

# Electro Critical Skills Resource Suite



## Entry Level Literacy and Numeracy Assessment for the Electrotechnology Trades

### Enrichment Resource

#### UNIT 4: Scales



managing apprentice progression

An E-Oz Energy  
Skills Australia project.



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## SCALES

Measuring is an important part of the electrical trade. Electrical measuring instruments are used to measure and monitor the electrical condition of an installation.

For example voltmeters measure voltage, ammeters measure current, ohmmeters measure resistance and wattmeters measure power.

Other measuring instruments that may be used are tape measures and temperature indicators which, like the electrical measuring instruments, involve the accurate reading of scales.

## LEARNING OUTCOME

- Can accurately read a linear scale

## PERFORMANCE CRITERIA

- Understands the concept of place value.
- Accurately read the scales of measuring instruments used in the electrical trade.



# REVISION OF PLACE VALUE

## EXERCISE 1

Complete the following table by filling in the "numbers" and "numbers in words" columns for f) to p).

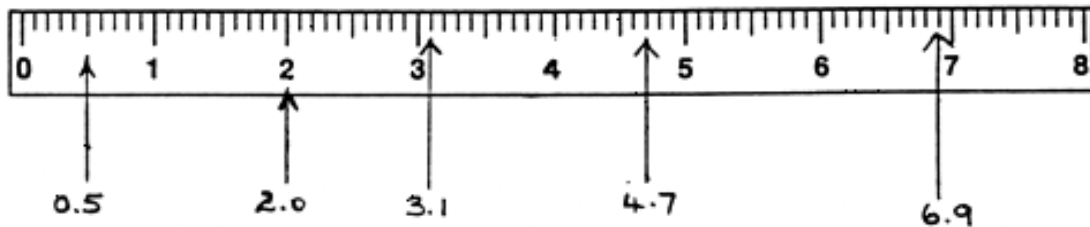
	HUNDRES	TENS	UNITS		1 <sup>ST</sup> DECIMAL PLACE	2 <sup>ND</sup> DECIMAL PLACE	3 <sup>RD</sup> DECIMAL PLACE	
	100's	10's	1's		The 1/10	The 1/100	The 1/1000	Number in words
eg a.			4	•	5			<ul style="list-style-type: none"> <li>Four and five tenths</li> <li>Four point five</li> </ul>
eg b.		1	5	•	2			<ul style="list-style-type: none"> <li>Fifteen and two tenths</li> <li>Fifteen point two</li> </ul>
eg c.		6	0	•	0	0	1	<ul style="list-style-type: none"> <li>Sixty and one thousandth</li> <li>Sixty point zero, zero one</li> </ul>
eg d.	8	9	3	•	7	4		<ul style="list-style-type: none"> <li>Eight hundred and ninety three and seventy four hundredths</li> <li>Eight hundred and ninety three point seven four</li> </ul>
eg e.			9	•	0	7	6	<ul style="list-style-type: none"> <li>Nine and seven six thousandths</li> <li>Nine point zero seven six</li> </ul>
f.		1	7	•	3	3		
g.				•				<ul style="list-style-type: none"> <li>Six point four</li> </ul>
h.			4	•	5			
i.				•				<ul style="list-style-type: none"> <li>Fifty and seventy two hundredths</li> </ul>
j.		4	5	•	7	1		
k.			3	•	5			
l.				•				<ul style="list-style-type: none"> <li>Eighteen and two hundredths</li> </ul>
m.		9	9	•	1	2	5	
n.				•				<ul style="list-style-type: none"> <li>Twenty one point zero three four</li> </ul>
o.			7	•	0	0	7	
p.			0	•	0	9	5	

## READING SCALES

To accurately read electrical measuring instruments, it is important to understand the graduation on the scale/s of the instruments. Let's see how the scale has been divided.

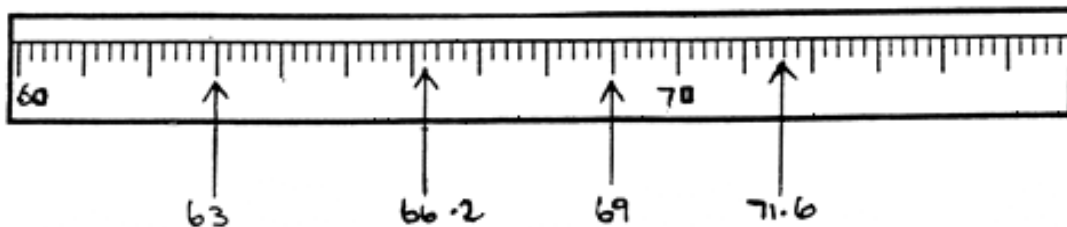
Tenths - the first decimal place

### EXAMPLE 1



The above scale has been marked out in 0.1 intervals.

