

Technical Mathematics Review

1) Simplify: $12 - 2[3 - (-2)^2 \div 4] + 1$

2) Solve. $\frac{x}{8} = \frac{5}{2}$

3) Evaluate: $\frac{2b^2 - 6c}{2a - b}$ when $a = 1$, $b = -3$, and $c = -2$

4) Simplify: $-8x - 3(5x - 2y)$

5) Solve. $21x + 5 = 13x + 53$

6) Simplify: $2x^2 + 4y^2 - 8x^2 + 7y - 21$

7) Solve: $2x - 5 = 3 - 6x$

8) Solve: $4(3x - 2) = 5x - 3(7 - 2x)$

9) The scale on a map is 1 inch = 125 miles. The distance between two cities on a map is $3\frac{1}{8}$ inch. What is the actual distance between the two cities?

10) A car uses 18 gal of gas to travel 560 mi. How many gallons of gas will the same car require to travel 2,688 miles?

11) The wavelength of a sound wave is given by the formula

$$\lambda = \frac{v}{f}$$

Where f is frequency in Hz, v is the velocity of sound in m/s, and λ is the wavelength of a sound wave in meters.

Find the frequency f of a sound wave when $v = 306$ m/s and $\lambda = 8.5$ m.

12) How many pounds of a 12% aluminum alloy must be mixed with 400 lb of a 25% aluminum alloy to make a 17% aluminum alloy?

13) A large pulley turns at 48 rpm. A smaller pulley 8 in. diameter turns at 300 rpm. What is the diameter of the larger pulley?

14) Find the Mechanical Advantage of a hydraulic system where the larger piston has a radius of 27 in. and the smaller piston has a radius of 3 in.

- 15) The formula for the voltage and current entering and leaving a transformer is given by the following formula.

$$\frac{V_1}{V_2} = \frac{I_2}{I_1}$$

Where V_1 is the voltage and I_1 is the current on one side of the transformer and V_2 and I_2 are the voltage and current on the other side.

The voltage on one side of a transformer is 12 volts and the current is 4.5 amperes. Find the voltage on the other side if the current on that side is 60 amperes.

- 16) Simon, Sven and Katie are purchasing tickets to the baseball game. They all purchase tickets in different areas of the stadium. Sven's ticket costs twice as much as Simon's ticket and Katie's ticket costs \$14 more than Sven's ticket. The sum of the price of the three tickets is \$248. How much did Simon pay for his ticket?

- 17) Solve the following formula for P.

$$V = \frac{kT}{P}$$

Where V is the volume of a gas, T is the temperature, P is the pressure and k is a constant dependent on the gas.

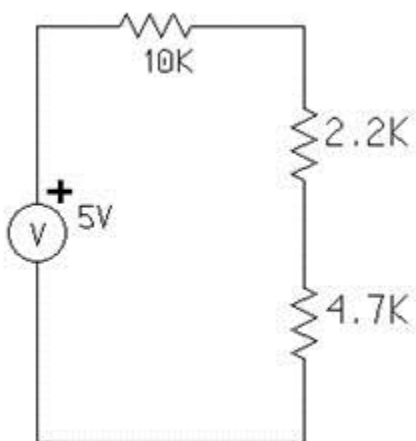
18) A man places one end of a lever under a large rock. The fulcrum is placed 2 ft from the rock. If 166 lb is placed on the other end of the lever, 4.5 ft from the fulcrum, how much does the rock weigh?

19) Solve the following formula for R_3 . $R_T = R_1 + R_2 + R_3 + R_4 + R_5$

20) Two sides of a triangular window are the same length. The third side is two inches less than the length of one of the equal sides. If the sum of all three lengths is 21 inches, what are the lengths of the sides?

21) The voltage loss in a line is 2.5 V. If this is 2% of the generator voltage, what is the generator voltage?

22) Find the total resistance in the series circuit.



23) If $6\frac{1}{4}$ ft of wire is needed to make one electrical extension cord, how many extension cords can be made from $68\frac{3}{4}$ ft of wire?

24) A candy store owner mixes $1\frac{1}{2}$ lb of caramels, $\frac{3}{4}$ lb of chocolates, and $\frac{1}{2}$ lb of candy corn. What is the total weight of the candy mixture?

25) Convert from Fahrenheit to Celsius:

$$86^{\circ}\text{F} = \underline{\hspace{2cm}}^{\circ}\text{C}$$

26) Write in scientific notation: 0.000173

27) Perform the indicated operations: $\left(\frac{10^{-5} \cdot 10^2}{10^3}\right)^{-3}$

28) How many liters of weed killer are contained in a 55-gallon drum?

29) Convert:

$$75\text{mi} = \underline{\hspace{2cm}} \text{ km}$$

30) Convert:

$$35 \text{ cm}^2 \text{ to in}^2$$