

3



3

~~A~~ *go back!*

How many liters of a 25% saline solution must be added to 3 liters of a 10% saline solution to obtain a 15% saline solution?

total amnt. of saline sol.

=

each...

(type of saline sol.) (% of sol.)

$$(x)(.25) + (3)(.1) = (x+3)(.15)$$

$$.25x + .3 = .15x + .45$$

$$-.15x \quad -.3 \quad -.15x \quad -.3$$

$$\frac{.10x}{-1} = \frac{.15}{-1}$$

$$x = 1.5$$

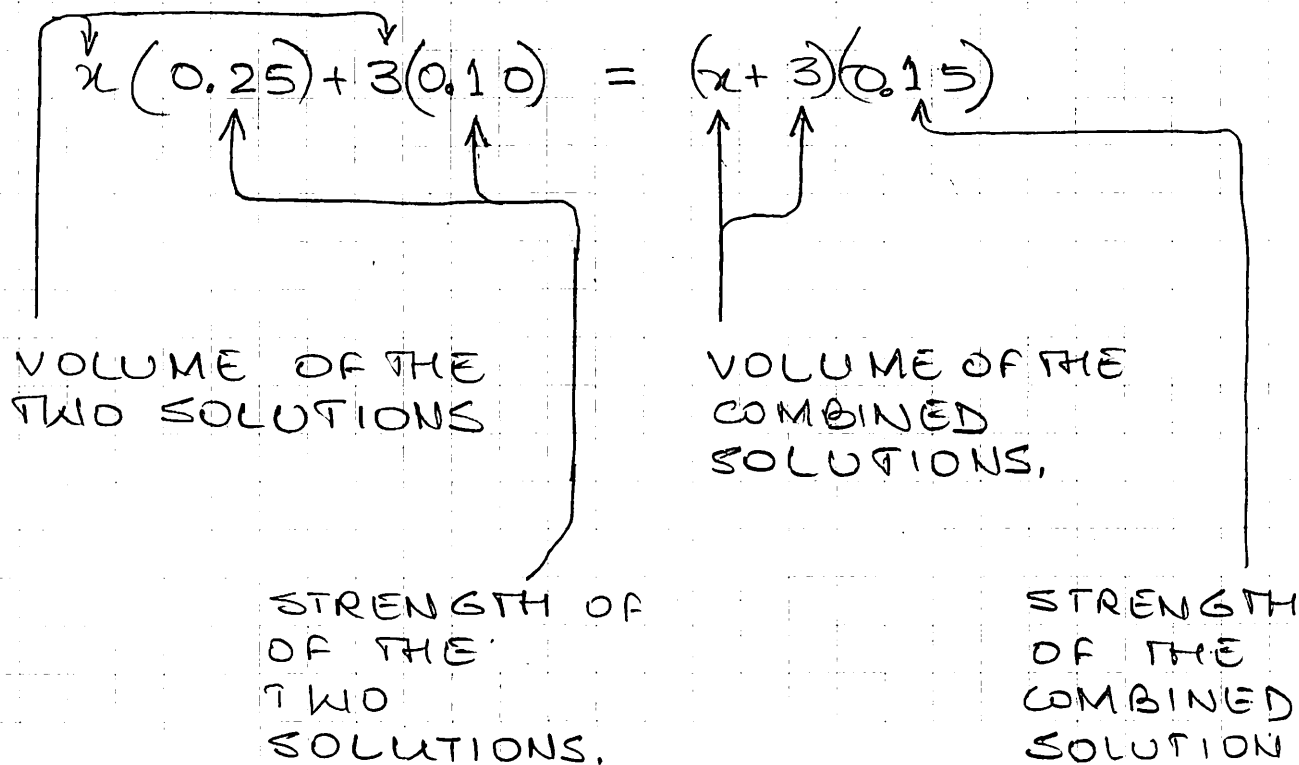
STOP

If you finish before time is called, you may check your work on this section only.

Do not turn to any other section.