### EXAMPLE 2



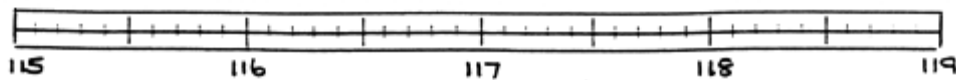
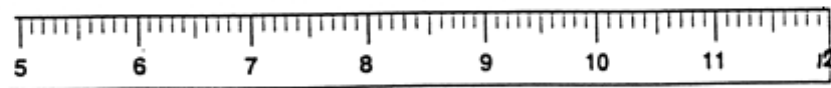
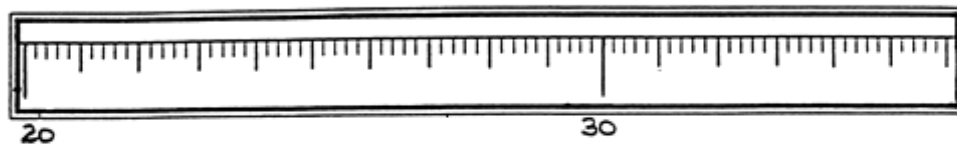
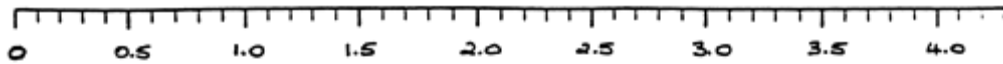
The above scale has been marked out in 0.2 intervals.

## EXERCISE 2

Mark the following numbers using an arrow on the appropriate scales.

5.5, 24, 116.1, 0.3, 8.9, 30.8, 115.6, 2.9

Before recording your answer, examine each scale carefully to determine how it has been marked out.

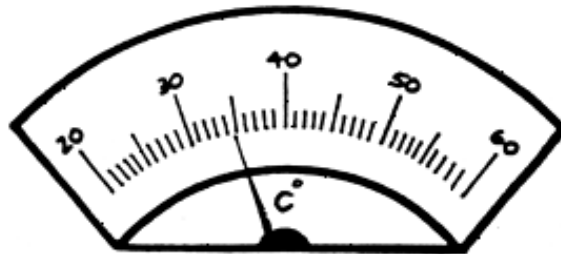


## MEASURING INSTRUMENTS

### EXERCISE 3

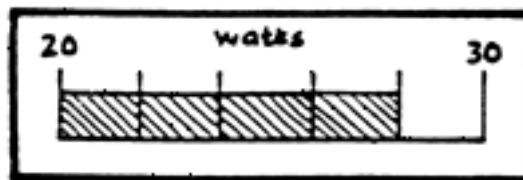
What are the readings on each of the following measuring instruments?

