SPU MATHEMATICS PLACEMENT TEST

There are 40 multiple choice questions on the mathematics part of the placement test. There are 5 choices given for each question. Most of the questions cover the following topics from Algebra:

- Operations with Polynomials: Addition, Subtraction, Multiplication, and Division
- Substitution in Algebraic Expressions and Equations
- Translation from Verbal to Algebraic Expressions
- Exponents and Roots
- Solving Linear Equations
- Factoring
- Solving Quadratic Equations by Factoring
- Algebraic Fractions
- Linear Inequalities and Order
- Graphs of Linear Equations
- Systems of Linear Equations

Sample questions may be found on pages 2 through 6 with answers on page 7.

If you have any further questions with regards to the Mathematics Placement Test, then please email Dr. Protomastro at gprotomastro@saintpeters.edu.

SAMPLE QUESTIONS

1. If A represents the number of apples purchased at 15 cents each, and B represents the number of bananas purchased at 10 cents each, which of the following represents the total value of the purchase in cents?

A) A + B
B) 25(A + B)
C) 10A + 15B
D) 15A + 10B
E) .15A + .10B

2. What is the value of the expression $2x^2 + 3xy - 4y^2$ when x = 2 and y = -4?

A) -80
B) -32
C) 32
D) 80
E) 48

3. $(3x - 2y)^2 =$

A) $9x^2 - 4y^2$
B) $9x^2 + 4y^2$
C) $9x^2 - 6xy + 4y^2$
D) $9x^2 - 12xy + 4y^2$
E) $9x^2 - 6xy - 4y^2$

4. If x > 2, then $\dfrac{x^2 - x - 6}{x^2 - 4} =$

A) $\dfrac{x-3}{2}$
B) $\dfrac{x+3}{x+2}$
C) $\dfrac{x-3}{x+2}$
D) $\dfrac{3}{2}$
E) $\dfrac{x-3}{x-2}$

5. Simplify: $6a\sqrt{20a^3b^2}$ (assume both variables are nonnegative)

A) $12a^2b\sqrt{5a}$
B) $12ab\sqrt{5a}$
C) $24a^2b\sqrt{5a}$
D) $24ab\sqrt{5a}$
E) $12a^3b\sqrt{5a}$

6. If $2x - 3(x + 4) = -5$, then x =

A) -17
B) -7
C) 7
D) 17
E) $\frac{7}{5}$

7. $20 - \frac{4}{5}x \geq 16$

Which of the following inequalities is equivalent to the inequality shown above?

A) $x \leq 5$
B) $x \geq 5$
C) $x \leq \frac{65}{2}$
D) $x \geq \frac{65}{2}$
E) $x \leq -45$

8. If $5t + 2 = 6$, then t =

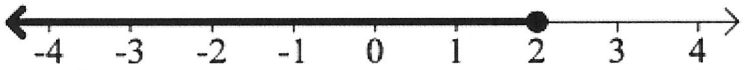
A) 8
B) $\frac{5}{4}$
C) $\frac{4}{5}$
D) -8
E) $\frac{8}{5}$

9. For which of the following equations are x = 5 and x = -5 both solutions?

A) $x^2 + 25 = 0$
B) $x^2 - 25 = 0$
C) $x^2 + 10x - 25 = 0$
D) $x^2 - 5x - 25 = 0$
E) $x^2 - 10x + 25 = 0$

10. Which of the following is a factor of both $x^2 - x - 6$ and $x^2 - 5x + 6$?

A) $x - 3$
B) $x - 2$
C) $x + 2$
D) $x + 3$
E) $x - 6$

11. 

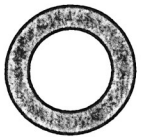
The solution set of which of the following inequalities is graphed on the number line above?

A) $2x - 4 \geq -3$
B) $2x + 5 \leq 6$
C) $3x - 1 \leq 5$
D) $4x - 1 \geq 7$
E) $-2x + 7 \leq 3$

12. Solve the system of equations: $\begin{cases} 5x - 4y = -3 \\ 2x - 3y = -4 \end{cases}$

A) (2,1)
B) (1,−2)
C) (1,2)
D) (-1,2)
E) no solution

13. In the figure below, both circles have the same center, and the radius of the larger circle is R. If the radius of the smaller circle is 3 units less than R, which of the following represents the area of the shaded region?



A) πR^2
B) $\pi(R-3)^2$
C) $\pi R^2 - \pi \times 3^2$
D) $\pi R^2 - \pi(R-3)^2$
E) $\pi R^2 + \pi(R-3)^2$

14. If $x \neq 0$, then $\frac{u}{x} + \frac{5u}{x} - \frac{u}{5x} =$

A) $\frac{7x}{5u}$
B) $\frac{5u}{7x}$
C) $\frac{9u}{5x}$
D) $\frac{31u}{5x}$
E) $\frac{29u}{5x}$

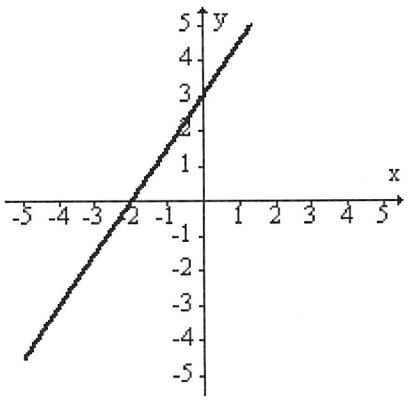
15. $5x(2x - 3) + (2x - 3) =$
    A) $(5x + 1)(2x + 3)$
    B) $(5x + 1)(2x - 3)$
    C) $(5x - 1)(2x + 3)$
    D) $(5x - 1)(2x - 3)$
    E) $10x(2x-3)$

16. $\frac{10x^6 + 8x^4}{2x^2} =$
    A) $9x^{12}$
    B) $14x^4$
    C) $5x^4 + 4x^2$
    D) $5x^3 + 2x^2$
    E) $9x^8$

17. If $a \neq b$ and $\frac{1}{x} + \frac{1}{a} = \frac{1}{b}$, then x =
    A) $\frac{1}{b} - \frac{1}{a}$
    B) $b - a$
    C) $\frac{1}{ab}$
    D) $\frac{a-b}{ab}$
    E) $\frac{ab}{a-b}$

18. A rectangular yard has area 96 square feet. The width of the yard is 4 feet less than the length. Find the length, in feet, of the rectangular yard.
    A) 6
    B) 8
    C) 12
    D) 16
    E) 24

19.



The line in the figure above is the graph of which of the following equations?

A) $3y - 2x = 0$
B) $3x - 2y = -6$
C) $3x + 2y = 6$
D) $3y - 2x = 6$
E) $2x + 3y = 6$

20. On Monday, it took Vicenza 3 hours to do a page of science homework exercises. The next day she did the same number of exercises in 2 hours. If her average rate on Monday was p exercises per hour, what was her average rate the next day, in terms of p?

A) $2(p + 1)$ exercises per hour
B) $3(p - 1)$ exercises per hour
C) $\frac{2}{3}p$ exercises per hour
D) $\frac{3}{2}p$ exercises per hour
E) $\frac{5}{3}p$ exercises per hour

ANSWERS TO SAMPLE QUESTIONS

1. D
2. A
3. D
4. E
5. A
6. B
7. A
8. C
9. B
10. A
11. C
12. C
13. D
14. E
15. B
16. C
17. E
18. C
19. B
20. D