Definimos los vectores

In[3]:=
```
p = {5, 11, 17, 23}
q = {33, 30, 27, 24}
r = {1, -3, -7, -11}
u = {2 * Pi, a, 7 c, 1}
```
número pi
```
v = {b^2, a^(1/2), 8 (b - a), 4 Sin[2 Pi/7]}
```
seno número pi
```
w = {3 c/(7 b), 2/(3 a), 15/13, 1}
```

Out[3]= {5, 11, 17, 23}

Out[4]= {33, 30, 27, 24}

Out[5]= {1, −3, −7, −11}

Out[6]= {2 π, a, 7 c, 1}

Out[7]= $\left\{b^2, \sqrt{a}, 8\,(-a+b), 4\,\text{Cos}\left[\frac{3\pi}{14}\right]\right\}$

Out[8]= $\left\{\frac{3\,c}{7\,b}, \frac{2}{3\,a}, \frac{15}{13}, 1\right\}$

In[9]:=
```
{3 c/(7 b), 2/(3 a), 15/13, 1}
```

Out[9]= $\left\{\frac{3\,c}{7\,b}, \frac{2}{3\,a}, \frac{15}{13}, 1\right\}$

In[10]:=
```
p + q // MatrixForm
```
forma de matriz

Out[10]//MatrixForm=
$$\begin{pmatrix} 38 \\ 41 \\ 44 \\ 47 \end{pmatrix}$$

In[11]:=
$$\begin{pmatrix} 38 \\ 41 \\ 44 \\ 47 \end{pmatrix}$$

```
q - p // MatrixForm
```
forma de matri

Out[11]= {38, 41, 44, 47}

Out[12]//MatrixForm=
$$\begin{pmatrix} 28 \\ 19 \\ 10 \\ 1 \end{pmatrix}$$

In[13]:=
$$\begin{pmatrix} 28 \\ 19 \\ 10 \\ 1 \end{pmatrix}$$

```
p + q - r // MatrixForm
```

forma de matri

Out[13]= {28, 19, 10, 1}

Out[14]//MatrixForm=
$$\begin{pmatrix} 37 \\ 44 \\ 51 \\ 58 \end{pmatrix}$$

In[15]:=
$$\begin{pmatrix} 37 \\ 44 \\ 51 \\ 58 \end{pmatrix}$$

```
α * p + γ * r // MatrixForm
```

forma de matri

Out[15]= {37, 44, 51, 58}

Out[16]//MatrixForm=
$$\begin{pmatrix} 5\,\alpha + \gamma \\ 11\,\alpha - 3\,\gamma \\ 17\,\alpha - 7\,\gamma \\ 23\,\alpha - 11\,\gamma \end{pmatrix}$$

In[17]:=
$$\begin{pmatrix} 5\,\alpha + \gamma \\ 11\,\alpha - 3\,\gamma \\ 17\,\alpha - 7\,\gamma \\ 23\,\alpha - 11\,\gamma \end{pmatrix}$$

```
u - v // MatrixForm
```

forma de matri

Out[17]= {5 α + γ, 11 α - 3 γ, 17 α - 7 γ, 23 α - 11 γ}

Out[18]//MatrixForm=
$$\begin{pmatrix} -b^2 + 2\,\pi \\ -\sqrt{a} + a \\ -8\,\left(-a + b\right) + 7\,c \\ 1 - 4\,\text{Cos}\left[\frac{3\,\pi}{14}\right] \end{pmatrix}$$

In[19]:=
$$\begin{pmatrix} -b^2 + 2\pi \\ -\sqrt{a} + a \\ -8(-a+b) + 7c \\ 1 - 4\cos\left[\frac{3\pi}{14}\right] \end{pmatrix}$$

```
α * w - 3 u // MatrixForm
```

forma de matri

Out[19]= $\left\{-b^2 + 2\pi,\ -\sqrt{a} + a,\ -8(-a+b) + 7c,\ 1 - 4\cos\left[\frac{3\pi}{14}\right]\right\}$

Out[20]//MatrixForm=
$$\begin{pmatrix} -6\pi + \frac{3c\alpha}{7b} \\ -3a + \frac{2\alpha}{3a} \\ -21c + \frac{15\alpha}{13} \\ -3 + \alpha \end{pmatrix}$$

In[21]:=
$$\begin{pmatrix} -6\pi + \frac{3c\alpha}{7b} \\ -3a + \frac{2\alpha}{3a} \\ -21c + \frac{15\alpha}{13} \\ -3 + \alpha \end{pmatrix}$$

```
v / 2 - β * q // MatrixForm
```

forma de matri

Out[21]= $\left\{-6\pi + \frac{3c\alpha}{7b},\ -3a + \frac{2\alpha}{3a},\ -21c + \frac{15\alpha}{13},\ -3 + \alpha\right\}$

