Chapter 8.1: Model Inverse and Joint Variation

Joint Variation

$z = axy, a \neq 0$

Inverse Variation

$y = \frac{a}{x}, a \neq 0$

$a = yx$

Direct Variation

$a = \frac{y}{x}$ $y = ax$

a is the constant of variation.

Tell if x and y show direct, inverse or joint variation.

$xy = 7$ → $y = \frac{7}{x}$ inverse

$y = x + 3$ neither

$\frac{y}{4} = x$ → $y = 4x$ Direct

The variables x and y vary inversely, and y=7 when x=4. Write an equation that relates x and y. Then find y when x=-2.

$y = \frac{a}{x}$

$a = yx$

$a = 7(4)$

$a = 28$

$y = \frac{28}{x}$

$y = \frac{28}{-2}$

$y = -14$

The table compares the area A of a computer chip with the number c of chips that can be obtained from a silicon wafer.

- Write a model that gives c as a function of A.

-Predict the number of chips per wafer when the area of a chip is 81 sq mm.

Area x	58	62	66	70
# of Chips y	448	424	392	376
	25,984	26,288	25,872	26,320

81

$y \approx 324$

$A(c) = \frac{26000}{c}$ 26,000

$y = \frac{a}{x}$

$\frac{81y}{81} = \frac{26,000}{81}$

The variable z varies jointly with x and y. Also z=-75 when x=3 and y=-5. Write an equation that relates x,y and z. then find z when x=2 and y=6.

$z = axy$

$\frac{-75}{-15} = \frac{a(3)(-5)}{-15}$

$5 = a$

$z = 5xy$

$z = 5(2)(6)$

$\boxed{z = 60}$

Write the equation:

y varies inversely with x

$y = \frac{a}{x}$

z varies jointly with x,y and r

$z = axyr$

y varies inversely with the square of x

$y = \frac{a}{x^2}$ $a = yx^2$

z varies directly with y and inversely with x

$z = \frac{ay}{x}$ $\rightarrow a = \frac{zx}{y}$

x varies jointly with t and r and inversely with s

$x = \frac{atr}{s}$

Homework: Chapter 8.1 pg.555
#'s 6,10,14,18,22,26,28,32,42