

3.2.1 Solve each of the following equations:

(b)  $4 - 2r = 17 + 5r$

(c)  $4 + 2.3y = 1.7y - 20$

(d)  $-2t + \frac{3}{2} = \frac{t}{4} - 12$

(e)  $-27u + 13u - 5 = 3 - 14u$

(g)  $-3(r + 7) = 5(3 - r)$

**3.3.2** My brother is 4 times as old as I am. Six years from now, he will be twice as old as I will be. How old is my brother now?

**3.3.3** Recall Captain Hook's clue to find his treasure:

*Get ye to the palm tree at the middle of the isle. Face ye to the west. Think ye of the number that is seventeen more than the quotient when six times the number of paces to the treasure is divided by two. This number be equal to the sum when twelve more than nine minus fifteen is added to four times the number of paces to the treasure. Dig ye only once, for if ye dig in the wrong spot, the treasure will disappear.*

How many paces should you take?

**3.3.4** Bocephus has a bag full of nickels and dimes. If there are 3 times as many dimes as nickels, and he has \$36.05 in his bag, how many nickels does he have?

**3.3.6** At the end of 1994 Walter was half as old as his grandmother. The sum of the years in which they were born is 3838. How old will Walter be at the end of 1999? (Source: AHSME) **Hints:** 19

**Problem 3.18:** Solve the following equations:

(b)  $2\sqrt{r} + 13 - \sqrt{r} = 9 - \sqrt{r}$ .

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3.4.2 Find  $r$  if  $4 - \sqrt{2r} = \sqrt{2r} - 6$ .

3.4.4 Find  $z$  if  $12 + 2\sqrt[4]{2-z} - 9 = \sqrt[4]{2-z}$ .

3.4.5★ At the end of the section, we let  $r = \frac{1}{x-1}$  in  $\frac{x}{x-1} + \frac{2}{3} = \frac{2}{x-1}$  to get  $xr + \frac{2}{3} = 2r$ .

While at first we may seem stuck because we have two variables instead of one, we can still use this substitution to solve the problem!

- Solve the equation  $r = \frac{1}{x-1}$  for  $x$  in terms of  $r$ . In other words, manipulate the equation until you have  $x$  equal to an expression with  $r$ 's in it, but no  $x$ 's.
- Substitute this expression for  $x$  in the equation  $xr + \frac{2}{3} = 2r$ . Do you have a linear equation now? Solve that equation for  $r$ . Use your value of  $r$  to find  $x$ .

**3.21** Solve each of the following equations:

(b)  $x - 3.8 + 1.1x = -4.2 + 2.1x + 0.4$

**3.23** Kyle is taking the SAT. He is asked to solve the equation  $5x + 10 = \frac{x}{3} + 24$ . The question is multiple-choice, with the following options for answers:

(A) 1      (B) 2      (C) 3      (D) 4      (E) 5

How does Kyle know the correct answer is (C) *without solving the equation or testing the five choices*?

## CHAPTER 3. ONE-VARIABLE LINEAR EQUATIONS

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**3.31** Five consecutive integers are added. The resulting sum is 6 more than the greatest of the five integers. What was the smallest of the five integers?

**3.35** Find  $r$  if  $3r^2 + r = 27 + 3r - 2r$ .

**3.36** Find  $y$  if  $\sqrt[4]{y} + \sqrt[4]{16y} - 2 = 4$ . **Hints:** 204

**3.38** Stan has an equal positive number of quarters, dimes, and nickels in his bag. The total amount of money Stan has in his bag is a whole number of dollars. What is the smallest amount of money Stan could have? **Hints:** 44

**3.42** Solve the equation  $\frac{3}{t-2} + \frac{9}{2-t} = 12$ . **Hints:** 91