TEST #6

COLLEGE BOARD ; TEST #6 ; SECTION 3 ; Q19



$$\Rightarrow x(0.25) + (0.30) = x(0.15) + 3(0.15)$$

$$\Rightarrow x(0.25) + (0.30) = x(0.15) + 0.45$$

$$\Rightarrow x(0.10) = (0.15)$$

$$\Rightarrow x(1.0) = (1.5)$$

$$\Rightarrow \boxed{x} = 1.5$$

\therefore $\boxed{1.5}$ liters of the 25% SOLUTION must be added to the 3.0 liters of the 10% SOLUTION to obtain a 15% SOLUTION.

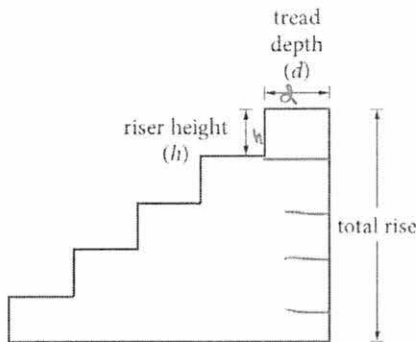
ANSWER

4



4

Questions 17-19 refer to the following information.



Note: Figure not drawn to scale.

When designing a stairway, an architect can use the riser-tread formula $2h + d = 25$, where h is the riser height, in inches, and d is the tread depth, in inches. For any given stairway, the riser heights are the same and the tread depths are the same for all steps in that stairway.

The number of steps in a stairway is the number of its risers. For example, there are 5 steps in the stairway in the figure above. The total rise of a stairway is the sum of the riser heights as shown in the figure.

17

Which of the following expresses the riser height in terms of the tread depth?

- A) $h = \frac{1}{2}(25 + d)$
- B) $h = \frac{1}{2}(25 - d)$
- C) $h = -\frac{1}{2}(25 + d)$
- D) $h = -\frac{1}{2}(25 - d)$

$$2h + d = 25$$

$$-d \quad -d$$

$$\frac{2h}{2} = \frac{25-d}{2}$$

$$h = \frac{1}{2}(25-d)$$

18

Some building codes require that, for indoor stairways, the tread depth must be at least 9 inches and the riser height must be at least 5 inches. According to the riser-tread formula, which of the following inequalities represents the set of all possible values for the riser height that meets this code requirement?

- A) $0 \leq h \leq 5$
- B) $h \geq 5$
- C) $5 \leq h \leq 8$
- D) $8 \leq h \leq 16$

Handwritten: need explain

$$d \geq 9 \quad h \geq 5$$

$$2h + d = 25$$

$$d = 25 - 2h$$

$$9 < 25 - 2h$$

$$-25 \quad -25$$

$$\frac{-10}{-2} \leq \frac{-2h}{-2} \rightarrow 8 \geq h$$

An architect wants to use the riser-tread formula to design a stairway with a total rise of 9 feet, a riser height between 7 and 8 inches, and an odd number of steps. With the architect's constraints, which of the following must be the tread depth, in inches, of the stairway? (1 foot = 12 inches)

- A) 7.2
- B) 9.5
- C) 10.6
- D) 15

Q18

(B) $h \geq 5$ SATISFIES
ALL POSSIBLE VALUES
FOR

CODE IS \rightarrow "THE RISER HEIGHT MUST BE
AT LEAST 5 INCHES."

