REFÁCIL

1.) Hallar los números enteros a y b tales que $a+b=216$ y $[a,b]=480$

$\frac{480}{P_1}=a$, $\frac{480}{P_2}=b$

$\frac{480}{P_1}+\frac{480}{P_2}=216$

$\frac{480(P_1+P_2)}{P_1 \cdot P_2}=216$ $\frac{P_1+P_2}{P_1 \cdot P_2}=\frac{216}{480}$

$\frac{P_1+P_2}{P_1 \cdot P_2}=\frac{9}{2}$ $P_1+P_2=9$, $P_1 \cdot P_2=20$

$P_1=5$ $P_2=4$

$\frac{480}{5}=a$, $\frac{480}{4}=b$

$96=a$ $120=b$

2.) Hallar todos los números a y b que satisfacen $(a,b)=24$ y $[a,b]=1140$

$a \cdot b = MCD(a,b) \cdot MCM(a,b)$

$a \cdot b = 24 \cdot 1140$

$a = 24 \cdot P$ $\quad b = 24 \cdot Q$ $\quad 24P \cdot 24Q = 24 \cdot 1140$

$P \cdot Q = \dfrac{1140}{24}$

$P \cdot Q = 47.5$

47.5	5
9.6	5
1.9	1.9
1	

$\{5, 5\} \to 25$ $\quad \{1.9\} \to 1.9$

$a = 25$ $\quad a = 24 \cdot 25 = 600$

$b = 24 \cdot 1.9 = 45.6$

4.)

3.) Calcular (4410, 1404, 8712) y luego expresarlo como combinación lineal de los números dados.

Hallamos (4410, 1404)

$$4410 = (1404)(3) + 198$$
$$1404 = (198)(7) + 18$$
$$198 = (18)(11) + 0$$

$$\begin{array}{r|l} 4410 & 1404 \\ \hline 198 & 3 \end{array} \qquad \begin{array}{r|l} 1404 & 198 \\ \hline 18 & 7 \end{array} \qquad \begin{array}{r|l} 198 & 18 \\ \hline 18 & 11 \\ 0 & \end{array}$$

$(4410, 1404) = 18$

$(18, 8712)$ $\qquad 8712 = (18)(484) + 0$

$(18, 8712) = 0$

$(4410, 1404, 8712) = (18, 8712) = 0 \rightarrow 18$

$[4410, 1404, 8712]$

$$[1404, 4410] = \frac{|(1404)(4410)|}{(1404, 4410)} = \frac{16,191,6401}{18} = \frac{6191640}{18} = 334,980$$

$(334980, 8712) = 36$

$$334980 = (8712)(38) + 3924$$
$$8712 = (3924)(2) + 864$$

$$\frac{|(334980)(8712)|}{36} = \frac{2918345760}{36} = 81065160$$

$3924 = (864)(4) + 468$

$864 = (468)(1) + 396$

$468 = (396)(1) + 72$

$392 = (72)(5) + 36$

$72 = (36)(2) + 0$

Podemos decir

$[1404, 4410, 8712] = 81{,}065{,}160$

4.) Calcular (112, 240, 192, 760) y luego expresarlo como combinación lineal de los números dados.

$240 = 112(2) + 16$

$112 = 16(7) + 16$

$192 = 16(12) + 16$

$760 = 16(47) + 8$

$16 = 8(2)$

$8 = 760 - 16(47)$

$8 = 760 . (240 - 112(2))47 + 192(0)$

$8 = 94(112) - 47(240) + 0(192) + 760$

$$[112,240] = \frac{|(112)(240)|}{(112,240)} = \frac{|26,880|}{8} = \frac{26880}{8} = 3360$$

$(3360, 760) = 40$

$3360 = (760)(4) + 320$

$160 = (320)(2) + 120$

$320 = (120)(2) + 80$

$120 = (80)(1) + 40$

$80 = (40)(2) + 0$

$$\frac{|(3360)(760)|}{40} = \frac{2,553600}{40} = 63840$$

$[112, 240, 192, 760] = 63840$

5.)

$$\begin{array}{r|l} 1485 & 3 \\ 495 & 3 \\ 165 & 3 \\ 55 & 5 \\ 11 & 11 \\ 1 & \end{array} \qquad \begin{array}{r|l} 5445 & 3 \\ 1815 & 3 \\ 605 & 5 \\ 121 & 11 \\ 11 & 11 \\ 1 & \end{array} \qquad \begin{array}{r|l} 13375 & 5 \\ 2675 & 5 \\ 535 & 5 \\ 107 & 107 \\ 1 & \end{array}$$

$$\begin{aligned} 1485 &= 3 \cdot 3 \cdot 3 \cdot 5 \cdot 11 \\ &= 3^3 \cdot 5 \cdot 11 \end{aligned}$$

$$\begin{aligned} 13375 &= 5 \cdot 5 \cdot 5 \cdot 107 \\ &= 5^3 \cdot 107 \end{aligned}$$

$$\begin{aligned} 5445 &= 3 \cdot 3 \cdot 5 \cdot 11 \cdot 11 \\ &= 3^2 \cdot 5 \cdot 11^2 \end{aligned}$$

$$\begin{aligned} (1485, 5445, 13375) &= 3^0 \cdot 5 \cdot 121^0 \cdot 107^0 \cdot 11^0 \\ &= 1 \cdot 5 \cdot 1 \cdot 1 \cdot 1 \\ &= 5 \end{aligned}$$

$$\begin{aligned} [1485, 5445, 13375] &= 3^3 \cdot 5^3 \cdot 11^2 \cdot 107 \\ &= 27 \cdot 125 \cdot 121 \cdot 107 \\ &= 43\,696\,125 \end{aligned}$$

6.)

$$\begin{array}{r|l} 392 & 2 \\ 196 & 2 \\ 98 & 2 \\ 49 & 7 \\ 7 & 7 \\ 1 & \end{array} \qquad \begin{array}{r|l} 1764 & 2 \\ 882 & 2 \\ 441 & 3 \\ 147 & 3 \\ 49 & 7 \\ 7 & 7 \\ 1 & \end{array} \qquad \begin{array}{r|l} 2646 & 2 \\ 1323 & 3 \\ 441 & 3 \\ 147 & 3 \\ 49 & 7 \\ 7 & 7 \\ 1 & \end{array} \qquad \begin{array}{r|l} 8820 & 2 \\ 4410 & 2 \\ 2205 & 3 \\ 735 & 3 \\ 245 & 5 \\ 49 & 7 \\ 7 & 7 \\ 1 & \end{array}$$

$$392 = 2 \cdot 2 \cdot 2 \cdot 7 \cdot 7$$
$$= 2^3 \cdot 7^2$$

$$1764 = 2 \cdot 2 \cdot 3 \cdot 3 \cdot 7 \cdot 7$$
$$= 2^2 \cdot 3^2 \cdot 7^2$$

$$2646 = 2 \cdot 3 \cdot 3 \cdot 3 \cdot 7 \cdot 7$$
$$= 2 \cdot 3^3 \cdot 7^2$$

$$8820 = 2^2 \cdot 3^2 \cdot 5 \cdot 7^2$$

$$(392, 1764, 2646, 8820) = 2^1 \cdot 3^0 \cdot 7^2 \cdot 5^0$$
$$= 2 \cdot 1 \cdot 49 \cdot 1$$
$$= 98$$

$$[392, 1764, 2646, 8820] = 2^3 \cdot 3^3 \cdot 7^2 \cdot 5$$
$$= 8 \cdot 27 \cdot 49 \cdot 5$$
$$= 52920$$