35—BAR SCALES (continued)

BAR SCALE CALCULATIONS — MILES (1 mile = 63,360 inches)—continued

FRACTIONAL SCALE	SCALE TO MAP REPRESENTATION: Scale Unit	:	represents Map Unit	TO FIND MILES PER INCH (**x** in ratio) Use ratio below or SCALE / 63 360	MILES PER INCH	TOTAL MILES ON SCALE	TO FIND TOTAL SCALE LENGTH IN INCHES (**y** in ratio) Use ratio below or Miles on scale / Miles per inch	TOTAL SCALE LENGTH (INCHES)
1:250 000	1 inch		250 000 in	$\frac{63\,360}{1} = \frac{250\,000}{\mathbf{x}}$	3.945707	25	$\frac{3.945707}{1} = \frac{25}{\mathbf{y}}$	6.336
1:400 000	1 inch		400 000 in	$\frac{63\,360}{1} = \frac{400\,000}{\mathbf{x}}$	6.3131313	40	$\frac{6.3131313}{1} = \frac{40}{\mathbf{y}}$	6.336
1:500 000	1 inch		500 000 in	$\frac{63\,360}{1} = \frac{500\,000}{\mathbf{x}}$	7.8914141	50	$\frac{7.8914141}{1} = \frac{50}{\mathbf{y}}$	6.336
1:750 000	1 inch		750 000 in	$\frac{63\,360}{1} = \frac{750\,000}{\mathbf{x}}$	11.837121	60	$\frac{11.837121}{1} = \frac{60}{\mathbf{y}}$	5.068
1:1 000 000	1 inch		1 000 000 in	$\frac{63\,360}{1} = \frac{1\,000\,000}{\mathbf{x}}$	15.782828	125	$\frac{15.782828}{1} = \frac{125}{\mathbf{y}}$	7.920
1:2 000 000	1 inch		2 000 000 in	$\frac{63\,360}{1} = \frac{2\,000\,000}{\mathbf{x}}$	31.565656	250	$\frac{31.565656}{1} = \frac{250}{\mathbf{y}}$	7.920
1:2 500 000	1 inch		2 500 000 in	$\frac{63\,360}{1} = \frac{2\,500\,000}{\mathbf{x}}$	39.45707	300	$\frac{39.45707}{1} = \frac{300}{\mathbf{y}}$	7.603
1:5 000 000	1 inch		5 000 000 in	$\frac{63\,360}{1} = \frac{5\,000\,000}{\mathbf{x}}$	78.914141	600	$\frac{78.914141}{1} = \frac{600}{\mathbf{y}}$	7.603
1:7 500 000	1 inch		7 500 000 in	$\frac{63\,360}{1} = \frac{7\,500\,000}{\mathbf{x}}$	118.37121	600	$\frac{118.37121}{1} = \frac{600}{\mathbf{y}}$	5.068
1:10 000 000	1 inch		10 000 000 in	$\frac{63\,360}{1} = \frac{10\,000\,000}{\mathbf{x}}$	157.82828	1100	$\frac{157.82828}{1} = \frac{1100}{\mathbf{y}}$	6.969

To find miles per inch on 1: 250 000 map . . .

63,360 inches = 1 mile
Show in ratio as ...

$$\frac{63\,360 \text{ inches}}{1 \text{ miles}}$$

Let SCALE (250 000) be in inches
Fractional scale says 1 inch represents 250,000 in
Let **x** be miles that 1 inch represents on map
Show in ratio as ...

$$\frac{250\,000 \text{ inches}}{\mathbf{x} \text{ miles}}$$

Solution . . .

$$\frac{63\,360}{1} = \frac{250\,000}{\mathbf{x}}$$

$$63\,360 \cdot \mathbf{x} = 250\,000 \cdot 1$$

$$\frac{63\,360}{63\,360}\mathbf{x} = \frac{250\,000}{63\,360}$$

$$\mathbf{x} = \frac{250\,000}{63\,360} \text{ (SCALE)}$$

$$\mathbf{x} = 3.945707$$

35—BAR SCALES (continued)

BAR SCALE CALCULATIONS — FEET (1 foot = 12 inches)

