

The Weekly Rigor

No. 152

“A mathematician is a machine for turning coffee into theorems.”

May 20, 2017

SAT Math Test Problem Children: Randomized Problem Set 2

(Part 5)

29. If $g(x) = -x + 2$ and $f(x) = g(x) + 4$, what is $f(5)$?

30. If $\frac{x-1}{4} = k$ and $k = 5$, what is the value of x ?

ANSWERS

1. $\frac{13}{5}$	7. A	13. -5 or 1	19. B	25. 6
2. D	8. $-2 \pm \sqrt{2}$	14. $\frac{30}{7}$	20. C	26. 8
3. $\{4, 5\}$	9. $\frac{1}{3}$	15. C	21. -17	27. C
4. 0.6	10. 15	16. $\frac{4}{5}$	22. $12 + 8i$	28. D
5. $\frac{26}{25}$	11. $\frac{1}{3}$	17. $-4, 4$	23. D	29. 1
6. 441	12. 0.4	18. $8x + 7$	24. $\frac{4}{5}$	30. 21

SELECTED SOLUTIONS

20. Before using the quadratic formula, we need to arrange the terms of the equation in the standard order, in order to correctly identify the constants a , b , and c . Hence, we have

$$x^2 - \frac{k}{4}x - 4p = 0.$$

We will make the problem easier to solve if we eliminate the fraction in the linear term. We can accomplish this by multiplying each term by 4. So, we will have

$$4x^2 - kx - 16p = 0.$$

Now, using the quadratic formula, with $a = 4$, $b = -k$, and $c = -16p$, we have

$$x = \frac{-(-k) \pm \sqrt{(-k)^2 - 4(4)(-16p)}}{2(4)} = \frac{k \pm \sqrt{k^2 + 256p}}{8} = \frac{k}{8} \pm \frac{\sqrt{k^2 + 256p}}{8}.$$

Therefore, the answer is option C.

28. In solving this problem, begin by noting that vertical angles y and u are congruent. Hence, since $x + y = u + w$, it follows that x and w are also congruent. Given the assumptions of this problem, equal angles y and u could both be 80° and both x and w could be, say, 40° . In that case, although $x = t$, $y \neq t$ (Hence, option I is out.). In a similar way, both options II and III fail to be true. Therefore, none of the options have to be true—choice D.

“Only he who never plays, never loses.”