

NAME: _____ Score _____/100
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SHOW ALL YOUR WORK IN A NEAT AND ORGANIZED FASHION

Circle T or F, whichever is correct. 2 pts. each for 1 – 27. 5 pts. each for 28 – 36.

1. T **F** My garden is 24 ft. long and 16 ft wide, its perimeter is $(24)(16)$ ft.
2. T **F** If 3 is a solution of a particular equation and 5 is not, then that equation is a contradiction .
3. **T** F If an equation in one variable is an identity, then 7 is a solution of that equation.
4. T **F** Every equation is a linear equation.
5. T **F** $5x + 7$ is a linear equation.
6. T **F** The exact volume of a cone of height 8 and radius 3 is a rational number.
7. **T** F The exact area of the right triangle with legs 5 and 12 and hypotenuse 13 is 30.
8. T **F** If both sides of an equation are multiplied by the same algebraic expression, the resulting equation is equivalent to the original equation.
9. T **F** Every linear equation in one variable has exactly one solution.
10. **T** F 2 is a solution of the equation $3x - 5 = 1$.

Fill in each of the blanks to make the statements true.

11. An **equation** is a mathematical statement which contains an = symbol.
12. A number (or numbers) that makes an equation true when substituted for the variable (or variables) is called a **solution** of the equation.
13. The graph of an equation consists of all the points, and only those points, whose coordinates are **solutions** of the equation.
14. Two equations are **equivalent** if they have the same solution sets.
15. If any expression is added to both sides of an equation the resulting equation is **equivalent** to the original equation.
16. If both sides of an equation are multiplied by the same non-zero real number, the resulting equation is **equivalent** to the original equation.
17. The process to solve a linear equation in one variable is to generate a sequence of equations each **equivalent** to the previous equation until a **simplest** equation is obtained.
18. The formula for the volume of a rectangular solid of length a, width b, and height c is **$V = abc$** .
19. The formula for the area of a triangle with base b and height h is **$A = \frac{1}{2}bh$** .
20. The formula for the area of a circle with radius r is **$A = \pi r^2$** .

21. The formula for the volume of a cylinder with radius r and height h is $V = \pi r^2 h$.
22. The formula for the distance between two points (x_1, y_1) and (x_2, y_2) is $d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$.
23. A linear equation in one variable is an equation that can be written in the form $ax + b = 0$ where a and b are real numbers with a not zero.

24. What is the solution set for the equation $2x + 1 = 2x + 3$?

Adding $2x$ to both sides of the equation yields the contradiction $1 = 3$. The solution set for $1 = 3$ is \emptyset . Because $1 = 3$ and $2x + 1 = 2x + 3$ are equivalent, they have the same solution set.

The solution set for $2x + 1 = 2x + 3$ is \emptyset . The null set. The empty set.

25. Which of the following are linear equations in one variable? Circle those that are.

$3x + 1 = 9$ $2x = 5$ $-7x + 0 = 5x + 1$ $2x^2 + 3x^3 + x - 9 = 0$

26. Which of the following are conditional equations? Circle those that are.

$x^2 = xx$ $x + 1 = 1$ $x^2 = -8$ $15x = \pi$ $3x = x + x + x + 1$

27. Present an argument which concludes that the equation $5x + 1 = 11$ is a conditional equation?

To verify that an equation is a conditional equation it is necessary to provide at least one solution and at least one non-solution.

2 is a solution and 1 is not a solution, therefore $5x + 1 = 11$ is a conditional equation.

Show your work on exercises 28 – 36 inclusive.

28. Solve $3x = 17$.

Solution:

$3x = 17$

$x = \frac{17}{3}$

29. Solve $\frac{3}{4}x + 1 = 11$.

Solution:

$\frac{3}{4}x + 1 = 11$

$\frac{3}{4}x = 10$

$x = \left(\frac{4}{3}\right)10 = \frac{40}{3}$

30. Solve $N = 3st^4 - 5sm$ for m . Simplify your answer as much as possible.

Solution:

$N = 3st^4 - 5sm$

$N - 3st^4 = -5sm$

$m = \frac{N - 3st^4}{-5s} = \frac{3st^4 - N}{5s}$

31. The cost of a new fax machine, including 8% tax, is \$464.40. What is its pretax retail price?

Let x be the pretax retail price

Then $0.08x$ is the tax

The total cost is (pretax retail price plus the tax) $x + 0.08x$

The total cost is \$464.40

The two expressions for total cost yields the equation $x + 0.08x = 464.40$

$1.08x = 464.40$

$x = \frac{464.40}{1.08} = 430$

The pretax retail price of the fax machine is \$430

32. Calculate the exact distance between the points (3, -2) and (5, 1).

$$d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2} = \sqrt{(5 - 3)^2 + (1 + 2)^2} = \sqrt{(2)^2 + (3)^2} = \sqrt{13}$$

33. 125 is what percent of 70? Be sure to write a conclusion after your computations.

Use A = PB

$$125 = P(70)$$

$$P = \frac{125}{70} = 1.785$$

125 is 178.5% of 70.

34. Solve the equation $7x - 2 = -3x + 9$.

Solution:

$$7x - 2 = -3x + 9$$

$$10x = 11$$

$$x = \frac{11}{10}$$

35. Calculate the exact area of a circle of radius 7.

$$A = \pi r^2 = \pi 7^2 = 49\pi$$

36. A serving of cashews contains 14 grams of fat, 7 grams of carbohydrate, and 6 grams of protein. Use the formula $C = 4h + 9f + 4p$ which relates calories (C), carbohydrates (h), fat (f), and protein (p) to determine how many calories are in a serving of cashews?

Use the formula $C = 4h + 9f + 4p$

$$C = 4(7) + 9(14) + 4(6) = 28 + 126 + 24 + 178$$