

- TSI Test -
- Detailed Solutions -

1) If $3t - 7 = 5t$, then $6t = \underline{\hspace{2cm}}$.

- Solution -

$$3t - 7 = 5t$$

Solve for t first.

Subtract $3t$ from both sides of the equation

$$\begin{array}{r} 3t - 7 = 5t \\ -3t \quad -3t \\ \hline \end{array}$$

$$-7 = 2t$$

Divide both sides by 2.

$$-\frac{7}{2} = t$$

Now to find $6t$
multiply by 6.

$$6 \times -\frac{7}{2} = \frac{-42}{2} = -21 \checkmark$$

2, The variables x and y are directly proportional, and $y = 2$ when $x = 3$.
What is the value of y when $x = 9$?

- Solution -

When x and y are directly proportional \Rightarrow

$$y = kx$$

Replace y with 2
and x with 3

$$2 = k(3)$$

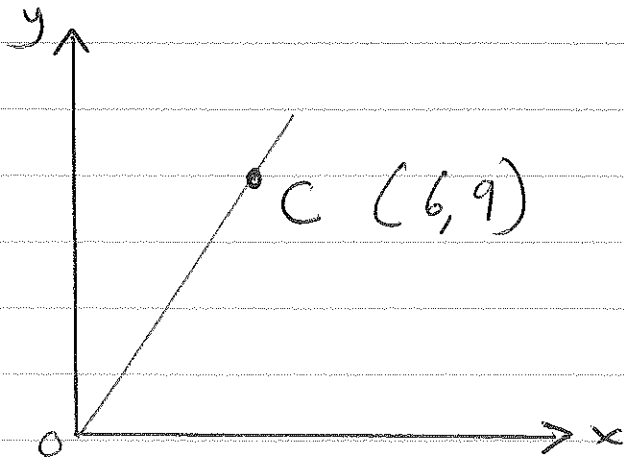
$$\Rightarrow k = \frac{2}{3}$$

Therefore $y = kx \Rightarrow y = \frac{2}{3}x$.

Now $x = 9$, replace x with 9.

$$y = \frac{2}{3} \times 9 = \frac{18}{3} = 6 \checkmark$$

3,



In the above xy -plane, which of the following is an equation of the line that contains points O and C ?

-Solution-

Since the line goes through the origin, its equation is: $y = mx$.

m : is the slope = $\frac{y_2 - y_1}{x_2 - x_1}$

$$O \begin{pmatrix} 0 \\ 0 \end{pmatrix} \begin{matrix} x_1 \\ y_1 \end{matrix}$$

$$, C \begin{pmatrix} 6 \\ 9 \end{pmatrix} \begin{matrix} x_2 \\ y_2 \end{matrix}$$

$$m = \frac{9-0}{6-0} = \frac{9}{6} \\ = \frac{3}{2}$$

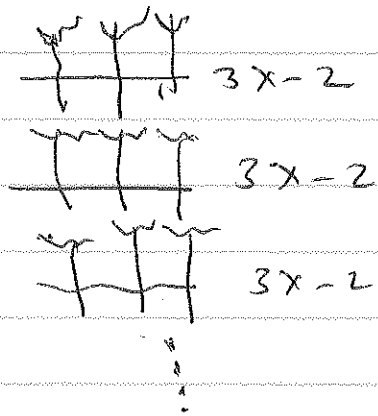
Therefore $y = \frac{3}{2}x$ ✓

- 4, There are $3x-2$ trees planted in each row of a rectangular parcel of land. If there are a total of $24x-16$ trees planted in the parcel, how many rows of trees are there in the parcel?

- Solution -

Draw a diagram.

How many $3x-2$ trees add up to $24x-16$
 Answer is 8 rows.



- 5, A group of 18 people ordered Soup and Sandwiches for lunch. Each person in the group had either one soup or one Sandwich. The Sandwiches cost \$7.75 each and the soups cost \$4.50 each. If the total cost of all 18 lunches was \$113.50, how many Sandwiches were ordered?

A. 7

B. 8

C. 9

D. 10

- Solution -

Since it's a multiple choice test use the answers given and work backwards.

Use choice "D" = 10 Sandwiches which means, we have 8 soups.

Now If $10 \times 7.75 + 8 \times 4.50$ equals 113.50 means "D" is correct.
check it "It works" ✓

6, Which of the following equations has both 1 and -3 as solutions?

A. $x^2 - 2x - 3 = 0$

B. $x^2 + 2x - 3 = 0$

C. $x^2 - 4x + 3 = 0$

D. $x^2 + 4x + 3 = 0$

- Solution -

Replace x with 1 and x with -3 in each choice to see which choice checks.

Try choice B: $x^2 + 2x - 3 = 0$
When $x = 1 \Rightarrow (1)^2 + 2(1) - 3 \stackrel{?}{=} 0$
 $1 + 2 - 3 \stackrel{?}{=} 0$
 $0 = 0 \checkmark$

When $x = -3 \Rightarrow (-3)^2 + 2(-3) - 3 \stackrel{?}{=} 0$
 $9 - 6 - 3 \stackrel{?}{=} 0$
yes ✓

7 In the xy -plane, what is the y -intercept of the graph of the equation $y = 2(x+3)(x-4)$?

- Solution -

y -intercept $\implies x$ value = 0.
Replace x with 0.

$$y = 2(0+3)(0-4)$$

$$y = 2(3)(-4) = -24 \checkmark$$

8 $x^4 - 1 = ?$

- Solution -

This is a difference of 2 squares.

