

1. Evaluate.

$$7 \square 3 | 4(5) \square 6^2 |$$

- A. 55
- B. 31
- C.  $\square 41$
- D.  $\square 17$
- E. None of the above

2. Simplify.

$$(4a^5b^{\square 8}c^0)(\square 2a^3b^{10}c^4)$$

- A.  $\square 8a^8b^2c^4$
- B.  $\square \frac{8a^{15}c^4}{b^{80}}$
- C.  $\frac{a^8b^2c^4}{8}$
- D.  $\frac{a^{15}c^4}{8b^{80}}$
- E.  $\square \frac{8a^2b^2}{c^4}$

3. Simplify.

$$\frac{\square \square 3x^{\square 5}y^2 \square}{\square x^{\square 1}z^{\square 3} \square}$$

- A.  $\frac{y^5z^6}{9x^7}$
- B.  $\square \frac{27y^6z^9}{x^{12}}$
- C.  $\frac{y^6z^9}{27x^{18}}$
- D.  $\square \frac{9y^5}{x^4}$
- E. None of the above

4. Simplify and rationalize the denominator, if appropriate.

$$\sqrt{8a^{13}b^6} \sqrt{3a^{15}}$$

A.  $2a^7b^3\sqrt{6a}$

B.  $\frac{12b^3}{a^4}$

C.  $\frac{b^3\sqrt{11}}{a^7\sqrt{a}}$

D.  $a^7b^3\sqrt{11a}$

E.  $\frac{2b^3\sqrt{6}}{a^4}$

5. Perform the indicated operations and simplify.

$$(7x^3 - 4x + 5) - x(2x^2 + 3)$$

A.  $5x^3 - 2x - 3$

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

C.  $5x^3 - 4x + 8$

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

E. None of the above

6. Which of the following is a factor of  $27x^6 - y^3$ ?

Hint:  $x^3 - y^3 = (x - y)(x^2 + xy + y^2)$

A.  $9x^4 + 3x^2y + y^2$

B.  $3x^2 + xy + y^2$

C.  $9x^2 - 3x^2y + y^2$

D.  $3x^4 - 3x^2y + y^2$

E.  $9x^4 + 27xy + y^2$

7. Which of the following is a factor of  $12x^2 - 11x - 5$ ?

A.  $2x - 1$

B.  $4x + 5$

C.  $3x + 1$

D.  $6x - 5$

E.  $2x + 5$

8. Simplify the expression.

$$\frac{\frac{5}{x} - \frac{5}{x+h}}{h}$$

- A.  $\frac{1}{x+h}$   
 B.  $\frac{h^2}{x(x+h)}$   
 C.  $\frac{5h^2}{x(x+h)}$   
 D.  $\frac{5}{x(x+h)}$   
 E.  $\frac{1}{x(x+h)}$

9. Simplify.

$$\frac{4x^2 - 9}{2x^2 - 15x + 18} \div \frac{(2x+3)^2}{x^2 - 12x + 36}$$

- A.  $\frac{x-18}{3(2x+3)}$   
 B.  $\frac{4x+2}{5x+2}$   
 C.  $x+6$   
 D.  $\frac{x-6}{5x+2}$   
 E.  $\frac{x-6}{2x+3}$

10. Solve the following equation. Choose the answer that best describes the solution.

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

- A.  $x$  is between  $-5$  and  $3$   
 B.  $x$  is between  $3$  and  $0$   
 C.  $x$  is between  $0$  and  $3$   
 D.  $x$  is between  $3$  and  $5$   
 E. There is no solution for  $x$

11. Solve  $R = Q + \frac{h}{B}$  for  $B$ .

- A.  $B = \frac{h}{R - Q}$   
 B.  $B = \frac{Q + h}{R}$   
 C.  $B = h(R - Q)$   
 D.  $B = Rh - Q$   
 E.  $B = \frac{1}{h(R - Q)}$

12. Solve the following equation for  $x$ . Choose the answer that best describes the solution(s).

$$\frac{4}{x - 5} - \frac{3}{x + 5} = \frac{7x + 5}{x^2 - 25}$$

- A.  $x$  is greater than 1  
 B.  $x$  is between  $-1$  and 1  
 C.  $x$  is less than  $-1$   
 D. There is no solution for  $x$ .  
 E. All real numbers are solutions except  $x = -5$  and 5.

13. An interior decorator charges \$60 per hour while consulting on a job. Her assistant only charges  $\frac{2}{3}$  of that amount per hour. On one particular job, the decorator worked five hours less than twice the number of hours of her assistant. If the customer was billed for \$850, find the number of hours that the assistant worked. Round your answer to the nearest tenth.

- A. 4.1 hours  
 B. 5.6 hours  
 C. 7.2 hours  
 D. 9.4 hours  
 E. None of the above

14. Two vehicles leave the same point traveling in opposite directions. The truck left first at 2:00 p.m., traveling at a rate of 40 miles per hour. The car left the point at 3:30 p.m., traveling at a rate of 60 miles per hour. After how many hours past 2:00 p.m. will the two vehicles be 120 miles apart?
- A. 2.1 hours  
B. 0.3 hours  
C. 1.8 hours  
D. 0.6 hours  
E. None of the above
15. John inherits \$45,000 and wishes to invest this amount in two accounts. The first account pays 6% simple interest, and will insure the entire \$45,000. The second account pays a higher rate of 7.5% simple interest, but only insures deposits up to \$30,000. Let  $x$  represent the amount John invests at 6%. If the annual interest earned is to be \$3,000, find the equation used to solve for  $x$ .
- A.  $0.06x + 0.075x = 3000$   
B.  $0.06x + 0.075(45000 - x) = 3000$   
C.  $0.06x + 0.075(30000) = 3000$   
D.  $0.06(45000 - x) + 0.075x = 0.135(3000)$   
E.  $0.06(45000) + 0.075(30000) = x$