

Tutorial 9 : Proportion and variation

Activities (P/E ratio)

Definition

The P/E ratio of a stock is the price of a company's stock divided by the company's earnings per share.

It is usually used to assess a stock's value.

For example ABC company earns \$6/share and its stock is selling at \$30/share.

$$\text{The P/E ratio of ABC is } \frac{30}{6} = 5$$

Activity 1 : The lecturer can quote some figures for the stocks in the HK Market and let the student to calculate the corresponding P/E ratio.

Activity 2 : Apply a tool in internet to do the same task

Step 1 : go to the URL : <http://quam.net/dl/tools.exe>

Step 2 : use the tool *P/E picker* to find some stocks at a particular P/E ratio.

Questions

- If $a : b = 2 : 3$ and $b : c = 4 : 5$, find the following ratios:
 - $a^2 : b^2$
 - $3a + b : b + 3c$
 - $a^2 : b^2 : c^2$
- If $4x = 5y$ and $7y = 10z$, find the following ratios:
 - $x : y : z$
 - $z^2 : x^2$
- A sum of \$9600 is divided among the four persons A , B , C and D in the ratio of $3 : 5 : 6 : 2$.
 - How much does each of them receive?
 - How much does A get more than D ?
- If $y \propto x$, complete the following table.

x	2	4	7	10
y	9			

- If $y \propto \frac{1}{x}$, complete the following table.

x	2	4	5	10
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y	80			
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6. The cost of painting a metal sphere varies as the square of its radius. It is given that the cost for painting a sphere of radius 3 cm is \$150
 - (a) What is the cost for painting a sphere of radius 4 cm?
 - (b) Determine the radius of a sphere that costs \$600 for being painted.

7. The pressure P of a fixed mass of gas varies inversely as the volume V of the gas at constant temperature. When $V = 950 \text{ cm}^3$, $P = 101 \text{ kPa}$. Find P when $V = 410 \text{ cm}^3$.

8. To hold a tea party, the expenses are partly constant and partly vary directly as the number of guests. When there are 50 guests, the expenses is \$1850. When there are 150 guests, the expenses are \$4350. Find the cost when there are 200 guests.

9. The expense of running a summer camp is partly constant and partly varies as the number of students participated. If the expense for 110 students is \$9650 and that for 140 students is \$11600,
 - (i) find an equation connecting the expense and the number of students participated.
 - (ii) calculate the expense for 160 students.

Numerical solutions to Tutorial 9

1.

(a) $a^2 : b^2 = 4 : 9$

(b) Let $a = 8k, b = 12k, c = 15k$

$$\frac{3a+b}{b+3c} = \frac{12}{19}$$

(c) $a^2 : b^2 : c^2 = 64 : 144 : 225$

2. (a)

$$x:y = 25:20, \quad y:z = 20:14, \quad x:y:z = 25:20:14$$

(b) $z^2 : x^2 = 196 : 625$

3. (a)

A get =\$1800

B get =\$3000

C get =\$3600

D get =\$1200

(b) A get \$600 more than D

4.

x	2	4	7	10
y	9	18	31.5	45

5.

x	2	4	5	10
y	80	40	32	16

6. $C = kr^2$

(a) $C = \frac{50}{3}r^2$

When $r = 4, C = \frac{800}{3}$

(b) When $C = 600, 600 = \frac{50}{3}r^2, \quad r = 6 \text{ cm}$

7. $P \propto \frac{1}{V}$

$$P = \frac{k}{V}$$

$$P V = k$$

$$P = 234 \text{ kPa}$$

8. Let C be the expenses and n be the number of guests

$$C = k_1 + k_2n$$

$$k_2 = 25$$

$$k_1 = 600$$

$$\text{Hence } C = 600 + 25n$$

$$\text{When } n = 200, C = 600 + 25(200) = 5600$$

9. Let E be the expenses

(i) and x be the number of students participated

$$\text{Then } E = k_1 + k_2x$$

$$\text{Equation required is } E = 2500 + 65x$$

$$\begin{aligned} \text{(ii) When } x=160 \quad E &= 2500 + 65 \times 160 \\ &= 12900(\$) \end{aligned}$$