

Exercise walk-through

2.2

Finance – Earning Money and Purchasing Goods

GAC Mathematics

1

The method

Method — Key knowledge: follow the stated rules rather than assuming real tax or payment conditions

Gross pay 税前工资 is pay before deductions; **net pay** 税后工资 is pay after the specified deductions. **Commission** 佣金 is a stated percentage or amount linked to sales. Define whether it is based on all sales or only sales above a threshold. Use total cost divided by quantity for unit-price comparisons. Apply sequential percentage changes with sequential multipliers. A discount followed by a separately added fee differs from discounting the fee too. Every rate, deduction and fee on this sheet is an invented teaching rule, not an actual tax schedule or financial recommendation.

Method — Worked example: calculate regular and overtime hours separately

Known: 8 hours at 20 units per hour and 2 overtime hours at 1.5 times that rate.
Separate the two categories before adding pay.

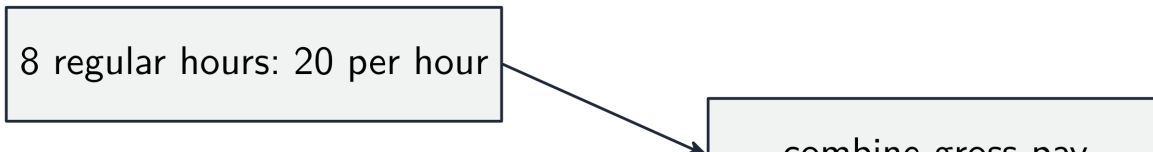
$$G = h_r p + h_o k p$$

$$G = 8(20) + 2(1.5)(20) = 220 \text{ units}$$

If the invented fixed deduction is 15 units, take it from gross pay once.

$$N = G - D = 220 - 15 = 205 \text{ units}$$

8 regular hours: 20 per hour



combine gross pay

Exercise 2.1

2.1 A worker earns 18 units per hour for 7 hours. Find gross pay.

[2]

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2.1

Multiply the rate by hours worked.

$$G = ph = 18(7) = 126 \text{ units}$$

Gross pay 126.

Exercise 2.2

2.2 A pack of 12 notebooks costs 30 units. A pack of 20 costs 46 units. Compare cost per notebook. [2]

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2.2

Divide each total by its count.

$$u_A = C_A/n_A = 30/12 = 2.50$$

$$u_B = C_B/n_B = 46/20 = 2.30$$

The 20-pack costs less per notebook. Both prices and the conclusion earn A1.

Exercise 2.3

2.3 A 200-unit item receives a 15% discount. A delivery fee of 6 units is then added. Find the delivered total and the overall saving compared with 200 units, as a percentage of 200. [3]

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Apply the discount to the item before adding the fee.

$$T = P(1 - r) + F = 200(0.85) + 6 = 176$$

Total 176.

$$s = \frac{P - T}{P} \times 100\% = \frac{200 - 176}{200} \times 100\% = 12\%$$

Overall saving 12%.

Exercise 2.4

2.4 An invented pay rule deducts 10% of gross pay plus a fixed 8 units. If gross pay is 360 units, find the total deduction and net pay. [3]

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Calculate the percentage and fixed parts.

$$D = rG + F = 0.10(360) + 8 = 44$$

Deduction 44.

$$N = G - D = 360 - 44 = 316$$

Net pay 316.

Exercise 3.1

3.1 A worker completes 35 regular hours at 16 units per hour and 5 overtime hours at 1.5 times the regular rate. Commission is 3% of all sales of 1200 units. A fixed deduction of 22 units applies once. Find regular pay, overtime pay, commission, gross pay and net pay. [6]

Exercise 3.1

3.1 A worker completes 35 regular hours at 16 units per hour and 5 overtime hours at 1.5 times the regular rate. Commission is 3% of all sales of 1200 units. A fixed deduction of 22 units applies once. Find regular pay, overtime pay, commission, gross pay and net pay. [6]

3.1

Regular pay uses regular hours.

Regular pay 560.

$$O = h_o k p = 5(1.5)(16) = 120$$

Overtime pay 120.

Full solution 3.1 (1/2)

3.1

Regular pay uses regular hours.

Full solution 3.1 (2/2)

Regular pay 560.

$$O = h_o k p = 5(1.5)(16) = 120$$

Overtime pay 120.

$$C = rS = 0.03(1200) = 36$$

Commission 36.

$$G = R + O + C = 560 + 120 + 36 = 716$$

Gross pay 716.

$$N = G - D = 716 - 22 = 694$$

Net pay 694.

Exercise 3.2

3.2 Shop A sells a 500-unit item with a 20% discount and then a 30-unit delivery fee. Shop B sells the identical item with successive 10% discounts and free delivery. (a) Find each total and the difference. (b) Explain why two 10% discounts are not 20% off. (c) Find the largest delivery fee Shop A could charge while costing no more than Shop B. Assume no other charges. [8]

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3.2

(a) Discount A before adding delivery.

$$T_A = P(1 - r_A) + F = 500(0.80) + 30 = 430$$

A total 430. Apply B's multipliers successively.

$$T_B = P(1 - r_1)(1 - r_2) = 500(0.90)(0.90) = 405$$

Full solution 3.2 (1/2)

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(a) Discount A before adding delivery.

$$T_A = P(1 - r_A) + F = 500(0.80) + 30 = 430$$

A total 430. Apply B's multipliers successively.

$$T_B = P(1 - r_1)(1 - r_2) = 500(0.90)(0.90) = 405$$

B total 405.

Full solution 3.2 (2/2)

$$\Delta = T_A - T_B = 430 - 405 = 25$$

B is cheaper by 25.

(b) The second discount uses the reduced base; the combined multiplier is 0.81, a 19% reduction.

(c) A must satisfy $400 + F \leq 405$.

$$F \leq T_B - 0.80P = 405 - 400 = 5$$

Largest delivery fee 5 units. The conclusion depends on the stated identical item and absence of other charges.