

Part A - Individual Questions Part 1 of 2

Grade 7

Name: _____.

1.) Calculate $195 - 85 + 125 - 280 + 45$

Answer:

0

2.) What is 7.234 rounded to the nearest tenth?

Answer:

7.2

3.) Calculate the sum of the following mixed fractions:

$$3\frac{2}{9} + \frac{2}{3}$$

Answer:

3 $\frac{8}{9}$

4.) Safety Factor = $\frac{\text{Maximum load a structure can support before breaking}}{\text{Actual load that a structure is designed to support}}$

Calculate the safety factor if the maximum load is 183 N and the actual load is 61 N.

Answer:

3

5.) Find the answer for F_f where:

$$F_f = \mu m g$$

$$\mu = 0.62$$

$$m = 8.4 \text{ kg}$$

$$g = 9.81 \text{ m/s}^2$$

Where:

F = Force due to friction (units of Newtons (N))

μ = co-efficient of friction

m = mass (units of kilograms, kg)

g = constant (acceleration due to earth's gravity, 9.81 m/s^2)

Answer:

51.09 N

6.) Simplify the expression: $7(8t + 8) + 4t$

Answer:

60t + 56

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7.) What is the missing number in this sequence? 1, 6, 36, ?, 1296

Answer:

216

8.) The **air** in our atmosphere is composed of molecules of different gases.

By volume, the composition of air is

78% nitrogen

21% oxygen

?% other gases including argon, carbon dioxide and others

Write 78% as a fraction (make sure you show your answer in the lowest terms, reduce the fraction).

Answer:

39/50

9.) One of the most widely used types of stainless steel is known as “Stainless Steel 18-8” since its composition is 18% chromium and 8% nickel.

Write 18% as a fraction (make sure to reduce the fraction)

Answer:

9/50

10.) The 2014 Porsche 911 has the following specifications:

350 horsepower

289 km/hr top speed

4.8 seconds 0 to 100 km/hr

64 liters fuel tank capacity

Average fuel consumption = 9.1 liters of fuel used for every 100 km of driving.

Mass 1815 kg

Price \$96,200

How far can you drive on a full tank of fuel? Round your answer to the nearest whole number.

Answer:

*
703 km

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- 11.) If
 $p = -4$
 Then evaluate the following expression:
 $5p$

Answer:

-20

- 12.) The refractive index, referred to as n , is defined as

$$n = \frac{c}{v}$$

Where c is the speed of light in outer space, that is $c = 299,792,458$ m/s

And v is the velocity of light in the medium it's traveling in (usually the optical lens)

What is the index of refraction of outer space?

Answer:

1

- 13.) Ohm's law is one of the most important principles used in Electrical Engineering.
 Ohm's law states that the current through a conductor between two points is directly proportional to the potential difference across the two points as described in equation below:

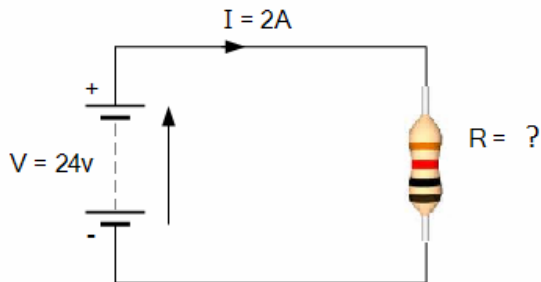
I is the current through the conductor in units of amps (A)

V is the voltage measured across the conductor in units of volts (V)

R is the resistance of the conductor in units of ohms (Ω)

$$I = \frac{V}{R}$$

Find the value of the resistor in a circuit where the voltage is 24V and the current is 2 Amps.



Answer:

12 amps

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- 14.) Electrical Energy is the capacity to do work.

Electrical energy is the product of power multiplied by the length of time it was consumed.

Energy = power x time

Power = voltage x current or more simply written as $P = V \times I$

Where Energy has the unit of in joule (J)

P is power in unit of watts (W)

Time has the unit of second (s)

A 40W study lamp has 1000 hours of work life. How much energy in Joules does this lamp consume before it burns out?

Answer: <div style="text-align: right;">144,000,000 J</div>
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- 15.) Calculate the following: -4^3

Remember:

$$-1 \times -1 = +1$$

$$+1 \times -1 = -1$$

Answer: <div style="text-align: right;">-64</div>
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- 16.) If the Prince Edward Viaduct was constructed 6 years earlier than Lasalle Causeway and Lasalle Causeway was constructed 3 years later after the Leaside Bridge.

How long ago was the Leaside Bridge constructed if the Prince Edward Viaduct was already built for 19 years?

Answer: <div style="text-align: right;">* 16 yrs</div>

- 17.) The Environmental Engineer conducted two test pits, each with an area of 25m², to collect soil samples for chemical analysis. If the test pits are placed side by side to form a larger rectangular excavation pit.

What will be the working total perimeter of the excavated area?

Answer: <div style="text-align: right;">* 30 m</div>
