Q1

a)

$600 \times 1.05$

$= \boxed{630}$

b)(i)

$€28 \times 1.04$

$= \boxed{€29.12}$

b)(ii)

$$\frac{€36.40}{1.04} = \boxed{€35}$$

c)

VAT included

$\Rightarrow 123\% = €984$

$1\% = {}^{984}/_{123} = €8$

$100\% = 8 \times 100 = \boxed{€800}$

d)

Price reduced by 15%

$\Rightarrow 85\% = €1360$

$1\% = {}^{1360}/_{85} = €16$

$100\% = 16 \times 100 = \boxed{€1600}$

e)(i)

Profit of 25% included

$\Rightarrow 125\% = €1150$

$1\% = {}^{1150}/_{125} = €9.20$

$120\% = 9.20 \times 120 = \boxed{€1104}$

e)(ii)

$1\% = €9.20$

$\Rightarrow 100\% = €920 =$ Cost Price

Selling Price $= €1050$

$\Rightarrow$ Profit $= 1050 - 920$

$= €130$

$$\Rightarrow \%\ \text{Profit Margin} = \frac{\text{Profit}}{\text{S.P}} \times 100\%$$

$$= \frac{130}{1050} \times 100\%$$

$= \boxed{12.4\%}$

f)(i)

$135\,km = 80km + 55\,km$

$\Rightarrow$ Can claim: $(80 \times 0.68) + (55 \times 0.42)$

$= 54.40 + 23.10$

$= \boxed{€77.50}$

f)(ii)

$€119.08$ is higher than $€77.50$

$\Rightarrow$ she did at least 80km

Let $x$ = no. of kms above 80

$\Rightarrow (80 \times 0.68) + (0.42 \times x) = 119.08$

$54.40 + 0.42x = 119.08$

$0.42x = 119.08 - 54.40$

$$\frac{0.42x}{0.42} = \frac{64.68}{0.42}$$

$\Rightarrow x = 154\,km$

$\Rightarrow$ Total journey $= 80 + 154$

$= \boxed{234\,km}$

g)

$2\%$ of $€10036 = €200.72$

$4\%$ of $€5980 = €239.20$

$7\%$ of $(57000 - 16016) = €2868.88$

$= \boxed{€3308.80}$

i)

Tax Paid = Gross Tax − Tax Credits

$\Rightarrow$ Gross Tax = Tax Paid + Tax Credits

$= 5960 + 3500$

$= €9460$

Tax paid @ standard rate on all income

$$\Rightarrow \frac{9460}{43000} \times 100\% = \text{Rate}$$

$\Rightarrow$ Rate $= \boxed{22\%}$

h)(i)

Gross Tax = Tax @ 20% + Tax @ 42%

$= (28000 \times 0.2) + (18000 \times 0.42)$

$= 5600 + 7560$

$= \boxed{€13160}$

h)(ii)

Tax Paid = Gross Tax − Tax Credits

$= 13160 - 3200$

$= \boxed{€9960}$

USC Payment

2% of €10036 = €200.72

4% of €5980 = €239.20

7% of (€46000 − €16016) = €2098.88

$\Rightarrow$ Total USC = €2538.80

h)(iii)

Net Income = 46000

− 9960 (Tax Paid)

− 180 (T.u. Fees)

− 2538.80 (USC)

$\boxed{€33,321.20}$

j)(i)

i) €1 = CAD 1.4

$\Rightarrow €3500 = 3500 \times 1.4$

$= \boxed{4900 \text{ CAD}}$

j)(ii)

$\frac{5600}{1.4} = \boxed{€4000}$

k)

€1 = AUD 1.36

$\Rightarrow 2500 \text{ AUD} = \frac{2500}{1.36} = €1838.24$

Tourist received €1801.47

$\Rightarrow$ Commission = €1838.24 − €1801.47

= €36.77

$\Rightarrow$ % Commission $= \frac{36.77}{1838.24} \times 100\%$

$= \boxed{2\%}$

l)

P = €1200 i = 4% = 0.04 t = 3

$F = P(1+i)^t$

$= 1200(1+0.04)^3$

$= 1200\ (1.04)^3$

$= €1349.84$

$\Rightarrow$ CI = 1349.84 − 1200

$= \boxed{€149.84}$

n)

Interest = 2612.50 − 2500

= €112.50

$\Rightarrow$ % Interest $= \frac{112.50}{2500} \times 100\%$

$= \boxed{4.5\%}$

m)

Year 1

$P_1 = €1500$

$R_1 = 3\%$

$I_1 = 3\%$ of 1500

$= €45$

$P_2 = 1500 + 45$

$= €1545$

Year 2

$P_2 = €1545$

$R_2 = 4\%$

$I_2 = 4\%$ of 1545

$= €61.80$

$P_3 = 1545 + 61.80$

$= \boxed{€1606.80}$

o)