Q19

GIVEN
TOTAL RISE = 9 feet = 108 inches
RISER HEIGHT TO BE BETWEEN 7 & 8 inches.
ARCHITECTS CONSTRAINTS $2h + d = 25$

$$2(7) + d = 25 \quad \text{---} \quad \textcircled{1}$$

$$d = 11$$

$$2(8) + d = 25 \quad \text{---} \quad \textcircled{2}$$

$$d = 9$$

OF THE FOUR CHOICES ONLY

$\frac{108}{9} = 12 \dots 0$ \therefore 12 STEPS FOR RISER HT. OF
JUST OVER 7". WILL WORK

$\frac{108}{8} = 13 \dots 4$ \therefore 13 STEPS FOR RISER HT. OF
JUST OVER 8". WILL NOT
WORK,

$\therefore \frac{108}{15} = 7.2$ \therefore RISER HT. PER STEP.

$$\therefore \text{PER } 2h + d = 25$$

$$2(7.2) + d = 25$$

$$d = 10.6$$

ANSWER

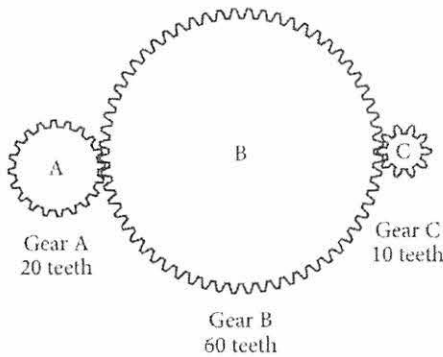
4



4

look @ explanation

A gear ratio $r:s$ is the ratio of the number of teeth of two connected gears. The ratio of the number of revolutions per minute (rpm) of two gear wheels is $s:r$. In the diagram below, Gear A is turned by a motor. The turning of Gear A causes Gears B and C to turn as well.



If Gear A is rotated by the motor at a rate of 100 rpm, what is the number of revolutions per minute for Gear C?

- A) 50
- B) 110
- C) 200
- D) 1,000

X

In the xy -plane, the graph of $2x^2 - 6x + 2y^2 + 2y = 45$ is a circle. What is the radius of the circle?

- A) 5
- B) 6.5
- C) $\sqrt{40}$
- D) $\sqrt{50}$

$(x-h)^2 + (y-k)^2 = r^2$

$x^2 - 3x + y^2 + y = 22.5$

$(x+1.5)^2 + (y+.5)^2 + .25 = 22.5$

$(x^2 - 3x + 2.25) + (y^2 - y + .25) = 22.5$

$(x+1.5)^2 + (y-.5)^2 = 22.5 + .25 + .25$

$5 = r$

28 Understand

Two different points on a number line are both 3 units from the point with coordinate -4 . The solution to which of the following equations gives the coordinates of both points?

- A) $|x+4| = 3$ $|x-a| = d$
- B) $|x-4| = 3$ $|x-(-4)| = 3$
- C) $|x+3| = 4$
- D) $|x-3| = 4$ $|x+4| = 3$

Watch SAT vids!

absolute value

distance

$|x-a| = d$

point coordinate

distance



4



4



For A-B

$$\text{Gear Ratio} = \frac{A}{B} = \frac{20}{60}$$

∴ Ratio of ^{Rotation} RPM for the $\frac{A}{B}$ GEARS is $\frac{60}{20} = \frac{3}{1}$