a. Temperature Gauge



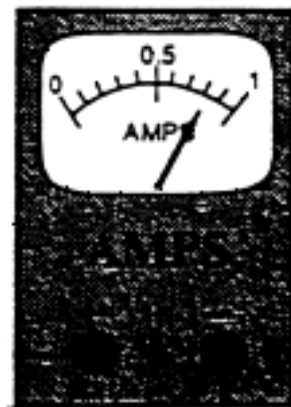
.....°C

b. Wattmeter



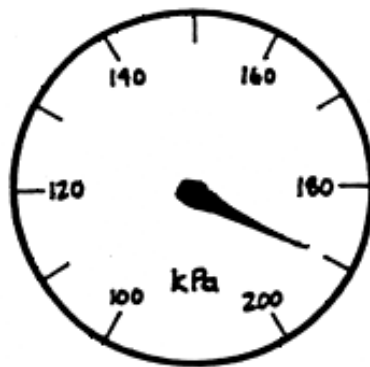
.....watts

c. Ammeter



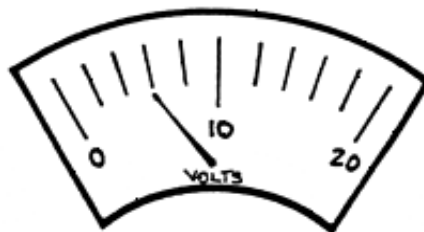
.....amps

d. Pressure Gauge



.....kPa

e. Voltmeter



.....volts

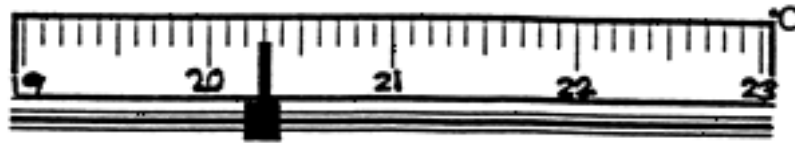
f. Tachometer



.....RPM



**g. Thermostat**



.....°C

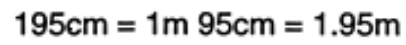
More than one decimal place

In order to measure certain quantities it may be necessary to read a scale accurately to two or more decimal places.

**For example.**

To measure the length of a piece of cable a tape measure is used to determine the length in metres, centimetres and millimetres. ie. to three decimal places.

Complete the list below by labelling the scale as shown in a) and b). Record the answers correct to two decimal places.



187cm = 1m 87cm = 1.87m

## EXERCISE 5

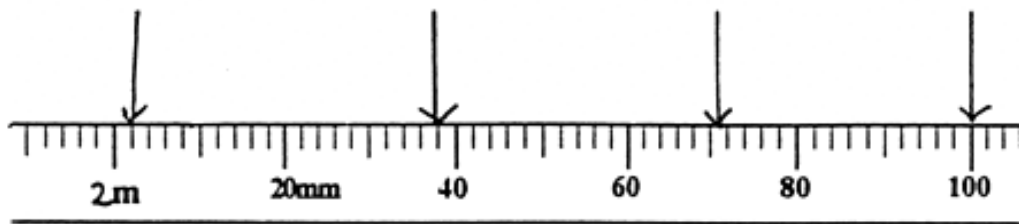
Complete the charts below by labelling the scales as shown in a). Record the answers correct to three decimal places.

a)  
2002mm  
2m 0cm 2mm  
2.002

b)  
2038mm  
.....  
.....  
.....

c)  
.....  
.....  
.....

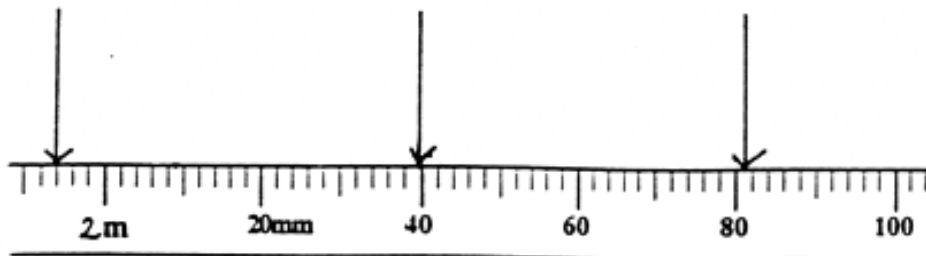
d)  
.....  
.....  
.....



e)  
.....  
.....  
.....

f)  
.....  
.....  
.....

g)  
.....  
.....  
.....



## EXERCISE 6

Draw a line to join the matching number and scale.

14

3.09

150

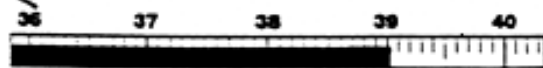
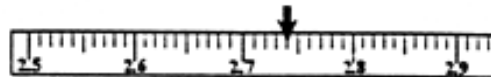
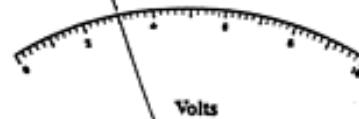
39

3.0

2.74

170

27



☒ Use the answer sheet to check your work.