$F = P(1+i)^t$

$\Rightarrow P = \frac{F}{(1+i)^t}$

$= \frac{10988.78}{(1+0.05)^6}$

$= \boxed{€8200}$

p)

Depreciates $\Rightarrow F = P(1-i)^t$

$= 15000(1-0.15)^4$

$= 15000(0.85)^4$

$= \boxed{€7830.09}$

q)

Units Used = 48249 − 46523

= 1726

$\Rightarrow$ Cost of Elec = 1726 × 0.215 (Cost per unit)

= €371.09

$\Rightarrow$ Bill = €371.09

+ €21.40 (Stand Charge)

€392.49

VAT = 13.5% of €392.49

= €52.99

$\Rightarrow$ Final Bill = €392.49 + €52.99

= $\boxed{€445.48}$

r)

A : B : C = 4 : 3 : 2

$\Rightarrow$ 9 parts in total

$\Rightarrow$ C gets $^2/_9$ = €1224

$\Rightarrow ^1/_9$ = €612

$\Rightarrow ^9/_9 = 612 \times 9$

= $\boxed{€5508}$

s)

Ratio : 1 : 2 : ½

Convert to whole numbers first by multiplying across by 2

2(1) : 2(2) : 2(½)

2 : 4 : 1

$\Rightarrow$ Smallest Share = $^1/_7$ of €315

= $\boxed{€45}$

Q2

a)

"Half Price" = 50%

Further 15% ⇒ 15% of 50% off
= 7.5%

⇒ Total of 57.5% off

⇒ Sale Price will be 42.5% of original price

b)(i)

Reduced by 20%

⇒ 80% = €336

1% = $336/80$ = €4.20

100% = 4.20 × 100 = €420

b)(ii)

5% Profit during sale

⇒ 105% = €336

1% = $336/105$ = €3.20

100% = 3.2 × 100 = €320 = Cost Price

Before sale

Profit = 420 − 320
= €100

⇒ % Profit = $\frac{100}{320} \times \frac{100}{1}$

= 31.25%

c)

Let $x$ = weight of the jar
$y$ = weight of a choc

A: $x + 8y = 160$
B: $(-)x + (-)20y = (-)304$

$-12y = -144$

$\frac{-12y}{-12} = \frac{-144}{-12}$

$y = 12$

Put $y$ into A

A: $x + 8y = 160$
$x + 8(12) = 160$
$x + 96 = 160$
$x = 160 - 96$
$x = 64$

⇒ Weight of Jar = 64g

d)

Let $x$ = no. of trips he makes

Cost for $x$ trips with Leap Card = $70 + 23x$

Cost for $x$ trips with Ordinary ticket = $34.50x$

We want value of $x$ that makes cost with Leap to be < ordinary cost

⇒ $70 + 23x < 34.50x$
$70 < 34.50x - 23x$

$\frac{70}{11.50} < \frac{11.50x}{11.50}$

$6.08 < x$

⇒ No. of trips needs to be 7

f)

€1 = $1.28

$1920 = $\frac{1920}{1.28}$ = €1500

Person receives €1462.50
⇒ Charge = 1500 − 1462.50
= €37.50

⇒ % Charge = $\frac{37.50}{1500} \times 100\%$

= 2.5%

e)

Have to start in year 2 and work in reverse

$105.5\% = €6709.80$

$1\% = 6709.80 / 105.5 = €63.60$

$100\% = 63.60 \times 100 = €6360$

Now we do the same for year 1.

$106\% = €6360$

$1\% = 6360 / 106 = €60$

$100\% = 60 \times 100 = \boxed{€6000}$

i)

The standard rate cut-off point is the amount of a person's gross income that they pay the standard rate of tax on. They pay the higher rate on any income they earn on top of the standard rate cut-off point.

e.g. if a person has a gross income of €50000 and a S.C.O. of €30000, they pay the standard rate on the first €30000 and the higher rate on the extra €20000.

g)

Year 1

$P_1 = €12000$

$R_1 = 7\%$

$I_1 = 7\% \text{ of } 12000$

$= €840$

$P_2 = 12000 + 840$

$= €12840$

Withdraws €B

$\Rightarrow P_2 = 12840 - B$

Year 2

$P_2 = ?$

$R_2 = 7\%$

$P_3 = €8923.80$

$\Rightarrow 107\% = €8923.80$

$1\% = \frac{8923.80}{107}$

$100\% = \frac{8923.80}{107} \times \frac{100}{1}$

$= €8340$

$\Rightarrow P_2 = €8340$

$P_2 = P_2$

$\Rightarrow 12840 - B = 8340$

$12840 - 8340 = B$

$\boxed{€4500 = B}$

j)(i)

24000 Windows → 36 workers → 4 months

i) Each worker is responsible for

$24000 / 36 = \boxed{666 \text{ windows}}$

j)(ii)

36 workers → 4 months

1 worker → $36 \times 4 = 144$ months

24 workers → $144 / 24 = \boxed{6 \text{ months}}$

j)(iii)

