
**THE
QUALITY INSPECTOR
SOLUTIONS TEXT**

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SECTION II

TECHNICAL MATH -- TEST QUESTIONS

2.1. If

$$A = \sqrt{B^2 + C^2}$$

then:

- a. $A = B + C$
- b. $A = B^2 + C^2$
- c. $A^2 = B^2 + C^2$
- d. $A = B + C^2$

Solution:

$$A = \sqrt{B^2 + C^2}$$

To remove the square root, square both sides of the equation.

Therefore:

$$A^2 = B^2 + C^2$$

Answer c is correct.

References: *CQI Primer*, Section II - 13. This question appeared on an old published CQT exam.

2.2. The number "-4.2" is:

- a. A negative integer
- b. A positive integer
- c. An imaginary number
- d. A real number

Solution: An integer is any whole number. -4.2 has a fraction portion (.2). Therefore, answers **a** and **b** are eliminated. Answer **c** is not correct because an imaginary number is any set of numbers that can be expressed as a multiple of the square root of -1. A real number is any number that can be represented by a point on a line. Thus, answer **d** is correct. -4.2 is also a negative number but that choice is not offered.

Answer d is correct.

References: *CQI Primer*, Section II - 40. This question appeared on an old published CQT exam.

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2.3. Solve for X in the following equation:

$$X = 6/7 + 2/5 - 1/2$$

- a. $X = 7/10$
- b. $X = 3/4$
- c. $X = 53/70$
- d. $X = 123/70$

Solution: The solution of this question requires the determination of the lowest common denominator. All denominators (7, 5, and 2) will divide evenly into 70. The solution to the question is:

$$X = \frac{60}{70} + \frac{28}{70} - \frac{35}{70} = \frac{53}{70}$$

Answer c is correct.

References: *CQI Primer*, Section II - 2/3. This question appeared on an old published CQT exam.

2.4. Perform a subtraction of angles:

$$\begin{array}{r} 118^{\circ} \quad 45' \quad 19.4'' \\ - 106^{\circ} \quad 51' \quad 19.6'' \\ \hline \end{array}$$

Resulting in:

- a. $11^{\circ} 52' 57.8''$
- b. $11^{\circ} 53' 58.8''$
- c. $11^{\circ} 53' 59.8''$
- d. $12^{\circ} 53' 59.8''$

Solution: After "borrowing," the subtraction problem becomes:

$$\begin{array}{r} 117^{\circ} \quad 104' \quad 79.4'' \\ - 118^{\circ} \quad 45' \quad 19.4'' \\ - 106^{\circ} \quad 51' \quad 19.6'' \\ \hline 11^{\circ} \quad 53' \quad 59.8'' \end{array}$$

Answer c is correct.

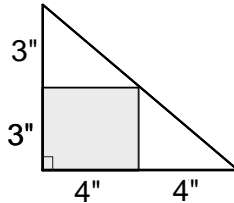
References: *CQI Primer*, Section II - 26. This question appeared on an old published CQT exam.

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TECHNICAL MATH -- TEST QUESTIONS

- 2.5. Find the area of the largest rectangle which can be inscribed in a right angle triangle whose legs are 6" and 8" respectively:
- a. 12 square inches
 - b. 16 square inches
 - c. 18 square inches
 - d. 24 square inches

Solution: Consider the following schematic of the problem.



Note that 24 square inches is the area for the entire triangle. The area of the represented rectangle is: $A = L \times W = 3" \times 4" = 12$ square inches.

This problem makes a good case for taking quadrille paper into the exam. When plotted to scale, the above rectangle is the largest the authors can determine. All others enclose a smaller area.

Answer a is correct.

References: *CQI Primer*, Section II - 21 and 23. This question appeared on an old published CQT exam.