Out[22]//MatrixForm=
$$\begin{pmatrix} \frac{b^2}{2} - 33\beta \\ \frac{\sqrt{a}}{2} - 30\beta \\ 4(-a+b) - 27\beta \\ -24\beta + 2\cos\left[\frac{3\pi}{14}\right] \end{pmatrix}$$

In[23]:=
$$\begin{pmatrix} \frac{b^2}{2} - 33\,\beta \\ \frac{\sqrt{a}}{2} - 30\,\beta \\ 4\,(-a+b) - 27\,\beta \\ -24\,\beta + 2\,\text{Cos}\left[\frac{3\pi}{14}\right] \end{pmatrix}$$

```
α * w - β * v + γ * u // MatrixForm
```
forma de matri:

Out[23]=
$$\left\{\frac{b^2}{2} - 33\,\beta,\ \frac{\sqrt{a}}{2} - 30\,\beta,\ 4\,(-a+b) - 27\,\beta,\ -24\,\beta + 2\,\text{Cos}\left[\frac{3\pi}{14}\right]\right\}$$

Out[24]//MatrixForm=
$$\begin{pmatrix} \frac{3\,c\,\alpha}{7\,b} - b^2\,\beta + 2\,\pi\,\gamma \\ \frac{2\,\alpha}{3\,a} - \sqrt{a}\,\beta + a\,\gamma \\ \frac{15\,\alpha}{13} - 8\,(-a+b)\,\beta + 7\,c\,\gamma \\ \alpha + \gamma - 4\,\beta\,\text{Cos}\left[\frac{3\pi}{14}\right] \end{pmatrix}$$

In[25]:=
$$\begin{pmatrix} \frac{3\,c\,\alpha}{7\,b} - b^2\,\beta + 2\,\pi\,\gamma \\ \frac{2\,\alpha}{3\,a} - \sqrt{a}\,\beta + a\,\gamma \\ \frac{15\,\alpha}{13} - 8\,(-a+b)\,\beta + 7\,c\,\gamma \\ \alpha + \gamma - 4\,\beta\,\text{Cos}\left[\frac{3\pi}{14}\right] \end{pmatrix}$$

Out[25]=
$$\left\{\frac{3\,c\,\alpha}{7\,b} - b^2\,\beta + 2\,\pi\,\gamma,\ \frac{2\,\alpha}{3\,a} - \sqrt{a}\,\beta + a\,\gamma,\ \frac{15\,\alpha}{13} - 8\,(-a+b)\,\beta + 7\,c\,\gamma,\ \alpha + \gamma - 4\,\beta\,\text{Cos}\left[\frac{3\pi}{14}\right]\right\}$$

In[26]:=

In[27]:=

In[28]:=
```
Dot [p, q]
```
producto escalar

Out[28]= 1506

In[29]:=
```
Norm[r]
```
norma

Out[29]= $6\sqrt{5}$

In[30]:=
```
6 √5
Norm[Pi * p]
```
norma número p

Out[30]= $6\sqrt{5}$

Out[31]= $2\sqrt{241}\ \pi$

In[32]:=

$2\sqrt{241}\ \pi$

In[33]:=

In[34]:=

In[35]:=

In[36]:= `Dot[v, v] - Norm[v, 2]`
producto es··· norma

Out[36]= $a + b^4 + 64\,(-a+b)^2 + 16\,\text{Cos}\left[\frac{3\pi}{14}\right]^2 - \sqrt{\text{Abs}[a] + \text{Abs}[b]^4 + 64\,\text{Abs}[-a+b]^2 + 16\,\text{Cos}\left[\frac{3\pi}{14}\right]^2}$

In[113]:= `Norm[u + r, 1]`
norma

Out[113]= $11 + 2\pi + \text{Abs}[-3+a] + \text{Abs}[-7+7c]$

Out[37]= $11 + 2\pi + \text{Abs}[-3+a] + \text{Abs}[-7+7c]$

In[38]:=

In[39]:=

In[40]:=

In[41]:= `Norm[u + r, 2]`
norma

Out[41]= $\sqrt{100 + (1+2\pi)^2 + \text{Abs}[-3+a]^2 + \text{Abs}[-7+7c]^2}$

In[42]:=

In[43]:= `Norm[u + r, 3]`
norma

Out[43]= $\left(1000 + (1+2\pi)^3 + \text{Abs}[-3+a]^3 + \text{Abs}[-7+7c]^3\right)^{1/3}$

