1. Express the following statement as an inequality:

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

   A. $\left|\frac{a}{b}\right| \geq \frac{1}{3}$

   B. $\frac{a}{b} \geq \frac{1}{3}$

   C. $\left|\frac{a}{b}\right| \leq \frac{1}{3}$

   D. $\frac{a}{b} \leq \frac{1}{3}$

   E. None of the above

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

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

   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

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

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

A. $\frac{x^{10}}{25y^{14}}$

B. $\frac{x^{7}}{10y^{9}}$

C. $\frac{x^{8}}{5y^{12}}$

D. $\frac{x^{5}}{5y^{11}}$

E. $\frac{x^{25}}{25y^{49}}$

4. Simplify completely.

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

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.

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

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. $\frac{4a^2-5a+15}{a(a+3)}$

B. $\frac{4a-5}{a(a+3)}$

C. $\frac{4a^2-5a-15}{a(a+3)}$

D. $\frac{4a-5}{2a+3}$

E. None of the above

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.

$$\frac{\frac{r}{s}-\frac{s}{r}}{\frac{r}{s}-1}$$

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. $\frac{11}{6}$ quarts

B. $\frac{26}{3}$ quarts

C. $\frac{30}{11}$ quarts

D. $\frac{5}{3}$ quarts

E. None of the above