Pennsylvania College of Technology

PENNSTATE

Elementary Algebra
Practice Math Placement Exam

- This 39-question practice exam measures your ability to perform basic operations and solve problems that involve elementary 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
Elementary Algebra Practice Placement Exam

1. The difference between -12 and what number produces -4?

   a. 8
   c. 16
   b. -8
   d. -16

2. Which of the following expressions is **NOT** equal to the others?

   a. $\frac{-a}{-b}$
   c. $-\frac{-a}{-b}$
   b. $\frac{a}{-b}$
   d. All are equal.

3. If P represents a positive number and Q represents a negative number, what type of number is represented by the expression $\frac{-P}{Q}$?

   a. Zero
   c. A positive number
   b. A negative number
   d. A positive or a negative number

4. Which of the following statements represents a correct step in performing the addition $\frac{3}{8}+\frac{-5}{4}$?

   a. $\frac{3+(-10)}{8}$
   c. $\frac{3+(-10)}{8+8}$
   b. $\frac{3+(-5)}{8}$
   d. $\frac{4\cdot 3+9\cdot(-5)}{8}$

5. Add: $\frac{2}{3}+\frac{-1}{4}$

   a. $\frac{11}{12}$
   c. $\frac{1}{12}$
   b. $\frac{1}{7}$
   d. $\frac{5}{12}$

6. Evaluate the expression, $-2mn + p^2$, if $m = -4,\ n = 3,$ and $p = -5$.

a. -49

b. 1

c. -1

d. 49

7. If $x = -4,\ y = 2,$ and $z = 4$, evaluate the expression $\dfrac{x - y}{y + z}$.

a. 1

b. -1

c. -2

d. 0

8. Which of the following expressions contains exactly three terms?

a. $\dfrac{x}{y} + 2x + 7$

b. $4xy$

c. $3(x + y)$

d. $\dfrac{x + y}{z}$

9. Simplify: $6b - 2(b - 4)$

a. $4b - 8$

b. $4b - 4$

c. $4b + 8$

d. $4b + 4$

10. Which of the following does **NOT** have a value of -9?

a. $-\left(3^2\right)$

b. -3^2

c. $(-3)^2$

d. $-(-3)^2$

11. Solve for *w*: $\dfrac{w}{3} = \dfrac{2}{5}(w - 10)$

a. 10

b. 60

c. -60

d. None of these

12. Which equation represents a correct step in the process of solving the equation $-7-y=3(y-1)$?

a. $-7+3=3y+y$

b. $\frac{-7}{3}-y=y-1$

c. $-7+3=3y-y$

d. None of these are correct.

13. If $4t=7t-3(5+2t)$, then t =

a. 3

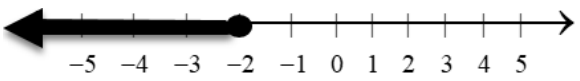
b. -5

c. $\frac{3}{2}$

d. None of these

14. Choose the graph of the solution to the inequality $-7x+3>17$.

a.



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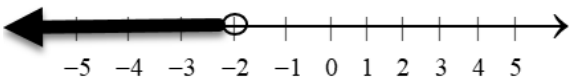

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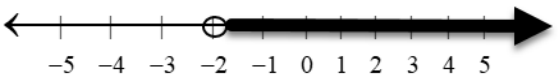

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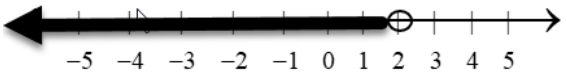


15. Translate into an algebraic expression: Four less than the square of a number.

a. $4<x^2$

b. $4-x^2$

c. $2x-4$

d. x^2-4

16. Translate the sentence: The length (L) is 8 more than 3 times the width (W).

a. $L=11W$

b. $L+8>3W$

c. $L=3W+8$

d. $L>8+3W$

17. Colin's auto repair shop charges $60 per hour for labor and $125 for a particular sensor. What is the maximum amount of time Colin's mechanics can take to install this sensor if they wish to keep the total customer bill under $255? Which of the following inequalities correctly represents the ideas in this problem?

a. $60h+125<255$

b. $(60+125)h\le 255$

c. $60h+125\le 255$

d. $60h+125\ge 255$

18. Which equation could be used to solve the proportion $\frac{5}{p+6}=\frac{2}{p}$?

a. $5p+2(p+6)=0$

b. $5p=2p+6$

c. $p(p+6)=10$

d. $5p-2p=12$

19. Cassidy has 40 milliliters of a 15% acid solution. Which of the following equations could be used to find the amount of a 42% solution that should be added to the 15% acid solution to create a 30% acid solution?

a. $40\cdot 15=42x+30(x+40)$

b. $0.15\cdot 40=0.42x+0.30$

c. $42x+15\cdot 40=30$

d. $42x+15\cdot 40=30(x+40)$

20. To make 3 dozen cookies, $1\frac{1}{4}$ cups of pecan halves are required. How many dozen cookies can be made with 5 cups of pecan halves?

a. 4

b. $6\frac{1}{4}$

c. 12

d. 10

21. The perimeter of a rectangle is represented by the expression $6x+16$. Which of the following expressions represents the length of the rectangle if the width is $2x+3$?

