College entrance exam and science high school entrance test tips. Conquer UPCAT, ACET, USTET, DLSUCET, PSHS-NCE, and other entrance tests.

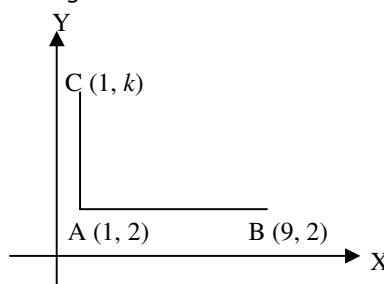# MATHEMATICS PROFICIENCY
(Intermediate Algebra)

Directions: This subtest is a measure of ability to think out solutions to quantitative problems. Solve each problem carefully and then decide which is the best among the answer choices. Blacken the circle it corresponds to after the appropriate item number on your answer sheet.

Notes:
► Calculators of any kind are not permitted. All numbers used are real numbers.

► Figures which accompany problems in this subtest are intended to provide information useful in solving the problems. They are drawn as accurately as possible <u>except</u> when it is stated in a specific problem that its figure is not drawn to scale. All figures lie in a plane unless otherwise indicated.

BEGIN HERE:

1. In the diagram at the right, line *AB* and *AC* have equal lengths. What is the value of *k*?
    a. 9
    b. 10
    c. 11
    d. 12

2. What is the equation of the line that passing through (1,1) and parallel to line $y = 2x - 5$?
    a. $y = 2x$ c. $y = 2x + 1$
    b. $y = 2x - 1$ d. $y = -\dfrac{1}{2}x + 1$

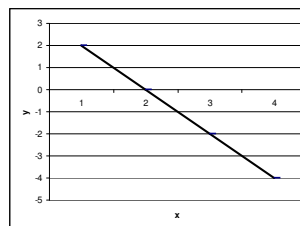3. What is the slope of the line containing the points (2, -4) and (-5, 7)?

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a. $\dfrac{11}{7}$　　　　b. $-\dfrac{11}{7}$　　　　c. $\dfrac{7}{11}$　　　　d. $-\dfrac{7}{11}$

4. Which of the following can best describe the graph?
   a. $y = 4 - 2x$
   b. $y < 4 - 2x$
   c. $y > 4 - 2x$
   d. cannot be determined

5. Kung ang $a = b + \dfrac{1}{2} = \dfrac{b+3}{2}$, ano ang halaga ng a?

   a. $\dfrac{1}{3}$　　　　b. 3　　　　c. $\dfrac{5}{2}$　　　　d. 2

6. If $2x + 4y - 5z = 19$ and $z = 3$, what is the value of $x + 2y + z$?
   a. 20　　　　b. 15　　　　c. 10　　　　d. 5

7. Ang eksponensyal na ekspresyong $3^{2/n}$ sa pormang radical ay _____.

   a. $\sqrt{3^n}$　　　　b. $\sqrt[n]{9}$　　　　c. $\sqrt[9]{n}$　　　　d. $\sqrt[3]{n}$

8. Ano ang halaga ng q sa tumbasang radikal na $\sqrt{21+q} = 3 + \sqrt{q}$?
   a. 5　　　　b. 4　　　　c. 3　　　　d. 2

9. Simplify the following expression : $\dfrac{1}{\sqrt{a+2}} + \dfrac{\sqrt{3a}}{\sqrt{a+2}}$

   a. $\dfrac{1+\sqrt{3a}}{a+2}$

   b. $\dfrac{1+\sqrt{3a}}{\sqrt{a+2}}$

   c. $\dfrac{\sqrt{3a}}{\sqrt{a+2}}$

   d. $\dfrac{\left(1+\sqrt{3a}\right)\left(\sqrt{a+2}\right)}{a+2}$

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10. Pasimplehin ang ekspresyong $\dfrac{2}{x+2} - \dfrac{3}{x^2-4}$

    a. $\dfrac{2x+1}{x^2-4}$ b. $\dfrac{2x+1}{x^2-4}$ c. $\dfrac{2x+1}{x^2-4}$ d. $\dfrac{2x+1}{x^2-4}$

11. Factor out the expression $ab - 1 - b + a$ completely:
    a. $(b - 1)(a + 1)$ c. $(b - 1)(a - 1)$
    b. $(b - 1)(a - 1)$ d. $(b + 1)(a + 1)$

