Section 1.3

Modeling

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To find x percent of y:

$\frac{x}{y}$ = decimal percentage

$\frac{x}{y}(100) = percentage$

a)

$\frac{68}{80} = .85 = 85\%$

"68 is 85% of 80."

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b) $.15 \times 123 = 18.45$

"15% of 123 is 18.45."

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c) $.08 \times 91 = 7.28$

"8% of 91 is 7.28."

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d) $1 \times 115 = 115$

"100 percent of 115 is 115."

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e) $2 * 23 = 46$

200% of 23 is 46."

200% of something is DOUBLE.

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Formula for percentage increase:

new = old + amt of increase

new = old + old(decimal percent)

new = old(1 + decimal percent)

$$new = old(1 + r)$$

where r = %increase(in decimal)

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Formula for percentage decrease:

new = old − amt of decrease

new = old − old(decimal percent)

new = old(1 − decimal percent)

new = old(1 - r)

where r = %decrease(in decimal)

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new = 1.93 + 1.93(.0621) = 2.05

1.93(1 + .0621)

1.93(1.0621)

$2.05

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new = 15000 + 15000(.03)

15000 + 450 = 15,450

-OR-

15000 (1.03)

$15450

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A decrease in students:

New = 600 - 600(0.06)

= 600 (1 - 0.06)

= 564 students

Fact: If 6% of the students are gone, then 94% of the students remain.

600(0.94) = 564

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A stock market decline:

new = 10,345 - 10,345(0.04)

= 9931.2

-- OR --

(0.96)10,345

96% of 10,345 = 9931.2

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If the dress is 30% OFF, then you should pay 70% of the original price.

0.7 * $25.00 = $17.50.

$17.50 is the correct price.

The cashier is trying to steal from you! (or she never took MS 100).

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Amt INC = new − old

12 cents

2.05 − 1.93 = .12

$\frac{\text{Amt INC}}{\text{old}} = \frac{.12}{1.93} = .0621 = 6.21\%$

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Formula for percent change:

$\%\text{change} = \frac{(\text{new}-\text{old})}{\text{old}}$

This will give you the *decimal percent*.

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13,500 - 12,000 = 1,500

Amount of Increase

$\frac{\text{AMT INC}}{\text{old}} = \frac{1500}{12000} = .125 = 12.5\%$

-- OR --

$\frac{(\text{new} - \text{old})}{\text{old}} = \frac{(13500 - 12000)}{12000}$

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Δ means "difference" or "change"

9,000 - 9,500 = -500 = Δ change

"negative change" means a *decrease*.

$\frac{-500}{9500} = -0.0526$

-- OR --

$\frac{(new - old)}{old} = \frac{(9000 - 9500)}{9500} = -0.0526$

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The conclusion can be stated in several ways:

1. The percentage change was -5.26%
2. The value decreased by 5.26%

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Rates

When one quantity is divided by another its called a *rate*.

For example: $\frac{miles}{hours} = mph$

"miles per hour"

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The Distance Formula

"distance is rate times time."

d i r t

$d = r\,t$

$d = 60\ \frac{\text{miles}}{\text{hour}} \cdot 2\ \text{hour}$

$= 120$ miles

$$\frac{miles}{hours} = mph$$

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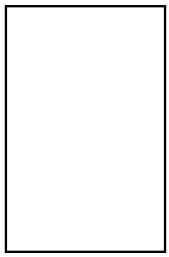
The *perimeter* of an object is the distance around the outside.

For many objects there is a formula for the perimeter based on its dimensions.

The two dimensions of a rectangle are LENGTH and WIDTH.

Perimeter of a rectangle:



$P = 2L + 2W$

L (length)

W (width)

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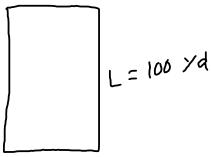

$L = 100$ yd

$W = 50$ yd

$A = L\,W$

$(100\text{ yd})(50\text{ yd})$

$5000\ (\text{yd})^2 = 5000$ square yards

$P = 2L + 2W$

$= 2(100\text{ yd}) + 2(50\text{ yd})$

$200\text{ yd} + 100\text{ yd}$

300 yd

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"relationship equation"

$L = 1.5w$

w

$P = 2L + 2w$

$25 = 2(1.5w) + 2w$

$3w + 2w$

$L = 1.5(w)$

$1.5(5)$

$L = 7.5$

$\frac{25}{5} = \frac{5w}{5}$

$5 = w$

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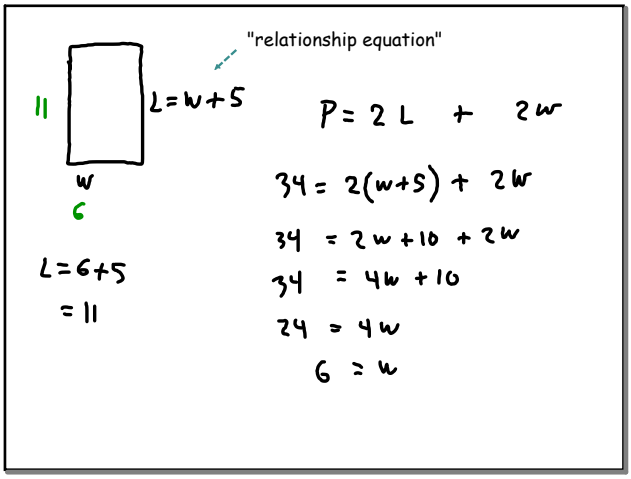

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Recall:

Natural Numbers = { 1, 2, 3, 4, ... }

Example: The sum of two consecutive natural numbers is 25. Find the numbers.

25 = first + second

25 = n + n+1

25 = 2n + 1

24 = 2n

12 = n

The numbers are 12 and 13.

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Let *n* be any integer, then:

$2n$ is an EVEN number

$2n \pm 1$ is an ODD number

Natural Even Numbers = { 2, 4, 6, 8, 10, 12, ... }

(numbers which are Natural AND Even)

Example: The sum of two consecutive even natural numbers is 26. Find the numbers.

26 = first even + Second even

26 = 2n + 2n + 2

26 = 4n + 2

24 = 4n

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24 = 4n

6 = n

12 = 2n

26 = 2n + 2n+2

12 + 14

The numbers are 12 and 14.

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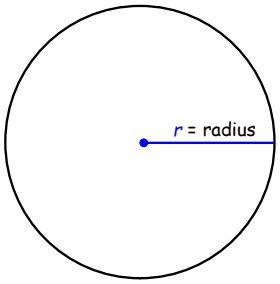
Circles

A *circle* is a collection of points equidistant from the center.



Circumference: $C = 2\pi r$

Area: $A = \pi r^2$

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The End.

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