FRACTIONAL SCALE	SCALE TO MAP REPRESENTATION: Scale Unit :	SCALE TO MAP REPRESENTATION: represents Map Unit	TO FIND FEET PER INCH (**x** in ratio) Use ratio below or SCALE/12	FEET PER INCH	TOTAL FEET ON SCALE	TO FIND TOTAL SCALE LENGTH IN INCHES (**y** in ratio) Use ratio below or Feet on scale / Feet per inch	TOTAL SCALE LENGTH (INCHES)
1:12 000	1 inch	12 000 in	$\frac{12}{1} = \frac{12\,000}{\mathbf{x}}$	1000.000	6000	$\frac{1000.000}{1} = \frac{6000}{\mathbf{y}}$	6.000
1:20 000	1 inch	20 000 in	$\frac{12}{1} = \frac{20\,000}{\mathbf{x}}$	1666.6666	8000	$\frac{1666.6666}{1} = \frac{8000}{\mathbf{y}}$	4.800
1:24 000	1 inch	24 000 in	$\frac{12}{1} = \frac{24\,000}{\mathbf{x}}$	2000.000	8000	$\frac{2000.000}{1} = \frac{8000}{\mathbf{y}}$	4.000
1:25 000	1 inch	25 000 in	$\frac{12}{1} = \frac{25\,000}{\mathbf{x}}$	2083.3333	8000	$\frac{2083.3333}{1} = \frac{8000}{\mathbf{y}}$	3.840
1:31 250	1 inch	31 250 in	$\frac{12}{1} = \frac{31\,250}{\mathbf{x}}$	2604.1666	8000	$\frac{2604.1666}{1} = \frac{8000}{\mathbf{y}}$	3.072
1:31 680	1 inch	31 680 in	$\frac{12}{1} = \frac{31\,680}{\mathbf{x}}$	2640.000	8000	$\frac{2640.000}{1} = \frac{8000}{\mathbf{y}}$	3.030
1:48 000	1 inch	48 000 in	$\frac{12}{1} = \frac{48\,000}{\mathbf{x}}$	4000.000	24 000	$\frac{4000.000}{1} = \frac{24\,000}{\mathbf{y}}$	6.000
1:50 000	1 inch	50 000 in	$\frac{12}{1} = \frac{50\,000}{\mathbf{x}}$	4166.6666	24 000	$\frac{4166.6666}{1} = \frac{24\,000}{\mathbf{y}}$	5.760
1:62 500	1 inch	62 500 in	$\frac{12}{1} = \frac{62\,500}{\mathbf{x}}$	5208.3333	30 000	$\frac{5208.3333}{1} = \frac{30\,000}{\mathbf{y}}$	5.760
1:63 360	1 inch	63 360 in	$\frac{12}{1} = \frac{63\,360}{\mathbf{x}}$	5280.000	30 000	$\frac{5280.000}{1} = \frac{30\,000}{\mathbf{y}}$	5.681
1:72 000	1 inch	72 000 in	$\frac{12}{1} = \frac{72\,000}{\mathbf{x}}$	6000.000	30 000	$\frac{6000.000}{1} = \frac{30\,000}{\mathbf{y}}$	5.000
1:75 000	1 inch	75 000 in	$\frac{12}{1} = \frac{75\,000}{\mathbf{x}}$	6250.000	30 000	$\frac{6250.000}{1} = \frac{30\,000}{\mathbf{y}}$	4.800
1:96 000	1 inch	96 000 in	$\frac{12}{1} = \frac{96\,000}{\mathbf{x}}$	8000.000	33 000	$\frac{8000.000}{1} = \frac{33\,000}{\mathbf{y}}$	4.125

To find feet per inch on 1: 12 000 map . . .

12 inches = 1 foot
Show in ratio as ...

$$\frac{12}{1}\ \begin{matrix}\textit{inches}\\ \textit{feet}\end{matrix}$$

Let SCALE (12 000) be in inches
Fractional scale says 1 inch represents 12,000 in
Let **x** be feet that 1 inch represents on map
Show in ratio as ...

$$\frac{12\,000}{\mathbf{x}}\ \begin{matrix}\textit{inches}\\ \textit{feet}\end{matrix}$$

Solution . . .

$$\frac{12}{1} = \frac{12\,000}{\mathbf{x}}$$

$$12 \cdot \mathbf{x} = 12\,000 \cdot 1$$

$$\frac{12}{12}\mathbf{x} = \frac{12\,000}{12}$$

$$\mathbf{x} = \frac{12\,000}{12}\ (\text{SCALE})$$

$$\mathbf{x} = 1000.00$$

35—BAR SCALES (continued)

BAR SCALE CALCULATIONS — KILOMETERS (1 kilometer = 100,000 centimeters)