12. Which of the following equations has a root in <u>common</u> with $x^2 - 6x + 5 = 0$?
    a. $x^2 + 1 = 0$ c. $2x^2 - 2 = 0$
    b. $x^2 - x - 2 = 0$ d. $x^2 - 2x - 3 = 0$

13. Alin sa mga sumusunod na ekspresyon ang <u>perfect square trinomial</u>?
    a. $9x^2 - 12x - 4$ c. $x^2 + 10x + 36$
    b. $4x^2 - 20x + 25$ d. $4x^2 + 10x + 25$

14. Kung ang $(x + y)^2 = 20$ at ang $xy = 4$, ano ang halaga ng $x^2 + y^2$?
    a. 16   b. 14   c. 12   d. 10

15. If -6 is one solution of the equation $x^2 + 5x + k = 7$, where k is constant, what is the other solution?
    a. 1   b. -1   c. 0   d. 2

16. For which value of p in the division $(2x^2 + 11x - p) \div (2x - 3)$ is the remainder zero?
    a. 3   b. 5   c. 18   d. 21

17. Aling pangungusap ang totoo sa mga graph ng mga tumbasan sa sistemang $y = -x + 3$ at $y = -x - 2$?
    a. Ang mga graph ng linya ay dumaraan sa mga point (0, 2) at (0, 3).
    b. Ang graph ng dalawang linya ay parallel.
    c. Ang graph ay may iisang linya.
    d. Ang mga graph ng dalawang linya ay nagtatagpo sa point (-2, 3).

18. What is the solution set (x, y) in system of equations: $2x - 3y = 12$ and $3x + y = 7$?
    a. (3, -2)   c. (2, -3)
    b. (-3, 2)   d. (-2, 3)

19. One number is 17 less than another. Their sum is 125. What is the smaller number?
    a. 54   b. 60   c. 71   d. 108

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20. Bruno raises a number of ducks and carabaos in his farm, all of which are normal. If his animals have a total of 44 feet and a total of 16 heads, how many carabaos does Bruno have?
    a. 5   b. 6   c. 7   d. 8

21. How many students are there in a class if two students are not seated when 4 rows of seat are filled and 9 students are not seated when 3 rows of seats are filled?
    a. 36   b. 34   c. 30   d. 28

22. The attendance at Enchanted Kingdom on a certain day was 737 persons. If there were 289 more adults than children, how many children were there?
    a. 513   b. 548   c. 274   d. 250

23. A train covers the distance d between two cities in h hours arriving 2 hours late. What speed would permit the train to arrive on schedule?

    a. $h - 2$ b. $\dfrac{d}{h} - 2$ c. $\dfrac{d}{h-2}$ d. $dh - 2$

24. Jerry ran a 200 – meter dash race at an average speed of 2.4 kph. If Ryan ran the same race at an average speed of 3 kph, how many minutes longer did it take for Jerry to complete the race?
    a. 1 min   b. 2 min   c. 3 min   d. 4 min

25. A taxi driver must complete a 180 mile trip in 4 hours. If he averages 50 miles an hour for the first three hours of his trip, how fast, in miles per hour, must he travel in the final hour?
    a. 30   b. 35   c. 40   d. 45

26. A man is thrice as old as his son. In five years, he will be three years more than twice his son's age. How many years old is the man now?
    a. 10   b. 24   c. 36   d. 41

27. Jack is now 14 years older than Jill. If in 10 years Jack will be twice as old as Jill, how many years old will Jack be in 5 years?
    a. 9   b. 19   c. 21   d. 23

28. How many liters of 60% solution of nitric acid should be added to 10 liters a 30% solution of nitric acid to obtain a 50% solution?
    a. 10   b. 15   c. 20   d. 25

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29. A tank can be filled in 6 hours by pipe A running alone, or in 4 hours by pipe B alone. How many hours would be needed to fill the tank if both pipes were running?

    a.   5   b. $2\dfrac{2}{5}$ c. $\dfrac{5}{12}$ d. $3\dfrac{1}{2}$

30. Grace can finish cleaning their room in 45 minutes. When her sister Abby helps her, it takes them 18 minutes to clean the room completely. How many minutes would it take Abby to clean their room alone?

    a.   20   b. 25   c. 30   d. 35