4 months → 36 workers

1 month → $36 \times 4 = 144$ workers

3 months → $144 / 3 = 48$ workers

⇒ Need to hire another $\boxed{12 \text{ workers}}$

l)

Filled with cold tap = 8 mins

Filled with hot tap = 12 mins

(i)

Capacity = 960 litres

⇒ Cold Tap = $960/8 = \boxed{120 \text{ litres/min}}$

Hot Tap = $960/12 = \boxed{80 \text{ litres/min}}$

(ii)

Let x = no. of mins taps are running for

⇒ Cold tap supplies $120x$ litres

Hot tap supplies $80x$ litres

Bath full ⇒ $120x + 80x = 960$

$200x = 960$

$\boxed{x = 4.8 \text{ mins}}$

**h)**

Tax Paid = Gross Tax − Tax Credits

$\Rightarrow$ Gross Tax = Tax Paid + Tax Credits
= €7650 + €3600
= €11250

Gross Tax = Tax @ 20% + Tax @ 35%
$11250 = (0.2 \times 30000) + (0.35 \times x)$
$11250 = 6000 + 0.35x$
$11250 - 6000 = 0.35x$
$\frac{5250}{0.35} = \frac{0.35x}{0.35}$
$€15000 = x$

extra income on top of €30000

$\Rightarrow$ Gross Income = €30000 + €15000

= **€45000**

**k)(i)**

12 block layers $\longrightarrow$ 15 days
1 block layer $\longrightarrow$ 15 × 12 = 180 days
20 block layers $\longrightarrow$ $^{180}/_{20}$ = **9 days**

**k)(ii)**

15 days $\longrightarrow$ 12 block layers
1 day $\longrightarrow$ 12 × 15 = 180 block layers
10 days $\longrightarrow$ $^{180}/_{10}$ = **18 block layers**

**m)**

Sale Price = €230000

$\Rightarrow$ Fee = 1.5% of €230000
= €3450

VAT = 20% of €3450
= €690

$\Rightarrow$ Agent's final bill = €3450 + €690
= **€4140**

**n)**

VAT = Value Added Tax

**s)**

The principal is the sum of money invested or borrowed.

**o)**

| | |
|---|---|
| $\frac{64}{16} : \frac{80}{16}$ | €3.20 : ?? |
| 4 : 5 | €3.20 × 1.25 |
| 1 : 1.25 | = **€4** |

**p)**

D = 3000 m = 3 km
T = 9 mins = $^{9}/_{60}$ = 0.15 hrs


$S = \frac{D}{T} = \frac{3}{0.15}$
= **20 km/h**

**q)(i)**

9 litres $\longrightarrow$ 78 km

1 litre $\longrightarrow$ $^{78}/_{9}$ km

21 litres $\longrightarrow$ $^{78}/_{9} \times {}^{21}/_{1} =$ **182 km**

**q)(ii)**

78 km $\longrightarrow$ 9 litres

1 km $\longrightarrow$ $^{9}/_{78}$ litres

390 km $\longrightarrow$ $^{9}/_{78} \times {}^{390}/_{1} =$ **45 litres**

**r)**

$$F = P(1-i)^t$$

$$\Rightarrow P = \frac{F}{(1-i)^t}$$

$$= \frac{14336}{(1-0.2)^3}$$

$$= \frac{14336}{(0.8)^3}$$

$$= \boxed{€28000}$$

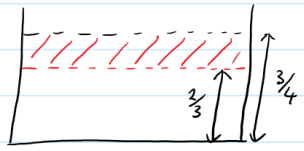
**w)**

Need to be in the same units

€20 = 2000 cents

$$\Rightarrow \frac{10}{2000} = \boxed{\frac{1}{200}}$$

**u)**




$^{3}/_{4} - {}^{2}/_{3} = {}^{1}/_{12}$ = Shaded region

$^{1}/_{12}$ = 100 litres

$\Rightarrow {}^{12}/_{12}$ = 100 × 12

= **1200 litres**

**t)**

L : W = 5 : 1

$\Rightarrow$ if Width = x, then Length = 5x

Area = L × W = 500

$5x(x) = 500$

$\frac{5x^2}{5} = \frac{500}{5}$

$x^2 = 100$

$\Rightarrow x = 10$

$\Rightarrow$ **Width = 10m Length = 50m**

**v)(i)**

€17 × 1.06

= **€18.02**

**v)(ii)**

Decrease = €1.02

$$\%\ \text{Dec} = \frac{1.02}{18.02} \times \frac{100}{1}$$

$$= 5.66\%$$

$$= \boxed{5.7\%}$$

**x)**

180000 × 1.1

= €198000

198000 × 1.08

= €213840

$\Rightarrow$ Total Increase = 213840 − 180000

= €33840

$$\Rightarrow \%\ \text{Increase} = \frac{33840}{180000} \times \frac{100}{1}$$

$$= \boxed{18.8\%}$$

**y)**

Depreciation means to lose value.