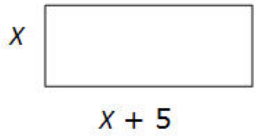
a. $4x+19$

b. $x+5$

c. $4x+13$

d. $2x+10$

22. Which of the following expressions represents the area of the rectangle?



a. $(x+5)+x+(x+5)+x$

b. $2x+5$

c. $x(x+5)$

d. $2x(x+5)$

23. Which of the following is **NOT** a true statement?

a. $\left(2a^3b^{-1}\right)^{-2}=\dfrac{-4b^2}{a^6}$

b. $\dfrac{g^{-4}}{g^3}=\dfrac{1}{g^7}$

c. $\dfrac{(3h)^2}{h^{-2}}=9h^4$

d. $x^0=1$

24. Identify the only accurate example of the exponent rules.

a. $x^3\cdot x^4=x^7$

b. $\left(x^2\right)^4=x^6$

c. $x^{-3}\cdot x^3=0$

d. $\dfrac{x^5}{x^{-2}}=x^3$

25. Simplify: $\left(-2a^4b\right)\left(-3a^{-2}b\right)^2$

a. $-18b^3$

b. $18b^3$

c. $-6a^4b^{-3}$

d. $6a^{-16}b^2$

26. Evaluate: $-|20|+|-15|$

a. 35

b. –35

c. –5

d. 5

27. Which of the following best describes the graph of $y = 7$?

a. V-shape

b. Vertical line

c. Horizontal line

d. Line rising to the right

28. Which statement best describes the graph of the equation $2x+5y=16$?

a. The y-intercept is 8.

b. The line has a negative slope.

c. The line contains the point $(2,5)$.

d. The x-intercept is $\frac{-2}{5}$.

29. Simplify: $(r+3p)^2$

a. $r^2+6rp+9p^2$

b. r^2+3p^2

c. $r^2+3rp+9p^2$

d. r^2+9p^2

30. Which expression is equivalent to: $(-7x^2+4x-8)+(9x^2-6x+11)$

a. $2x^2-2x+3$

b. $-2x^2-2x-3$

c. $2x^4-2x^2+3$

d. None of these

31. Which statement illustrates the associative property of multiplication?

a. $(2r)s=2rs$

b. $(2r)s=s(2r)$

c. $(2r)s=(r\cdot 2)s$

d. $(2r)s=2(rs)$

32. A tool box is on sale for 20% off the original price. If the original price was $550.00, which expression represents the discounted price?

a. $550-20$

b. $(1.20)(550)$

c. $(0.80)(550)$

d. $(0.20)(550)$

33. 30% of what number is 90?

a. 2700

b. 27

c. 3

d. None of these

34. A college student drove his truck 500 miles in 2 days. Which equation represents a proportion to determine how far the student will drive in 5 days at the same rate?

a. $\frac{500}{5}=\frac{x}{2}$

b. $\frac{500}{2}=\frac{x}{5}$

c. $\frac{500}{2}=\frac{5}{x}$

d. $\frac{500}{5}=\frac{2}{x}$

35. Which equation **DOES NOT** have a *y*-intercept of $(0,3)$?

a. $2y=x+6$

b. $8x+y=3$

c. $5x-y=3$

d. $9x=y-3$

36. Which of the following statements is **TRUE** about the line created by the equation $3x-5y=4$?

a. Slope is 3 and *y*-intercept is $(0,4)$

b. Slope is 3 and *y*-intercept is $\left(0,\frac{4}{5}\right)$

c. Slope is $\frac{3}{5}$ and *y*-intercept is $\left(0,-\frac{4}{5}\right)$

d. Slope is $-\frac{3}{5}$ and *y*-intercept is $(0,4)$

37. The graph of which equation would be perpendicular to a line whose slope is $\frac{1}{3}$?

a. $y=3x-7$

b. $y=-3x+7$

c. $\frac{1}{3}x+y=9$

d. $y-\frac{1}{3}x=5$

38. The bowling handicap, *H*, in terms of bowling average, *A*, is $H = 0.8(200 - A)$. What is the bowling average if the handicap is 20?

a. 144

b. 140

c. 175

d. 1580

39. Solve the formula $V = \frac{1}{3}\pi r^2 h$ for *h*.

a. $h = \frac{3V}{\pi r^2}$

b. $h = \frac{V}{3\pi r^2}$

c. $h = 3(V - \pi r^2)$

d. $h = \frac{(V - \pi r^2)}{3}$

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Mathematics Department
Elementary Algebra Practice Placement Exam Solutions

1. b.
2. a.
3. c.
4. a.
5. d.
6. d.
7. b.
8. a.
9. c.
10. c.
11. b.
12. a.
13. b.
14. b.
15. d.
16. c.
17. a.
18. d.
19. d.
20. c.
21. b.
22. c.
23. a.
24. a.
25. a.
26. c.
27. c.
28. b.
29. a.
30. a.
31. a.
32. c.
33. d.
34. b.
35. c.
36. c.
37. b.
38. c.
39. a.