In[44]:=

In[45]:= `Cross[{5, 11, 17}, {3 c / 7 b, 2 / (3 a), 15 / 13}]`
producto vectorial

Out[45]= $\left\{\frac{165}{13} - \frac{34}{3a}, -\frac{75}{13} + \frac{51bc}{7}, \frac{10}{3a} - \frac{33bc}{7}\right\}$

In[46]:=

In[112]:= `Cross[{5, 11, 17}, {1, -3, -7}] × Cross[{2 * Pi, a, 7 c}, {1, -3, -7}]`
producto vectorial producto ve·· número pi

Out[112]= $\{-26\,(-7a+21c),\ 52\,(7c+14\pi),\ -26\,(-a-6\pi)\}$

In[48]:=

In[83]:= `vectorP[pi_] = {Pi * n, 6 + n, 11 + n, 42 + n, 96 + n}`
número pi

Out[83]= $\{n\pi, 6+n, 11+n, 42+n, 96+n\}$

In[50]:=

In[51]:=

In[52]:=

In[84]:=
```
Table[vectorP[pi], {n, 1, 67, 2}] // TableForm
```
tabla forma de tabl

Out[84]//TableForm=

π	7	12	43	97
$3\,\pi$	9	14	45	99
$5\,\pi$	11	16	47	101
$7\,\pi$	13	18	49	103
$9\,\pi$	15	20	51	105
$11\,\pi$	17	22	53	107
$13\,\pi$	19	24	55	109
$15\,\pi$	21	26	57	111
$17\,\pi$	23	28	59	113
$19\,\pi$	25	30	61	115
$21\,\pi$	27	32	63	117
$23\,\pi$	29	34	65	119
$25\,\pi$	31	36	67	121
$27\,\pi$	33	38	69	123
$29\,\pi$	35	40	71	125
$31\,\pi$	37	42	73	127
$33\,\pi$	39	44	75	129
$35\,\pi$	41	46	77	131
$37\,\pi$	43	48	79	133
$39\,\pi$	45	50	81	135
$41\,\pi$	47	52	83	137
$43\,\pi$	49	54	85	139
$45\,\pi$	51	56	87	141
$47\,\pi$	53	58	89	143
$49\,\pi$	55	60	91	145
$51\,\pi$	57	62	93	147
$53\,\pi$	59	64	95	149
$55\,\pi$	61	66	97	151
$57\,\pi$	63	68	99	153
$59\,\pi$	65	70	101	155
$61\,\pi$	67	72	103	157
$63\,\pi$	69	74	105	159
$65\,\pi$	71	76	107	161
$67\,\pi$	73	78	109	163

In[54]:=

In[55]:=

In[56]:=

In[57]:=

In[58]:=

In[78]:=
```
vector[b_] = {E * n, 6 + n, 11 + n, 42 + n, 96 + n}
```
número e

Out[78]= $\{e\, n, 6 + n, 11 + n, 42 + n, 96 + n\}$

In[79]:=
```
Table[vector[b], {n, 2, 66, 2}] // TableForm
```
tabla forma de tabla

Out[79]//TableForm=

2 e	8	13	44	98
4 e	10	15	46	100
6 e	12	17	48	102
8 e	14	19	50	104
10 e	16	21	52	106
12 e	18	23	54	108
14 e	20	25	56	110
16 e	22	27	58	112
18 e	24	29	60	114
20 e	26	31	62	116
22 e	28	33	64	118
24 e	30	35	66	120
26 e	32	37	68	122
28 e	34	39	70	124
30 e	36	41	72	126
32 e	38	43	74	128
34 e	40	45	76	130
36 e	42	47	78	132
38 e	44	49	80	134
40 e	46	51	82	136
42 e	48	53	84	138
44 e	50	55	86	140
46 e	52	57	88	142
48 e	54	59	90	144
50 e	56	61	92	146
52 e	58	63	94	148
54 e	60	65	96	150
56 e	62	67	98	152
58 e	64	69	100	154
60 e	66	71	102	156
62 e	68	73	104	158
64 e	70	75	106	160
66 e	72	77	108	162

In[61]:=

In[87]:=
```
pi = Table[vectorP[pi], {n, 1, 67, 2}]
```
tabla

```
e = Table[vector[b], {n, 2, 66, 2}]
```
tabla

