Academic Enhancement Center Sample Math Placement Exam

Note: This is a SAMPLE exam

1. $16x^2 - 49 =$
   (A) $(4x - 7)^2$
   (B) $4(x - 7)(x + 7)$
   (C) $(4x - 7)(4x + 7)$
   (D) $(16x - 7)(16x + 7)$

2. $(3x^3 y^2)^3 =$
   (A) $9x^6 y^5$
   (B) $9x^6 y^6$
   (C) $27x^6 y^5$
   (D) $27x^9 y^6$

3. $36a^2 + 60ab + 25b^2 =$
   (A) $(6a + 5b)^2$
   (B) $(6a - 5b)(6a + 5b)$
   (C) $(6a - 5b)^2$
   (D) $(12a + 5b)(12a + 5b)$

4. Which rational expression is in simplest form?
   (A) $\frac{x^2 + 2x}{x^2 + 2x}$
   (B) $\frac{x^2 + 2x}{x^2 + 4x}$
5. \((8x - 3)^2 =\)
(A) \(64x^2 - 9\)
(B) \(64x^2 + 9\)
(C) \(64x^2 - 48x + 9\)
(D) \(64x^2 - 48x - 9\)

6. \(\frac{6}{x + 6} = 5\) then \(x\) equals
(A) 0
(B) \(-1\)
(C) \(-\frac{24}{5}\)
(D) \(-\frac{5}{24}\)

7. \(a^3b - ab^3 =\)
(A) \(a^2b(a - b)\)
(B) \(-a^2b(a + b)\)
(C) \(ab(a^2 + b^2)\)
(D) \(ab(a + b)(a - b)\)

8. John is 7 years older than Sam. Their combined age is 45 years. If Sam’s age is represented by \(x\), which of the following is an equation that can be used to find Sam’s age?
(A) \(x + 7 = 45\)
(B) \(x + x - 7 = 45\)
(C) \(x(x + 7) = 45\)
(D) \(x + x + 7 = 45\)
9. If $|9 - x| = 12$ then $x =$
   (A) $-3$ only
   (B) $21$ only
   (C) $-3$ or $21$
   (D) $3$ or $-21$

10. If $A = 2xy$, then $y =$
   (A) $A - 2x$
   (B) $Ax - 2$
   (C) $\frac{2x}{A}$
   (D) $\frac{A}{2x}$

11. A jar contains 3 red marbles and 4 blue marbles. If a marble is chosen at random, what is the probability that the marble will be red?
   (A) $\frac{1}{3}$
   (B) $\frac{3}{4}$
   (C) $\frac{4}{7}$
   (D) $\frac{3}{7}$

12. If the average (mean) of $x + 1$, $x + 4$, and $x + 7$ is 20, what is the value of $x$?
   (A) 16
   (B) 17
   (C) 20
   (D) 24

13. Given the following system: \[
\begin{align*}
  y &= 2x + 1 \\
  3x + y &= -4
\end{align*}
\] what is the value of $x$?
14. The expression: \( \frac{6}{4-\sqrt{7}} \) is equivalent to:

(A) \( \frac{4+\sqrt{7}}{3} \)

(B) \( \frac{2(4+\sqrt{7})}{3} \)

(C) \( 4+\sqrt{7} \)

(D) \( 6(4+\sqrt{7}) \)

15. What are the roots to the following equation \( 2x^2 + 5x - 3 = 0 \) ?

(A) \(-3\) and \(2\)

(B) \(-3\) and \(\frac{1}{2}\)

(C) \(-2\) and \(\frac{1}{3}\)

(D) \(-2\) and \(-3\)

16. What is the slope of the line segment joined by the points \((2,7)\) and \((-2,6)\)

(A) \(\frac{1}{2}\)

(B) \(\frac{1}{4}\)

(C) \(-\frac{1}{2}\)

(D) \(-\frac{1}{4}\)

17. Which of the following is equivalent to: \(-2x + 12 \leq 4\)
(A) \( x \leq 4 \)
(B) \( x \geq 4 \)
(C) \( x \leq -4 \)
(D) \( x \geq -4 \)

18. A rectangle of length \( x \) and width \( y \) has a perimeter of 50 and an area of 150. Which of the following pairs of equations can be used to find \( x \) and \( y \)?

(A) \[ \begin{align*}
\{ & x + y = 50 \\
\{ & xy = 150
\end{align*} \]
(B) \[ \begin{align*}
\{ & 2(x + y) = 50 \\
\{ & xy = 150
\end{align*} \]
(C) \[ \begin{align*}
\{ & x + y = 150 \\
\{ & xy = 50
\end{align*} \]
(D) \[ \begin{align*}
\{ & 2(x + y) = 150 \\
\{ & xy = 50
\end{align*} \]

19. At Roosevelt High School, a student scored 70, 90, and 75 on his first three exams. What must he get on his fourth exam to have a final average of 80?

(A) 88
(B) 85
(C) 87
(D) 89

20. \( \frac{2}{x-2} - \frac{2}{x+2} = \)

(A) 0
(B) \( \frac{2}{x} \)
(C) \( \frac{8}{x^2-4} \)
21. Cary has 4 pairs of shirts and 5 pairs of pants. How many different outfits consisting of 1 shirt and 1 pair of pants can he wear?
(A) 9
(B) 4
(C) 5
(D) 20

22. Find the slope of the equation \(-2x - y = 3\)
(A) 2
(B) 3
(C) \(-1\)
(D) \(-2\)

23. The roots of the equation \(x^2 - 4x - 3 = 0\) are
(A) \(2 \pm \sqrt{7}\)
(B) \(-2 \pm \sqrt{7}\)
(C) \(4\pm\sqrt{7}\)
(D) \(-4 \pm \sqrt{7}\)

24. Which of the following is the equation of a line with slope of \(\frac{1}{3}\) and contains the point \((3, -7)\)?
(A) \(y - 7 = \frac{1}{3}(x - 3)\)
(B) \(y - 7 = \frac{1}{3}(x + 3)\)
(C) \(y + 7 = \frac{1}{3}(x - 3)\)
(D) \(y + 7 = \frac{1}{3}(x + 3)\)
25. What are all values of x for which $4x^2 - 2x \leq 0$

(A) $x \leq 0$
(B) $x \geq \frac{1}{2}$
(C) $0 \leq x \leq \frac{1}{2}$
(D) $x \leq 0$ or $x \geq \frac{1}{2}$

26. Simplify: $\left(9x^4\right)^{\frac{3}{2}}$

(A) $3^5 x^{\frac{5}{2}}$
(B) $6x^3$
(C) $9x^6$
(D) $27x^6$

27. The product of $\frac{5-y}{(3y)^2}$ and $\frac{9y^2}{y-5}$ is:

(A) 1
(B) $-1$
(C) 3
(D) $-3$

28. The expression $\sqrt{27} + \sqrt{12}$ is equivalent to

(A) $5\sqrt{3}$
(B) $13\sqrt{3}$
(C) $5\sqrt{6}$
(D) $\sqrt{39}$
29. If \((2x+3)(x-5)\) is written in the form \(ax^2 + bx + c\), what is the value of \(c\)

(A) \(-2\)
(B) \(-15\)
(C) 2
(D) \(-7\)

30. The solution set of the equation \(\sqrt{y-2} = 2 - y\) is:

(A) 2 and 3
(B) 2 only
(C) 3 only
(D) Neither 2 nor 3