/hr.

(3)

	r	* t	= d
with	x+y	2	18
against	x-y	2	14

x = rate in still water
y = rate of the current

$2(x+y)=18 \rightarrow x+y=9$
$2(x-y)=14 \rightarrow +x-y=7$
$2x=16$
$x=8$

$2(8+y)=18$
$8+y=9$
$y=1$

Lucy can swim 8 km/hr in still water. Rate of current is 1 km/hr.

(4)

	r	* t	= d
with	x+y	2.5	2500
against	x-y	2.5	2000

x = rate of plane in still air
y = rate of wind

$2.5(x+y)=2500 \rightarrow x+y=1000$
$2.5(x-y)=2000 \rightarrow +x-y=800$
$2x = 1800$
$x = 900$

$2.5(900+y)=2500$
$900+y=1000$
$y=100$

The rate of the plane in still air is 900 km/hr. The rate of the wind is 100 km/hr.

(5)

	r	* t	= d
with	x+y	2.5	40
against	x-y	5	40

x = rate in still water
y = rate of current

$2.5(x+y)=40 \rightarrow x+y=16$
$5(x-y)=40 \rightarrow +x-y=8$
$2x = 24$
$x = 12$

$2.5(12+y)=40$
$12+y=16$
$y=4$

The rate in still water is 12 km/hr. The rate of current is 4 km/hr.

(10)

	r	* t	= d
with	x+y	t	2400
against	x-y	$\frac{1}{6}$	1600

x = rate in still air
y = rate of wind

$t(x+y)=2400 \rightarrow x+y=14400$
$\frac{1}{6}(x-y)=1600 \rightarrow +x-y=9600$
$2x = 24000$
$x = 12000$

$12000+y=14400$
$y=2400$

(12000/60 = 200 mi/min
2400/60 = 40 mi/min)

The rate in still air is 12,000 m/hr. (200 m/min)
The rate of the wind is 2,400 m/hr. (40 m/min)

	r	*	t	=	d
with	$x+y$		4		1400
against	$x-y$		1.5		450

x = rate in still air
y = rate of wind

$4(x+y)=1400 \longrightarrow x+y=350$
$1.5(x-y)=450 \longrightarrow +\ x-y=300$
$2x = 650$
$x = 325$

$325+y=350$
$y=25$

The rate of the plane in still air is 325 km/hr.
The rate of the wind is 25 km/hr.

(8)

	r	*	t	=	d
with	$x+y$		8		100
against	$x-y$		20		100

x = rate in still water
y = rate of current

$8(x+y)=100 \rightarrow x+y=12.5$
$20(x-y)=100 \rightarrow +\ x-y=5$
$2x = 17.5$
$x = 8.75$

$8.75+y=12.5$
$y=3.75$

The rate in still water is 8.75 m/min.
The rate of the current is 3.75 m/min.