

There are several different equations we need to be able to solve. For most of the problems, once you have the equation, you'll need to apply the appropriate techniques to isolate the variable you're solving for. One way to think about this is that you're undoing all the steps, in reverse order, that has been done to the variable. The following practice problems are most of the equations you have to be able to solve. Here are a few things to look out for

- always double check your answer by substituting it back in to see if it works
- related to the last comment, sometimes an equation has no solution, so be sure to know why that might happen as it can save you time when solving
- show all steps when solving; this not only helps you recheck your steps but most of the potential points earned on our final and in MATH 1060 is in the work
- for the most part, solving trig equations require algebra and knowledge of the unit circle; sometimes, we may have to rewrite the original problem using trig identities
- be sure to know the algebra rules, including exponent rules, logarithmic properties, how exponents and radicals are related, the unit circle, how to translate a word problem into an equation, how to solve absolute value problems, how to factor, how to work with fractions

PRACTICE

1. Solve for u :

$$2(u - 1) - 2 = -3(-4u + 6) - 6u$$

2. Solve for v :

$$4(v + 1) + v = 5(v - 1) + 9$$

3. Solve for y :

$$(y - 6)^2 = 2y^2 - 8y + 15$$

4. On Thursday, a local hamburger shop sold a combined total of 424 hamburgers and cheeseburgers. The number of cheeseburgers was three times the number of hamburgers sold. How many hamburgers were sold on Thursday?

5. The container that holds the water for the football team is $\frac{1}{4}$ full. After pouring in 9 gallons of water, it is $\frac{5}{8}$ full. How many gallons can the container hold?

6. Solve for x :

$$|x| - 8 = -11$$

7. Solve for y :

$$|3y + 5| = |3y + 4|$$

8. Two trains leave the station at the same time, one heading west and the other east. The westbound train travels at 65 miles per hour. The eastbound train travels at 75 miles per hour. How long will it take for the two trains to be 364 miles apart?

9. Solve the compound inequality:

$$3w + 2 \leq -16 \quad \text{and} \quad 2w - 6 < -2$$

10. Graph the solution to the inequality on the number line:

$$|x - 5| \geq 3$$

11. Graph the solution to the inequality on the number line:

$$|4u - 4| < 12$$

12. Solve: $4|v - 7| + 8 < 44$

13. Solve for u , where u is a real number.

$$\sqrt{24 - 6u} = u - 4$$

14. Solve for w , where w is a real number.

$$\sqrt{w+6} = 4$$

15. Solve for u :

$$-\frac{4}{u+3} = \frac{3}{4u+12} + 1$$

16. Solve for w , where w is a real number: $w^{\frac{1}{4}} = 2$

17. Solve for y where y is a real number: $\sqrt[4]{7y+11} + 3 = 6$

18. Solve for x where x is a real number: $\sqrt[3]{x} = 4$

19. The length of a rectangle is 1m more than twice the width, and the area of the rectangle is 66m^2 .
Find the dimensions of the rectangle.

20. Solve $(y + 7)^2 - 32 = 0$, where y is a real number.

21. Solve the quadratic equation by completing the square: $x^2 + 4x - 10 = 0$

22. Solve for v :
$$-\frac{3}{v+4} = -4 - \frac{7}{v-1}$$

23. Solve: $x^4 - 37x^2 = -36$

24. Graph the solution to the following inequality on the number line: $(x - 4)(x + 2) > 0$

25. Solve for x :

$$\log_{125} x = \frac{1}{3}$$

26. Solve for x :

$$\log_2(3x - 5) = 3$$

27. Solve for x :

$$\log_5(x + 6) = 1 - \log_5(x + 2)$$

28. Solve for x :

$$25^{-x+5} = 125$$

29. Solve for x :

$$\ln 18 = \ln 2 + \ln(x - 8)$$

30. Find all solutions to the equation and write the answer in radians in terms of π :

$$2 \cos \theta + \sqrt{3} = 0$$

31. Use substitution to solve the system:

$$5x + 2y = 12$$

$$x = 3y - 1$$