

Scientific Foundations of Basic Algebra

Basic Algebra · Answer Key · 15 Questions

1. The ideal gas law is $PV = nRT$. If you solve for pressure P in terms of the other variables, which algebraic expression is correct?

- A) $P = nRT / V$**
- B) $P = nRT - V$
- C) $P = V / nRT$
- D) $P = nR / TV$

2. In Einstein's mass-energy equivalence, $E = mc^2$. If energy E is 9 and mass m is 1, what is the value of c ?

- A) 1
- B) 2
- C) 3**
- D) 9

3. The distance d an object falls in time t under gravity is $d = 0.5gt^2$. If $g = 9.8$ and $t = 2$, what is the distance d ?

- A) 9.8
- B) 19.6**
- C) 39.2
- D) 4.9

4. The conversion from Celsius (C) to Fahrenheit (F) is $F = 1.8C + 32$. What is the value of C when $F = 32$?

- A) 0**
- B) 32
- C) 1.8
- D) 16

5. The formula for the area of a circle is $A = \pi r^2$. If the area A equals 9, what is the radius r ?

- A) 4.5
- B) 9
- C) 3**
- D) 18

6. Newton's Second Law is $F = ma$. If force F is 20 newtons and acceleration a is 4 m/s^2 , what is the mass m ?

A) 80

B) 5

C) 16

D) 0.2

7. The kinetic energy formula is $K = 0.5mv^2$. If mass $m = 2$ and velocity $v = 5$, what is the kinetic energy K ?

A) 5

B) 10

C) 25

D) 50

8. In Ohm's Law, $V = IR$. If voltage $V = 12$ and current $I = 3$, what is the resistance R ?

A) 36

B) 9

C) 0.25

D) 4

9. The circumference of a circle is $C = 2\pi r$. If $C = 10\pi$, what is the diameter ($2r$)?

A) 5

B) 10

C) 20

D) 2.5

10. The frequency of a wave is $f = v / \lambda$. If velocity $v = 300$ and wavelength $\lambda = 2$, what is the frequency f ?

A) 600

B) 150

C) 100

D) 300

11. The density formula is $\rho = m / V$. If mass $m = 50$ and density $\rho = 2$, what is the volume V ?

A) 100

B) 25

C) 48

D) 52

12. For a right triangle, the Pythagorean theorem is $a^2 + b^2 = c^2$. If $a = 3$ and $b = 4$, what is the value of c ?

- A) 7
- B) 12
- C) 5**
- D) 25

13. The momentum of an object is $p = mv$. If mass $m = 10$ and velocity $v = 3$, what is the momentum p ?

- A) 30**
- B) 13
- C) 0.3
- D) 3.3

14. The work formula is $W = Fd$. If work $W = 100$ and force $F = 20$, what is the distance d ?

- A) 2000
- B) 120
- C) 80
- D) 5**

15. If the power formula is $P = IV$ and current $I = 2$ and voltage $V = 110$, what is the power P ?

- A) 55
- B) 220**
- C) 218
- D) 440