To factor it

$$(x^2 + 1)(x^2 - 1)$$

Now factor $x^2 - 1$ one more time.

$$(x^2 + 1)(x+1)(x-1) \checkmark$$

9, $(3x^2y^3)^3 =$

- Solution -
 Laws of Exponent: $(x^a)^b = x^{ab}$
 $= 3^3 x^{2 \times 3} y^{3 \times 3} = 3^3 x^6 y^9$
 $= 27x^6y^9$

#10, If $\sqrt{5-x} = 4$, then $x =$ _____

- A. -21
- B. -11
- C. 1
- D. 11

- Solution -

Use each answer choice + replace it in the given equation.

Try choice A = -21

$$\sqrt{5-x} = 4$$

$$\sqrt{5-21} \stackrel{?}{=} 4$$

$$\sqrt{5+21} \stackrel{?}{=} 4$$

$$\sqrt{26} \stackrel{?}{=} 4$$

(No)

Try choice B = -11

$$\sqrt{5 - \cancel{x}} = 4$$

$$\sqrt{5 - 11} \stackrel{?}{=} 4$$

$$\sqrt{5 + 11} \stackrel{?}{=} 4$$

$$\sqrt{16} \stackrel{?}{=} 4 \text{ yes } \checkmark$$

11, If $\frac{x-1}{x} = 20$, then $x =$

- Solution -

$$\frac{x-1}{x} = \frac{20}{1}$$

cross multiply

$$x-1 = 20x$$

Subtract x
from both
sides of the
equation.

$$\begin{array}{r} x-1 = 20x \\ -x \qquad \qquad -x \\ \hline \end{array}$$

$$-1 = 19x \Rightarrow x = \frac{-1}{19} \checkmark$$

12, A ball was kicked into the air from a balcony 20 ft above the ground, and the ball's height above the ground, in feet, t seconds after the ball was kicked was

$$h(t) = 20 - 16t^2 + 32t.$$

What was the maximum height, in feet, of the ball above the ground after it was kicked?

- Solution -

$$h(t) = 20 - 16t^2 + 32t$$

Rearrange the problem: $-16t^2 + 32t + 20$

It is of Quadratic form:

$$a = -16, \quad b = 32, \quad c = 20.$$

Maximum height is reached at the vertex.

$$x_{\text{vertex}} = \frac{-b}{2a} = \frac{-32}{2(-16)} = \frac{-32}{-32}$$

$$= 1$$

Now replace $x=1$

or $t=1$ in:

$$\begin{aligned} h(t) &= 20 - 16t^2 + 32t \\ &= 20 - 16(1)^2 + 32(1) \\ &= 20 - 16 + 32 = 36 \checkmark \end{aligned}$$

13,

The yard behind the Cindy's house is rectangular in shape and has a perimeter of 72 ft. If the length l of the yard is 18 ft longer than the width w of the yard, what is the area of the yard?

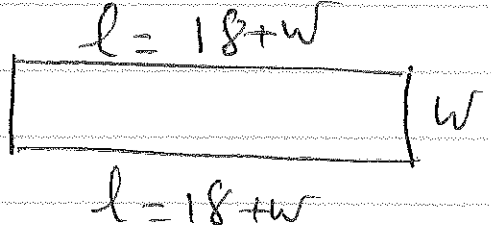
A. 36

B. 144

C. 243

D. 486

~ Solution ~

Draw the rectangle w  w

Now perimeter = 72 \Rightarrow Distance around the rectangle = 72.

$$18 + w + w + 18 + w + w = 72$$

Combine like terms.

$$36 + 4w = 72$$

Subtract
36 from
both sides

$$4w = 36 \Rightarrow w = 9$$

$$\text{Therefore } l = 18 + w = 18 + 9 = 27.$$

$$A = l \times w = 27 \times 9 = 243 \checkmark$$

14,

City	High Temperature
A	$t^{\circ}\text{F}$
B	87°F
C	81°F
D	62°F
E	93°F

If the median of the high temperatures for these cities was 81°F , which of the following could not have been the high temperature for City A?

- A. 85°F
- B. 75°F
- C. 65°F
- D. 55°F

- Solution -

Since 81°F is the median of 5 data, it means there are 2 numbers larger than 81 and 2 numbers are lower than 81.

$\underline{\quad} \quad \underline{\quad} \quad \underline{81} \quad \underline{87} \quad \underline{93}$
 ↑
 median

Since 85 is not lower than 81, it is the answer.

15)

There are 20 children in the cast of a class play, and 8 of the children are boys. Of the boys, 4 have a speaking part in the play. If a child from the cast of the play is chosen at random, what is the probability that the child has a speaking part?

- Solution -

Probability that the child has a speaking part = $\frac{\text{\# of children (speaking part)}}{20}$

Now, # of boys with speaking part = 4

Total # of girls = $20 - 8 = 12$.

Since 8 girls do not have a speaking part $\Rightarrow 12 - 8 = 4$.

Total # of children with speaking part = $4 + 4 = 8$.

$$P = \frac{8}{20} \quad \text{Divide both sides by 4}$$

$$P = \frac{2}{5} \checkmark$$