Out[87]=
```
{{π, 7, 12, 43, 97}, {3 π, 9, 14, 45, 99}, {5 π, 11, 16, 47, 101}, {7 π, 13, 18, 49, 103},
 {9 π, 15, 20, 51, 105}, {11 π, 17, 22, 53, 107}, {13 π, 19, 24, 55, 109},
 {15 π, 21, 26, 57, 111}, {17 π, 23, 28, 59, 113}, {19 π, 25, 30, 61, 115},
 {21 π, 27, 32, 63, 117}, {23 π, 29, 34, 65, 119}, {25 π, 31, 36, 67, 121},
 {27 π, 33, 38, 69, 123}, {29 π, 35, 40, 71, 125}, {31 π, 37, 42, 73, 127},
 {33 π, 39, 44, 75, 129}, {35 π, 41, 46, 77, 131}, {37 π, 43, 48, 79, 133},
 {39 π, 45, 50, 81, 135}, {41 π, 47, 52, 83, 137}, {43 π, 49, 54, 85, 139},
 {45 π, 51, 56, 87, 141}, {47 π, 53, 58, 89, 143}, {49 π, 55, 60, 91, 145},
 {51 π, 57, 62, 93, 147}, {53 π, 59, 64, 95, 149}, {55 π, 61, 66, 97, 151},
 {57 π, 63, 68, 99, 153}, {59 π, 65, 70, 101, 155}, {61 π, 67, 72, 103, 157},
 {63 π, 69, 74, 105, 159}, {65 π, 71, 76, 107, 161}, {67 π, 73, 78, 109, 163}}
```

Out[88]=
```
{{2 ℮, 8, 13, 44, 98}, {4 ℮, 10, 15, 46, 100}, {6 ℮, 12, 17, 48, 102},
 {8 ℮, 14, 19, 50, 104}, {10 ℮, 16, 21, 52, 106}, {12 ℮, 18, 23, 54, 108},
 {14 ℮, 20, 25, 56, 110}, {16 ℮, 22, 27, 58, 112}, {18 ℮, 24, 29, 60, 114},
 {20 ℮, 26, 31, 62, 116}, {22 ℮, 28, 33, 64, 118}, {24 ℮, 30, 35, 66, 120},
 {26 ℮, 32, 37, 68, 122}, {28 ℮, 34, 39, 70, 124}, {30 ℮, 36, 41, 72, 126},
 {32 ℮, 38, 43, 74, 128}, {34 ℮, 40, 45, 76, 130}, {36 ℮, 42, 47, 78, 132},
 {38 ℮, 44, 49, 80, 134}, {40 ℮, 46, 51, 82, 136}, {42 ℮, 48, 53, 84, 138},
 {44 ℮, 50, 55, 86, 140}, {46 ℮, 52, 57, 88, 142}, {48 ℮, 54, 59, 90, 144},
 {50 ℮, 56, 61, 92, 146}, {52 ℮, 58, 63, 94, 148}, {54 ℮, 60, 65, 96, 150},
 {56 ℮, 62, 67, 98, 152}, {58 ℮, 64, 69, 100, 154}, {60 ℮, 66, 71, 102, 156},
 {62 ℮, 68, 73, 104, 158}, {64 ℮, 70, 75, 106, 160}, {66 ℮, 72, 77, 108, 162}}
```

In[90]:=
```
e1 = Total[e[[All, 1]]]
```
total todo

1122 ℮

In[98]:=
```
e2 = Total[e[[All, 2]]]
```
total todo

Out[98]= 1320

In[101]:=
```
e3 = Total[e[[All, 3]]]
```
total todo

Out[101]= 1485

In[96]:=
```
e4 = Total[e[[All, 4]]]
     total   todo
e5 = Total[e[[All, 5]]]
     total   todo
```

Out[96]= 2508

Out[97]= 4290

In[102]:=
```
p = Total[pi[[All, 1]]]
    total   todo
```

Out[102]= $1156\,\pi$

In[103]:=
```
p2 = Total[pi[[All, 2]]]
     total   todo
```

Out[103]= 1360

In[104]:=
```
p3 = Total[pi[[All, 3]]]
     total   todo
```

Out[104]= 1530

In[105]:=
```
p4 = Total[pi[[All, 4]]]
     total   todo
```

Out[105]= 2584

In[106]:=
```
p5 = Total[pi[[All, 5]]]
     total   todo
```

Out[106]= 4420

In[108]:=
```
total = {e1 + p, e2 + p2, e3 + p3, e4 + p4, e5 + p5} // MatrixForm
                                                      forma de matri
```

Out[108]//MatrixForm=

$$\begin{pmatrix} 1122\,e + 1156\,\pi \\ 2680 \\ 3015 \\ 5092 \\ 8710 \end{pmatrix}$$