- 2.6. What amount should an employee receive as bonus so that he/she would net \$500 after deducting 30% for taxes?
- a. \$832.36
 - b. \$525.00
 - c. \$665.75
 - d. \$714.29

Solution: If presented this question on an exam, the authors would multiply the answers quickly by 0.7 to determine which one would produce \$500. The proper solution requires the establishment of a ratio.

\$500.00 is to 70% of pay as X is to 100% of pay. Mathematically, this problem becomes:

$$\frac{\$500}{.7} = \frac{X}{1.0} \quad \text{or} \quad .7X = \$500.00 \quad \text{and} \quad X = \$714.29$$

Answer d is correct.

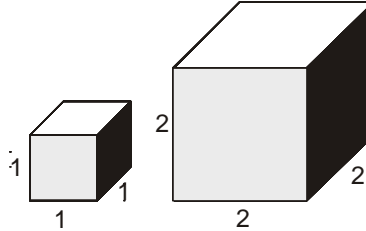
References: *CQI Primer*, Sections II - 5 and VIII - 9. This question appeared on an old published CQT exam.

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TECHNICAL MATH -- TEST QUESTIONS

- 2.7. A manufacturer produces two sizes of sugar cubes, both have the same density. One side of the larger cube is twice that of the smaller cube. The weight of the larger cube is:
- Twice the smaller
 - Four times the smaller
 - Eight times the smaller
 - Sixteen times the smaller

Solution: The relationship between the small and large cube is illustrated below:



When the dimensions of solids are doubled, the volumes increase by a multiple of eight. If the density is constant, the weight will also increase by eight times.

Answer c is correct.

References: *CQI Primer*, Section II - 22. This question appeared on an old published CQT exam.

- 2.8. A tank can be filled by three pipes separately in 20, 30 and 60 minutes respectively. In how many minutes can it be filled by the three pipes working together?
- 14 minutes
 - 36 minutes
 - 12 minutes
 - 10 minutes

Solution: The three fill rates must be standardized. One method of doing this is to determine what would happen at the end of 60 minutes with all pipes flowing:

$$\frac{60 \text{ min}}{20 \text{ min}} = 3 \text{ fills} \quad \frac{60 \text{ min}}{30 \text{ min}} = 2 \text{ fills} \quad \frac{60 \text{ min}}{60 \text{ min}} = 1 \text{ fill}$$

The tank would be filled 6 times in 60 minutes. Therefore: 60 minutes/6 fills = 10 minutes/fill

Answer d is correct.

References: *CQI Primer*, Sections II - 2, II - 5, and VIII - 9. This question appeared on an old published CQT exam.

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TECHNICAL MATH -- TEST QUESTIONS

2.9. Find the volume of a cylindrical can whose inside dimensions are:

diameter: 4 inches

height: 6 inches

- a. 25.1 cubic inches
- b. 301.6 cubic inches
- c. 402.1 cubic inches
- d. 75.4 cubic inches

Solution: This question requires a volume calculation for a cylinder.

$$v = \pi r^2 h$$

Note that if $d = 4$ inches, $r = 2$ inches

$$v = \pi(2 \text{ in})^2(6 \text{ in})$$

$$v = \pi 24 \text{ in}^3 = 75.4 \text{ in}^3$$

Answer d is correct.

References: *CQI Primer*, Section II - 22. This question appeared on an old published CQT exam,

2.10. Factor $12X^2 - 4X - 8$ to the lowest level:

- a. $(3X + 2)(4X - 4)$
- b. $(6X + 4)(2X - 2)$
- c. $(6X - 4)(2X + 2)$
- d. $4(3X + 2)(X - 1)$

Solution: The common factor for all terms is 4. Thus, the trinomial becomes:

$$4(3X^2 - X - 2)$$

Factoring further, the best solution becomes:

$$4(3X + 2)(X - 1)$$

Note, that of all the answers presented, answers **a** and **b** are correct, but both can be reduced to

$4(3X+2)(X-1)$. Answer **c** is incorrect.

Answer d is correct.

Reference: *CQI Primer*, Section II - 16/17.