Pennsylvania College of Technology

PENNSTATE

Intermediate Algebra
Practice Math Placement Exam

- This 24-question practice exam measures your ability to perform basic operations and solve problems that involve intermediate algebra skills and concepts.
- Although you may use a basic four-function, scientific, or graphing calculator, it is possible to solve every question without a calculator.
- **Do not make random guesses**. If you have **NO KNOWLEDGE** of the question, you should leave the answer blank. If you have some knowledge, you may be able to narrow choices and intelligently select the correct answer.
- You should do your best on this test so that your score reflects your knowledge of mathematics. This result, in turn, allows placement into a math course for which you are prepared and should enable your successful completion of that course.

Pennsylvania College of Technology
Mathematics Department
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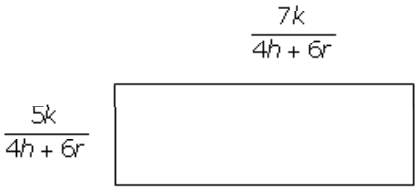
1. The diagonal distance across the screen of a television measures 19 inches. What is the actual width of the television if the height of the screen is 10 inches?

   a. 9 inches
   c. 16.2 inches
   b. 21.5 inches
   d. None of these

2. The width of a rectangle is represented by $\frac{5k}{4h+6r}$; the length of the rectangle is represented by $\frac{7k}{4h+6r}$. Which of the following expressions represents the perimeter of the rectangle?



   a. $\frac{12k}{2h+3r}$
   c. $\frac{24k}{16h+24r}$
   b. $\frac{12k}{4h+6r}$
   d. $\frac{35k^2}{(4h+6r)^2}$

3. A chemist has a 20% acid solution and a 50% acid solution. How much of each must be mixed to get 10 liters of a 30% acid solution? Which of the following systems of equations correctly represents this problem?

   a. $\begin{cases} x+y=300 \\ 20x+30y=300 \end{cases}$
   c. $\begin{cases} 10-x=y \\ 20x+50y=30 \end{cases}$
   b. $\begin{cases} 0.20x+0.50y=0.30 \\ x+y=10 \end{cases}$
   d. $\begin{cases} x+y=10 \\ 20x+50y=300 \end{cases}$

4. The expression $\left(5a^6\right)^{-1/3}$ is equivalent to which of the following?

   a. $\frac{1}{5}a^2$
   c. $-\sqrt[3]{5}a^2$
   b. $-\sqrt[3]{5a^6}$
   d. $\frac{1}{\sqrt[3]{5}a^2}$