∴ " " RPM " " $\frac{A}{B}$ " " $\frac{60}{20} = \frac{3}{1}$

$$\text{Gear Ratio of } \frac{B}{C} = \frac{60}{10}$$

∴ Ratio of ROTATION for the $\frac{B}{C}$ GEARS is $\frac{10}{60} = \frac{1}{6}$

" " RPM " " $\frac{B}{C}$ " " $\frac{10}{60} = \frac{1}{6}$

∴ RATIO OF RPM for the $\frac{A}{B} \times \frac{B}{C}$ GEARS is =

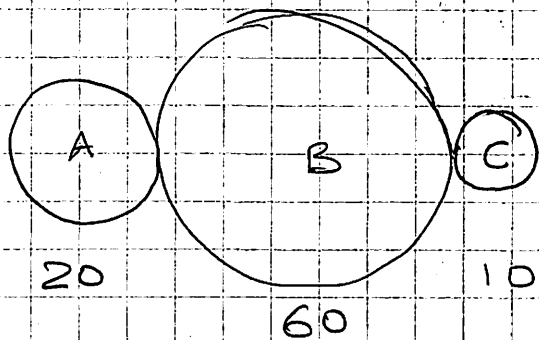
$$= \frac{3}{1} \times \frac{1}{6}$$

$$\frac{\text{RPM of A}}{\text{RPM of C}} = \frac{1}{2}$$

$$\Rightarrow \frac{100}{\text{RPM of C}} = \frac{1}{2}$$

$$\Rightarrow \boxed{(100) \cdot 2 = \text{RPM of C}} \quad \text{ANS. (C)}$$

COLLEGE BOARD; TEST # 6; SECTION 4; Q 26



$$\frac{20}{60} \times \frac{60}{10}$$

20 teeth to
10 teeth

∴ FOR every ROTATION of Gear A
Gear C has to turn 2
ROTATIONS.

∴ if GEAR 'A' rotates @ 100 rpm,
∴ Gear 'B' rotates @ 100 rpm x 2

$$= 200 \text{ rpm.}$$

∴ ANSWER (C)

COLLEGE BOARD, TEST # 6, SECTION 4, Q 27

$$2x^2 - 6x + 2y^2 + 2y = 45$$

$$x^2 - 3x + y^2 + y = \frac{45}{2}$$

$$\left(x - \frac{3}{2}\right)^2 + \left(y + \frac{1}{2}\right)^2 = \frac{45}{2} + \left(\frac{3}{2}\right)^2 + \left(\frac{1}{2}\right)^2$$

$$= \frac{45}{2} + \frac{9}{4} + \frac{1}{4}$$

$$= \frac{90}{4} + \frac{9}{4} + \frac{1}{4}$$

$$= \frac{100}{4}$$

$$= 25$$

$$\boxed{\left(x - \frac{3}{2}\right)^2 + \left(y + \frac{1}{2}\right)^2 = (5)^2}$$


$\left(\frac{3}{2}, -\frac{1}{2}\right)$ CO. OD. OF CENTER,

5 = RADIUS.

Please read and understand the examples on the following page.

Example 15: Coordinate Geometry, Circles.

<https://www.averagesmart.com/sat-pt01-ex15-co-od-geom-circles.pdf>

4  4

29 *ap math*
 A motor powers a model car so that after starting from rest, the car travels s inches in t seconds, where $s = 16t\sqrt{t}$. Which of the following gives the average speed of the car, in inches per second, over the first t seconds after it starts?

- A) $4\sqrt{t}$ in/sec over t seconds
- B) $16\sqrt{t}$
- C) $\frac{16}{\sqrt{t}}$
- D) $16t$

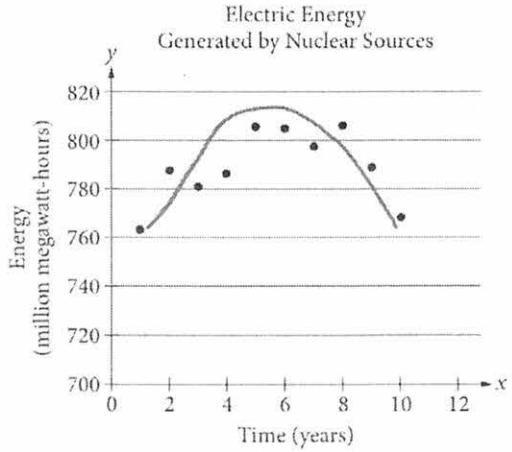
Handwritten: $s = 16(1)\sqrt{(1)}$
 $16(1)$
 16

Handwritten: $s = \frac{d}{t}$

Handwritten: avg. speed = $\frac{\text{total dist.}}{\text{total time}}$

b

30 *ap math*
 The scatterplot below shows the amount of electric energy generated, in millions of megawatt-hours, by nuclear sources over a 10-year period.



Of the following equations, which best models the data in the scatterplot?

