NORTH ISLAND COLLEGE

Math Review for Electrician Apprentices

The following questions are for you to self-assess your current knowledge of math, to inform you whether you are prepared for the types of questions you will be required to complete as part of your apprenticeship technical training. Use these questions as a self-test by completing the questions on your own, without looking at the answers provided. If you cannot answer all the questions below, you should seek assistance prior to coming to your technical training session. While additional help is available while you are in school, it will be to your benefit to undertake this study prior to schooling, especially as you will find the workload will be quite heavy as it is. The intention is to ensure you understand how to apply these types of questions.

1. **Addition**

   a) 2.027 + 16.6 +153 = _____

   b) 326.008 + 13 3/8 + 4 1/4 = _____

   c) 5/8 + 3/4 + 13/16 = _____

   d) 14 3/10 + 8 7/15 + 6 9/20 + 2 17/30 = _____

2. **Subtraction**

   a) 523 - 34.08 = _____

   b) 0.065 - 0.0007 = _____

   c) 1/3 – ¼ = _____

3. **Multiplication and Division**

   a) 99 X 8 = _____

   b) 807 X 12.2 = _____

   c) 10.08 x 6 2/5 = _____

d) $24 \div 5 =$ _____

e) $192.8 \div 12.05 =$ _____

f) $10212 \div 222 =$ _____

g) Divide 12 ¾ by 8 = _____

h) $(2 \times 5/6) \times (6 \div 7/10) =$ _____

4. Decimals

a) Express 1/8 as a decimal _____

b) Express 60% as a decimal _____

c) Express 1 5/8 as a decimal _____

d) Express 900 / 320 in its lowest terms __ _____

e) What is the lowest common denominator of the fractions
¼, 1/5, & 1/6 ? _____

f) $1/3 + ¼ =$ _____

g) $31/5 + 11/3 =$ _____

h) Change 3.4 into a fraction _____

5. Percentage

a) What is 4.5% of 1200 _____

b) What percentage of 80 is 16 _____

c) Express 60% as a fraction _____

d) Express 152.6 as a percentage. _____

6. Algebra

a) If a= 2, b= 6, c= 4, x = 3 and y = ½ calculate the following:

i) $2by =$ _____

ii) $2a(cy + bc) =$ _____

iii) $a^2 - y^2 =$ _____

iv) $8ac + 5\,ax =$ _____

b) Simplify these terms
   i) $a + (b + a) =$ _____

   ii) $5a - (a - b) =$ _____

   iii) $8ab - (2ab - 2a^2) =$ _____

c) Solve for x

   i) $5x + 10 + 4x =$ _____

   ii) $ax + b = cx + d$ $\qquad$ X=_____

   iii) $E = IR$

   $\qquad$ I = _____

   $\qquad$ R = _____

d) How many 2 ½" lengths of rod can be cut from a length that is 31" long, assuming there is no waste from cutting?

7. **Geometry, Area & Volume**

a) What is the area of a room that is 5 m wide and 8 m long?

b) What is the area of the end of a 2" diameter shaft?

c) If the diameter of a circle is 102 cm, what is the radius?

d) If the radius of a circle is 27 cm what is the diameter?

e) If the circumference of a circle is 88 cm what is its diameter?

f)   What is the volume of a box that measures 2.5 m wide x 2.75 m long x 1.2 m high?

g)   A concrete machine base measures 6 m x 8.5m x 0.6m.   What is the volume of concrete in the base?

h)   If one cubic foot equals 6.23 gallons, how many gallons will be held in a tank of 26 2/3 cubic foot

      capacity?

i)   What is the inside diameter of a pipe that has a wall thickness of 3/16" and an outside diameter of 2' ?

j)   What is the circumference of a 12 foot diameter tank?   (Round to 2 decimal places.)

8.   Ratio & Proportion

a)   It costs $120 for 10 feet of 4 inch conduit. What will it cost for 50 feet of 4 inch conduit?

b)   An electric drill has a chuck attachment to obtain a slower speed. If the attachment has a ratio of 4:1, find
     the resulting speed if the drill normally turns at 3600 RPM.

c)   If 4 electricians can complete a job in 8 hours how long will it take 3 electricians to complete the same job?

d)   A 250 foot run of steel EMT conduit expands at a rate of 1.12×10^{-5} per °C- ft. What is the new length of
     the conduit run if the temperature rises by 26°C?

9. General Formulas

Solve for the indicated variable:

$$X_L = 2\pi f L, \qquad L =$$

$$N_S = \frac{E_S N_p}{X}, \qquad N_p =$$

10. Trigonometry

a) A right angle triangle has one sides of the following lengths:
a= 25, b=15,
Find the length of the hypotenuse.

b) A tree casts a shadow that is 57 feet long and the angle from the tip of the shadow to the top of the tree is 27°. How tall is the tree?

c) An elevated loading platform has an 8 foot long ramp leading from the road to the   top of the platform. The platform is 1.5 feet above the road. What is the angle of   the ramp with the road?

Answers to Math Review

Question	Answer	Question	Answer
1a	171.62	8a	$600.
1b	343.633	8b	900RPM
1c	2-3/16	8c	10.67 hrs.
1d	31.78	8d	250.0728 ft.
2a	488.92	9	L=Xl/(2π f)
2b	0.0643		Np=(Ns(X))/Es
2c	1/12	10a	29.15
3a	792	10b	29 ft.
3b	9,845	10c	10.8˚
3c	64.51		
3d	4.8		
3e	16		
3f	46		
3g	1.594		
3h	14.286		
4a	0.125		
4b	0.6		
4c	1.625		
4d	2.8 or 2 13/16		
5a	54		
5b	20%		
5c	3/5		
5d	152.60%		
6ai	6		
6aii	104		
6aiii	3-3/4		
6aiv	94		
6bi	2a+b		
6bii	4a+b		
6biii	$6ab+2a^2$		
6ci	-10/9		
6cii	(d-b)/(a-c)		
6ciii	I=ER		
	R=E/I		
7a	40m2		
7b	3.14in2		
7c	51cm		
7d	54cm		
7e	28cm		
7f	8.25m3		
7g	30.6m3		
7h	166.13gal		
7i	23-5/8 in.		
7j	37.7 ft.		