5. The expression $\left(25x^{16}\right)^{1/2}$ is equivalent to which of the following?

a. $5x^8$

c. $5x^4$

b. $25x^8$

d. $25x^4$

6. When solving the following system by substitution, which expression could be used?

$$\begin{cases} 4x + y = 1 \\ -3x + 2y = -9 \end{cases}$$

a. $3x - 9$

c. $1 - 4x$

b. $4x + 1$

d. $3y + x$

7. Solve for m in the following system: $\begin{cases} m - n = 7 \\ 3m + 2n = 6 \end{cases}$

a. 3

c. -4

b. -3

d. 4

8. Which binomial is a factor of $6x^2 + 7x - 3$?

a. $(3x + 1)$

c. $(x + 1)$

b. $(3x - 1)$

d. $(x + 3)$

9. Find the value of b that makes $x^2 + bx + 36$ a perfect square.

a. 6

c. 36

b. 12

d. 324

10. Which expression is equivalent to $\dfrac{3y^2 - 27}{3 - y}$?

a. $3(3 - y)$

c. $-3(3 - y)$

b. $3(y + 3)$

d. $-3(y + 3)$

11. Find the solution set for $(x+1)(x-2)=4$.

a. $\{2,-1\}$

c. $\{3,-2\}$

b. $\{3,6\}$

d. $\{-3,2\}$

12. The solutions of $x^2-2x-48=0$.

a. $-8,-6$

c. $-6,8$

b. $-8,6$

d. $6,8$

13. Which of the following expressions is equivalent to $\frac{1}{x}+\frac{1}{y}$?

a. $\frac{1}{x+y}$

c. $\frac{x+y}{y+x}$

b. $\frac{xy}{x+y}$

d. $\frac{x+y}{xy}$

14. Add and simplify: $\frac{2y}{y^2+7y+12}+\frac{y+2}{y+4}$

a. $\frac{y^2+7y+6}{(y+4)(y+3)}$

c. $\frac{y^2+2y+6}{(y+4)(y+3)}$

b. $\frac{y^2+5y+6}{(y+4)(y+3)}$

d. $\frac{3y+2}{y^2+8y+16}$

15. Which of the following represents a correct step in the process of solving the equation

$\frac{x+4}{x}-\frac{3}{7}=0$?

a. $7x+4-3x=0$

c. $7(x+4)=-3x$

b. $7x+28-3x=0$

d. $\frac{x+4-3}{x-7}=0$

16. Solve: $\frac{x^2}{x-1}=\frac{1}{x-1}$

a. $\{1\}$

b. $\{1,-1\}$

c. $\{-1\}$

d. No solution

17. Solve: $\frac{7}{y}-\frac{1}{5}=\frac{1}{2}$

a. 49

b. $\frac{1}{10}$

c. 10

d. $\frac{12}{5}$

18. Simplify completely: $\sqrt{99}$

a. $3\sqrt{33}$

b. $9\sqrt{11}$

c. 33

d. $3\sqrt{11}$

19. Perform the indicated operation; simplify answer: $\left(\sqrt{3}+5\right)^2$

a. 28

b. $28+10\sqrt{3}$

c. $\sqrt{6}+10$

d. None of these

20. Solve using the quadratic formula: $x^2+6x+2=0$

a. $-3\pm\sqrt{7}$

b. $-3\pm2\sqrt{7}$

c. $6\pm\sqrt{7}$

d. $3\pm2\sqrt{7}$

21. Determine the number of real solutions to $x^2-5x+8=0$.

a. 2

b. 1

c. 0

d. Infinitely many

22. The difference of a number and 6 times its reciprocal is 15. If n represents the number, which of the following represents a correct equation to solve the problem?

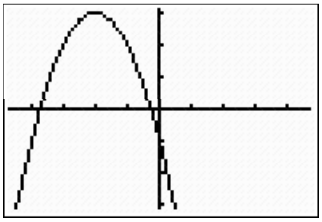
a. $n-\frac{6}{n}=15$

b. $\frac{6}{n}-n=15$

c. $6n\left(\frac{1}{n}\right)=15$

d. $(n-6)\left(\frac{1}{n}\right)=15$

23. In the general form of the quadratic equation, $y=ax^2+bx+c$, what values of a could generate the graph shown below?



a. $0<a<1$

b. $a>0$

c. $a<0$

d. $a=0$

24. The perimeter of a new rectangular lawn that needs sod is 72 feet. The length of the lawn is 6 feet more than twice the width. Which system of equations will determine the length L and the width W of the lawn?

a. $\begin{cases} L+W=72 \\ L=6+2W \end{cases}$

b. $\begin{cases} 2L+2W=72 \\ L+6=2W \end{cases}$

c. $\begin{cases} 2L+2W=72 \\ L=2W+6 \end{cases}$

d. $\begin{cases} 2L+2W=72 \\ W=2L+6 \end{cases}$

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Mathematics Department
Intermediate Algebra Practice Placement Exam Solutions

1. c.
2. a.
3. d.
4. d.
5. a.
6. c.
7. d.
8. b.
9. b.
10. d.
11. c.
12. c.
13. d.
14. a.
15. b.
16. c.
17. c.
18. d.
19. b.
20. a.
21. c.
22. a.
23. c.
24. c.