FRACTIONAL SCALE	SCALE TO MAP REPRESENTATION: Scale Unit :	SCALE TO MAP REPRESENTATION: represents Map Unit	TO FIND KILOMETERS PER CENTIMETER (CM) (**x** in ratio) Use ratio below or SCALE / 100 000	KILOMETERS PER CM	TOTAL KILOMETERS ON SCALE	TO FIND TOTAL SCALE LENGTH IN CENTIMETERS (**y** in ratio) Use ratio below or Kilometers on scale / Kilometers per cm	TOTAL SCALE LENGTH IN: CENTIMETERS	TOTAL SCALE LENGTH IN: MILLIMETERS
1:12 000	1 cm	12 000 cm	$\frac{100\,000}{1} = \frac{12\,000}{\mathbf{x}}$	0.120	1.5	$\frac{0.120}{1} = \frac{1.5}{\mathbf{y}}$	12.500	125.00
1:20 000	1 cm	20 000 cm	$\frac{100\,000}{1} = \frac{20\,000}{\mathbf{x}}$	0.200	2	$\frac{0.200}{1} = \frac{2}{\mathbf{y}}$	10.000	100.00
1:24 000	1 cm	24 000 cm	$\frac{100\,000}{1} = \frac{24\,000}{\mathbf{x}}$	0.240	2	$\frac{0.240}{1} = \frac{2}{\mathbf{y}}$	8.333	83.33
1:25 000	1 cm	25 000 cm	$\frac{100\,000}{1} = \frac{25\,000}{\mathbf{x}}$	0.250	2	$\frac{0.250}{1} = \frac{2}{\mathbf{y}}$	8.000	80.00
1:31 250	1 cm	31 250 cm	$\frac{100\,000}{1} = \frac{31\,250}{\mathbf{x}}$	0.3125	2	$\frac{0.3125}{1} = \frac{2}{\mathbf{y}}$	6.400	64.00
1:31 680	1 cm	31 680 cm	$\frac{100\,000}{1} = \frac{31\,680}{\mathbf{x}}$	0.3168	2	$\frac{0.3168}{1} = \frac{2}{\mathbf{y}}$	6.313	63.13
1:48 000	1 cm	48 000 cm	$\frac{100\,000}{1} = \frac{48\,000}{\mathbf{x}}$	0.480	6	$\frac{0.480}{1} = \frac{6}{\mathbf{y}}$	12.500	125.00
1:50 000	1 cm	50 000 cm	$\frac{100\,000}{1} = \frac{50\,000}{\mathbf{x}}$	0.500	6	$\frac{0.500}{1} = \frac{6}{\mathbf{y}}$	12.000	120.00
1:62 500	1 cm	62 500 cm	$\frac{100\,000}{1} = \frac{62\,500}{\mathbf{x}}$	0.625	8	$\frac{0.625}{1} = \frac{8}{\mathbf{y}}$	12.800	128.00
1:63 360	1 cm	63 360 cm	$\frac{100\,000}{1} = \frac{63\,360}{\mathbf{x}}$	0.6336	8	$\frac{0.6336}{1} = \frac{8}{\mathbf{y}}$	12.626	126.26
1:72 000	1 cm	72 000 cm	$\frac{100\,000}{1} = \frac{72\,000}{\mathbf{x}}$	0.720	8	$\frac{0.720}{1} = \frac{8}{\mathbf{y}}$	11.111	111.11
1:75 000	1 cm	75 000 cm	$\frac{100\,000}{1} = \frac{75\,000}{\mathbf{x}}$	0.750	8	$\frac{0.750}{1} = \frac{8}{\mathbf{y}}$	10.666	106.66
1:96 000	1 cm	96 000 cm	$\frac{100\,000}{1} = \frac{96\,000}{\mathbf{x}}$	0.960	9	$\frac{0.960}{1} = \frac{9}{\mathbf{y}}$	9.375	93.75
1:100 000	1 cm	100 000 cm	$\frac{100\,000}{1} = \frac{100\,000}{\mathbf{x}}$	1.000	11	$\frac{1.000}{1} = \frac{11}{\mathbf{y}}$	11.000	110.00
1:125 000	1 cm	125 000 cm	$\frac{100\,000}{1} = \frac{125\,000}{\mathbf{x}}$	1.250	12	$\frac{1.250}{1} = \frac{12}{\mathbf{y}}$	9.600	96.00
1:150 000	1 cm	150 000 cm	$\frac{100\,000}{1} = \frac{150\,000}{\mathbf{x}}$	1.500	12	$\frac{1.500}{1} = \frac{12}{\mathbf{y}}$	8.000	80.00

To find kilometers per centimeter on 1: 12 000 map . . .

100 000 centimeters = 1 kilometer
Show in ratio as ...

$$\frac{100\,000 \text{ centimeters}}{1 \text{ kilometers}}$$

Let SCALE (12 000) be in centimeters
Fractional scale says 1 centimeter represents 12,000 centimeters
Let **x** be kilometers that 1 cm represents on map
Show in ratio as ...

$$\frac{12\,000 \text{ centimeters}}{\mathbf{x} \text{ kilometers}}$$

Solution . . . $100\,000 \cdot \mathbf{x} = 12\,000 \cdot 1$

$$\frac{100\,000}{1} = \frac{12\,000}{\mathbf{x}} \qquad \frac{100\,000}{100\,000}\mathbf{x} = \frac{12\,000}{100\,000}$$

$$\mathbf{x} = \frac{12\,000 \text{ (SCALE)}}{100\,000}$$

$$\mathbf{x} = 0.120$$