# ANSWERS

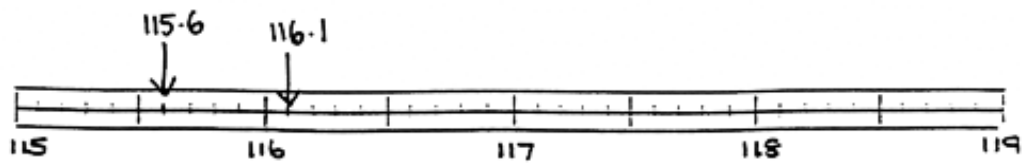
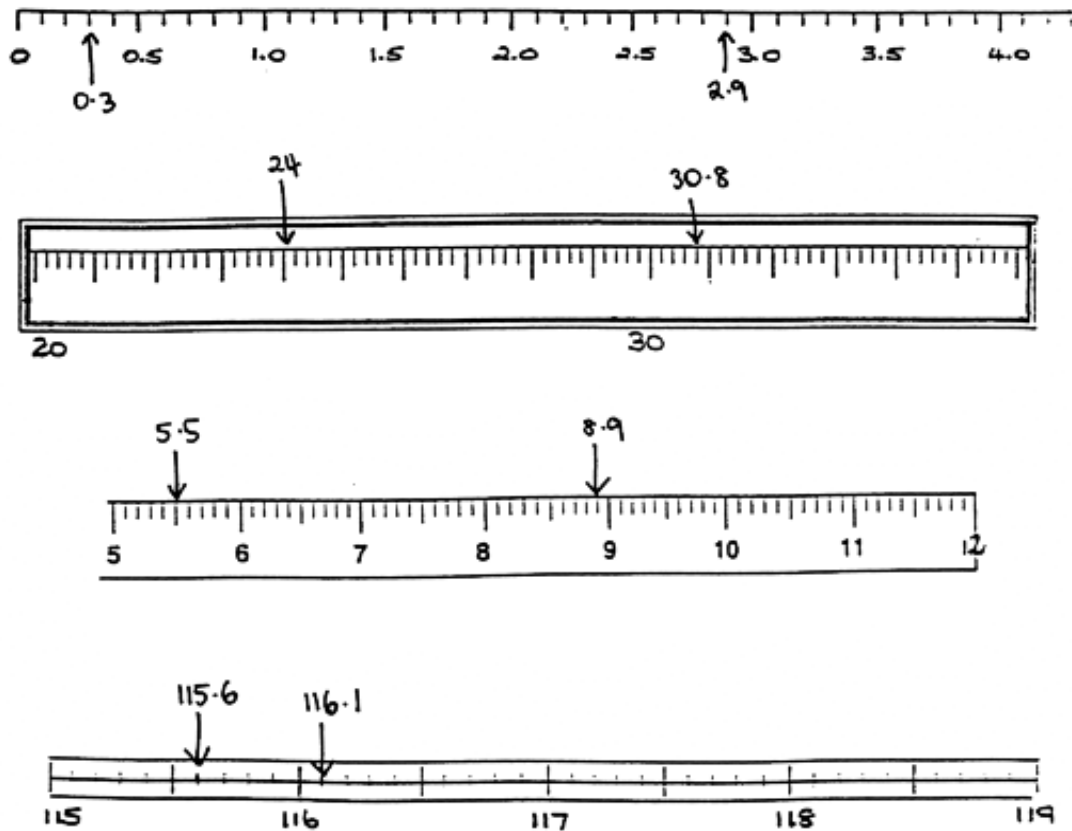
## REVISION OF PLACE VALUE

### EXERCISE 1

Complete the following table by filling in the "numbers" and "numbers in words" columns for f) to p).

	HUNDREDS	TENS	UNITS		1 <sup>ST</sup> DECIMAL PLACE	2 <sup>ND</sup> DECIMAL PLACE	3 <sup>RD</sup> DECIMAL PLACE	
	100's	10's	1's		The 1/10	The 1/100	The 1/1000	Number in words
eg a.			4	•	5			<ul style="list-style-type: none"> <li>Four and five tenths</li> <li>Four point five</li> </ul>
eg b.		1	5	•	2			<ul style="list-style-type: none"> <li>Fifteen and two tenths</li> <li>Fifteen point two</li> </ul>
eg c.		6	0	•	0	0	1	<ul style="list-style-type: none"> <li>Sixty and one thousandth</li> <li>Sixty point zero zero one</li> </ul>
eg d.	8	9	3	•	7	4		<ul style="list-style-type: none"> <li>Eight hundred and ninety three and seventy four hundredths</li> <li>Eight hundred and ninety three point seventy four</li> </ul>
eg e.			9	•	0	7	6	<ul style="list-style-type: none"> <li>Nine and seven six thousandths</li> <li>Nine point seven six</li> </ul>
f.		1	7	•	3	3		<ul style="list-style-type: none"> <li>Seventeen and thirty three hundredths</li> <li>Seventeen point three, three</li> </ul>
g.			6	•	4			<ul style="list-style-type: none"> <li>Six point four</li> </ul>
h.			4	•	5			<ul style="list-style-type: none"> <li>Four and five tenths</li> <li>Four point five</li> </ul>
i.		5	0	•	7	2		<ul style="list-style-type: none"> <li>Fifty and seventy two hundredths</li> </ul>
j.		4	5	•	7	1		<ul style="list-style-type: none"> <li>Forty five and seventy one hundredths</li> <li>Forty five point seven one</li> </ul>
k.			3	•	5			<ul style="list-style-type: none"> <li>Three and five tenths</li> <li>Three point five</li> </ul>
l.		1	8	•	0	2		<ul style="list-style-type: none"> <li>Eighteen and two hundredths</li> </ul>
m.		9	9	•	1	2	5	<ul style="list-style-type: none"> <li>Ninety nine point one two five</li> <li>Ninety nine and one hundredths and twenty five thousandths</li> </ul>
n.		2	1	•	0	3	4	<ul style="list-style-type: none"> <li>Twenty one point zero three four</li> </ul>
o.			7	•	0	0	7	<ul style="list-style-type: none"> <li>Seven point zero zero seven</li> <li>Seven and seven thousandths</li> </ul>
p.			0	•	0	9	5	<ul style="list-style-type: none"> <li>Seven point zero nine five</li> <li>Ninety five thousandths</li> </ul>

