1. Express the following statement as an inequality:

The quotient of $a$ and $b$ is at most $\frac{1}{3}$.

A. $\frac{|a|}{|b|} \geq \frac{1}{3}$
B. $\frac{a}{b} \geq \frac{1}{3}$
C. $\frac{|a|}{|b|} \leq \frac{1}{3}$
D. $\frac{a}{b} \leq \frac{1}{3}$
E. None of the above

2. Simplify. Do not leave negative exponents in your answer.

$$\left(\frac{1}{3}a^8\right)(12a^{-5})(2a^{-7})$$

A. $\frac{1}{8a^4}$
B. $\frac{1}{72a^4}$
C. $\frac{8}{a^4}$
D. $\frac{a^4}{72}$
E. None of the above


$$\left(\frac{2x^8y^0}{10x^3y^4y^3}\right)^2$$
4. Simplify completely.

$$\sqrt[3]{\frac{27d^{12}}{b^{18}}}$$

A. $$\frac{3a^9}{b^{15}}$$

B. $$\frac{81a^{36}}{b^{54}}$$

C. $$\frac{9a^9}{b^{15}}$$

D. $$\frac{9a^{36}}{b^{54}}$$

E. None of the above

5. Subtract and express as a polynomial.

$$9x^5 - 4x^2 + 8 - 2(3x^5 + 5x^3 - 3x^2 + 9)$$

A. $$4x^5 + 3x^3 - 9x^2 + 15$$

B. $$3x^5 - 10x^3 + 2x^2 - 10$$

C. $$4x^5 + 3x^3 - 7x^2 - 10$$

D. $$3x^5 + 5x^3 - 7x^2 + 17$$

E. None of the above
6. Multiply and express as a polynomial.
   \((5x - 3)(x^2 + 2x - 4)\)

   \[ A. \ 5x^3 + 7x^2 - 26x + 12 \]
   \[ B. \ 5x^3 + 2x^2 - 26x - 7 \]
   \[ C. \ 5x^3 + 4x^2 - 7 \]
   \[ D. \ 5x^3 + 2x^2 - 16x + 12 \]
   \[ E. \ None \ of \ the \ above \]

7. Simplify completely.

   \[
   \frac{2x^2 - 5x - 3}{x^2 - 9} \div \frac{10x^2 + x - 2}{5x^2 - 17x + 6}
   \]

   \[ A. \ \frac{2}{2-5x} \]
   \[ B. \ \frac{x-3}{x+3} \]
   \[ C. \ \frac{2-5x}{2} \]
   \[ D. \ \frac{(2x+1)^2}{(x+3)(x-3)} \]
   \[ E. \ \frac{1}{x+3} \]

8. Subtract and simplify completely.

   \[
   \frac{4a}{a+3} - \frac{5}{a}
   \]

   \[ A. \ \frac{2}{2-5x} \]
   \[ B. \ \frac{x-3}{x+3} \]
   \[ C. \ \frac{2-5x}{2} \]
   \[ D. \ \frac{(2x+1)^2}{(x+3)(x-3)} \]
   \[ E. \ \frac{1}{x+3} \]
9. Which of the following is a factor of \(6x^3 + x^2 - 12x\)?

A. \(x + 12\)
B. \(3x - 4\)
C. \(2x - 3\)
D. \(3x + 4\)
E. None of the above

10. Simplify completely.

A. \(1 + s\)
B. \(\frac{s}{s - r}\)
C. \(\frac{r + s}{r}\)
D. \(\frac{s}{r - 1}\)
E. \(s\)
11. Solve for $x$. Circle the answer that best describes the solution(s).

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

A. $x$ is between $-6$ and $-\frac{5}{2}$

B. $x$ is between $-\frac{5}{2}$ and 0

C. $x$ is between 0 and 6

D. There is no solution

E. All reals except $x = \pm\frac{3}{2}$

12. Solve $M = \frac{b^2}{a + ab}$ for $a$.

A. $a = \frac{b}{1+M}$

B. $a = \frac{b}{2M}$

C. $a = \frac{b^2}{1+bM}$

D. $a = \frac{b}{M}$

E. $a = \frac{b^2}{M(1+b)}$
13. The total price of a coat sold to a customer is $85. This total includes the wholesale price of the coat plus a 15% markup, and a 5% sales tax (after the markup has been added). Find the equation that would be used to compute the wholesale price of the coat assuming that \( x \) represents the wholesale price. Simplify your equation. Do not solve the equation.

\[
A. 0.2x = 85 \\
B. 1.5x = 85 \\
C. 1.2075x = 85 \\
D. 1.1575x = 85 \\
E. 1.2x = 85
\]

14. A mechanic needs 5 quarts of a 60% antifreeze solution. Unfortunately, she only has a 70% antifreeze solution and a 40% antifreeze solution available. How much of the 40% antifreeze solution should she use to get the 5 quarts of 60% antifreeze solution?

\[
A. \frac{11}{6} \text{ quarts} \\
B. \frac{26}{3} \text{ quarts} \\
C. \frac{30}{11} \text{ quarts} \\
D. \frac{5}{3} \text{ quarts} \\
E. \text{ None of the above}
\]