- A) $y = 1.674x^2 + 19.76x - 745.73$
- B) $y = -1.674x^2 - 19.76x - 745.73$
- C) $y = 1.674x^2 + 19.76x + 745.73$
- D) $y = -1.674x^2 + 19.76x + 745.73$

COLLEGE BOARD, TEST #6, SECTION #4, Q29

average speed = $\frac{\text{TOTAL DISTANCE}}{\text{TOTAL TIME}}$

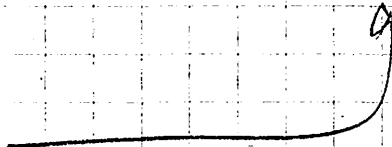
$$= \frac{s \text{ inches}}{t \text{ seconds}}$$

$$= \frac{16t\sqrt{t}}{t}$$

AVG. SPEED,

$$= \boxed{16\sqrt{t}} \frac{\text{inches}}{\text{second}}$$


ANSWER



COLLEGE BOARD; TEST #6, SECTION #4; Q30

LOOK AT THE SHAPE.

DOWNWARD OPENING PARABOLA.

31  A group of friends decided to divide the \$800 cost of a trip equally among themselves. When two of the friends decided not to go on the trip, those remaining still divided the \$800 cost equally, but each friend's share of the cost increased by \$20. How many friends were in the group originally?

$$800 = x + 20$$

$$\frac{800}{n}$$

$$\frac{800}{n} + 20$$

$$\frac{800}{n-2} + 20 = \frac{800}{n}$$

$$(n(n-2)) \frac{800}{n-2} + 20 = \frac{800}{n} (n(n-2))$$

$$800n - 1600 + 20n^2 - 40n = 800n$$

$$40n - 80 + n^2 - 2n = 40$$

$$n^2 - 2n - 80 = 0$$

$$(n+8)(n-10) \quad n = \begin{matrix} -8 \\ -10 \end{matrix}$$

$$\boxed{n=10}$$

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CONTINUE 

32 $2(5x - 20) - (15 + 8x) = 7$
What value of x satisfies the equation above?

$$10x - 40 - 15 - 8x = 7$$

$$2x - 55 = 7$$

$$+55 \quad +55$$

$$\frac{2x}{2} = \frac{62}{2}$$

$$\boxed{x=31}$$

COLLEGEBOARD; TEST #6; SECTION #4; Q31

GIVEN

COST OF THE TRIP = \$800.

NUMBER OF FRIENDS PLANNING THE TRIP = n

" " " " GOING ON " " = $n-2$

→ COST PER PERSON. = $\frac{800}{n}$ ——— (1)

COST PER PERSON = $\frac{800}{n-2}$ ——— (2) ←

COST PER PERSON IS HIGHER BY \$20 WHEN THE # OF FRIENDS ON THE TRIP GOES DOWN.

∴ $\frac{800}{n} + 20 = \frac{800}{n-2}$

$\frac{(800)(n-2)(n)}{n} + 20(n-2)(n) = \frac{800(n-2)(n)}{(n-2)}$

$800n - 1600 + 20n^2 - 40n = 800n$

$-1600 + 20n^2 - 40n = 0$

$+ 20n^2 - 40n - 1600 = 0$

$(+20)n^2 + (-40)n + (-1600) = 0$
a b c

$n = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

= $\frac{40 \pm \sqrt{1600 - (4)(20)(-1600)}}{2(20)}$

= $\frac{40 \pm \sqrt{(1600)(81)}}{40}$

→ $\frac{(40) \pm (40)(9)}{(40)}$
 = $\frac{(1) \pm (1)9}{(1)}$
 = 1 ± 9
 = 10 or -8

ANSWER = 10.

College Board; Test #6; Section #3; Q19

$$x(0.25) + 3(0.10) = (x+3)(0.15)$$

$$(0.25)x + 0.30 = (0.15)x + 0.45$$

$$(0.10)x = 0.15$$

$$(0.10)x (10) = (10)(0.15)$$

$$(1)(x) = (1.5)$$

$$x = 1.5$$