## EXERCISE 2

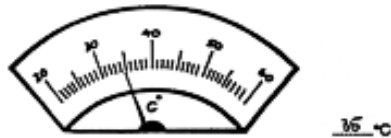


## EXERCISES 3 & 4

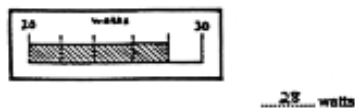
### EXERCISE 3

What are the readings on each of the following measuring instruments?

a. Temperature Gauge



b. Wattmeter



c. Ammeter



d. Pressure Gauge



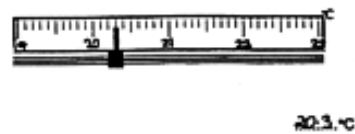
e. Voltmeter



f. Tachometer

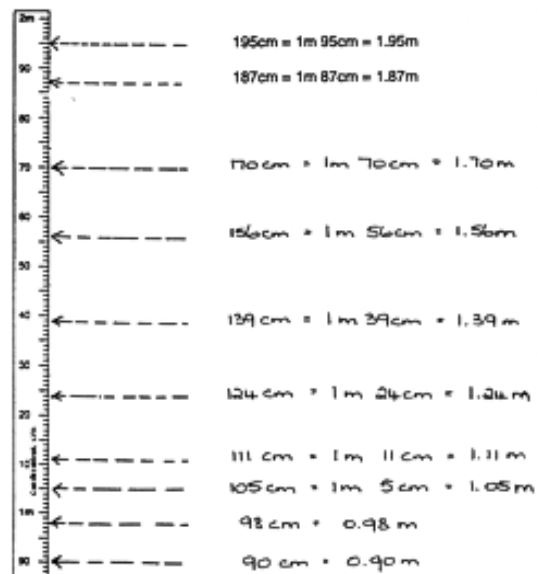


g. Thermostat



### EXERCISE 4

Complete the list below by labelling the scale as shown in a) and b). Record the answers correct to two decimal places.

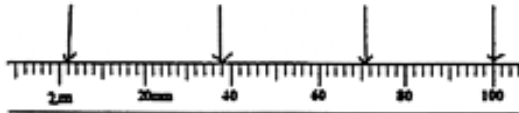


## EXERCISES 5 & 6

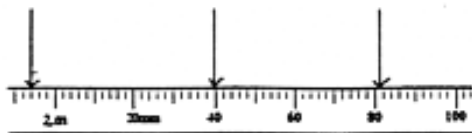
### EXERCISE 5

Complete the charts below by labelling the scales as shown in a). Record the answers correct to three decimal places.

a) 2002mm 2m 0cm 2mm 2.002m  
b) 2038mm 2m 3cm 8mm 2.038m  
c) 2071mm 2m 7cm 1mm 2.071m  
d) 2162mm 2m 16cm 2mm 2.162m



e) 1048mm 1m 4cm 8mm 1.048m  
f) 2045mm 2m 4cm 5mm 2.045m  
g) 2081mm 2m 8cm 1mm 2.081m



### EXERCISE 6

Draw a line to join the matching number and scale.

