

Math 146 Chapter 1 test practice

Solve each equation:

1. $\frac{1}{3}x + 5 = \frac{1}{4}(x + 2)$

2. $2(3x - 1) - (x + 4) = x - 3$

3. $0.2x + 3.1 = 0.4(3x + 8.2)$

(round to 2 decimal places)

4. Solve for t: $V = a^2rt + \frac{bt}{2} + n$

5. Solve for k: $D = (n - k)rt$

6. Solve by factoring: $2x^2 - 5x - 12 = 0$

7. Solve and leave the answer in exact simplified form (square roots, fractions, but no decimals)

a. $2x^2 - 2x + 3 = 0$

b. $x^2 + 4x - 8 = 0$

Factor each expression:

8. a. $x^2 + 4x$

b. $x^3 - 10x^2 + 24x$

c. $6x^2 + 11x + 4$

Solve each equation:

9. $\frac{x+1}{x^2-9} - \frac{x+3}{x^2+5x+6} = \frac{4}{x^2-x-6}$

10. $(x+3)^{2/3} = 36$

Solve each inequality. Tell the answer using interval notation.

11. $2x + 5 \leq 4x + 13$

12. $x^2 + 4x > 21$

Solve the absolute equations and inequalities. Give inequality answers in interval notation.

13. $|2x + 5| = 4$

14. $\left| \frac{x+3}{2} \right| \leq 4$

15. $|4(x-7)| \geq 2$

Solve the following application problems:

16. a. A cube of ironwood has a volume of 22.8 mL, and a weight of 15.0 g. What is its density in g/mL? Round your answer to 3 significant figures

b. A carved figure made of ironwood has weight 8.5 g. Find the volume of the figure.

17. An ideal gas satisfies the equation $PV = nRT$, where P is the pressure in atm, V is the volume in Liters, T is the temperature in degrees kelvin, n is the number of moles, and R is a constant.

a. Solve for the constant R.

b. Air inside a 30 L. scuba canister is compressed to a pressure of 200 atmospheres. If the gas is released container with volume 150 L., what will the pressure of the gas be? (assume temperature does not change).

c. CaCO_3 decomposes at ~ 12200 K to form CO_2 gas and CaO . If 25.0 L of CO_2 are collected at 12200 K, what will the volume of this gas be after it cools to 500K?

18. A sample containing 0.63 M CO_2 and 0.57 M H_2 is allowed to equilibrate at 700 K. The final amount x of

H_2O and CO is given by $\frac{x^2}{(0.57-x)(.63-x)} = 0.11$. Solve for x.

Answers:

1. -54 2. 3/4 3. -0.18 4.: $\frac{2V-2n}{2a^2r+b} = t$ 5. $k = n - \frac{D}{rt}$

6. $2x^2 - 5x - 12 = 0$ $(2x+3)(x-4) = 0 \Rightarrow x = 4, -3/2$

7. a. $x = \frac{1 \pm i\sqrt{5}}{2}$ alternate form: $x = \frac{1}{2} \pm \frac{i\sqrt{5}}{2}$ b. $x = -2 \pm 2\sqrt{3}$

8. a. $x^2 + 4x = x(x+4)$ b. $x^3 - 10x^2 + 24x = x(x-6)(x-4)$ c. $6x^2 + 11x + 4 = (3x+4)(2x+1)$

9. -1

10. 213 and -219 (for technical reasons, 213 without the alternate solution -219 would also be accepted as the correct answer)

11. $[-4, \infty)$ 12. $(-\infty, -7) \cup (3, \infty)$ 13. -1/2, -9/2 14. $[-11, 5]$ 15. $(-\infty, 13/2] \cup [15/2, \infty)$

16. a. 0.658 g/mL

b. 12.9 mL

17. b. $R = \frac{PV}{nT}$ b. $\frac{(200 \text{ atm})(30L)}{nT} = \frac{P(150L)}{nT} \Rightarrow P = 40 \text{ atm}$

c. $\frac{P(25L)}{n12200K} = \frac{PV}{n500K} \Rightarrow V = 1.02L$

18.

$$\frac{x^2}{(0.57-x)(.63-x)} = 0.11 \Rightarrow x^2 = .11(0.57-x)(.63-x) \Rightarrow x^2 = .11x^2 - 0.132x + .039501$$

$$\Rightarrow 0.89x^2 + 0.132x - 0.039501 = 0 \Rightarrow x = \frac{-.132 \pm \sqrt{.132^2 - 4(.89)(-.039501)}}{2 \cdot .89}$$

$x \approx .15$