TSI Sample Questions-Worked

Monday, August 19, 2013 10:37 PM

1. If $3t - 7 = 5t$, then $6t =$

   A. 21
   B. −7
   C. −21
   D. −42

$3t - 7 = 5t$
$-3t \qquad -3t$

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

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

$6\left(-\frac{7}{2}\right) = 6t$

$\frac{-42}{2} = 6t$

$-21 = 6t$

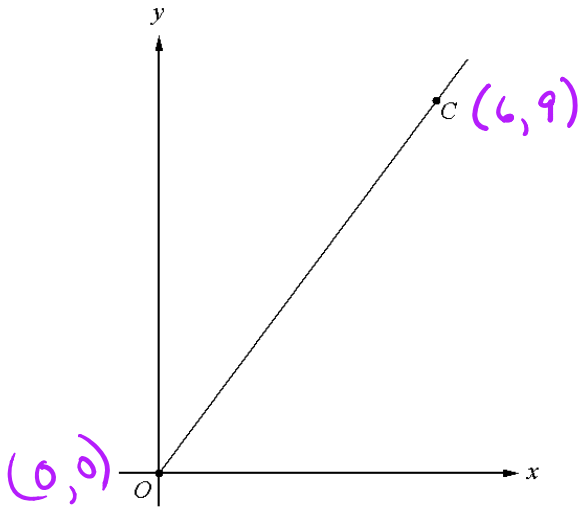
2. The variables x and y are directly proportional, and $y = 2$ when $x = 3$. What is the value of y when $x = 9$?

   A. 4
   B. 6
   C. 8
   D. 12

$\frac{2}{3} = \frac{y}{9}$

$\frac{18}{3} = \frac{3y}{3}$

6 = y



3. In the xy -plane above, point C has coordinates $(6, 9)$. Which of the following is an equation of the line that contains points O and C ?

A. $y = x - 3$

B. $y = x + 3$

C. $y = \frac{2}{3}x$

D. $y = \frac{3}{2}x$

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

y-intercept = 0

$y = mx + b$

$y = \frac{3}{2}x + 0$

$y = \frac{3}{2}x$

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?

A. $21x - 18$

B. $21x - 14$

C. $8x$

D. 8

$24x - 16 \div 3x - 2$

8

D. 8

$$3x-2 \overline{)\,24x-16}$$

$$8$$

$$-(24x-16)$$

$$0$$

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

x = sandwiches

$18 - x$ = soups

$$7.75(x) + 4.50(18-x) = 113.50$$

$$7.75x + 81 - 4.50x = 113.50$$

$$3.25x + 81 = 113.50$$

$$-81 \quad -81$$

$$\frac{3.25x}{3.25} = \frac{32.50}{3.25}$$

$$x = 10$$

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

$x = 1 \qquad x = -3$

$(x - 1)\ (x - (-3))$

$(x - 1)(x + 3)$

$x^2 - x + 3x - 3$

$x^2 + 2x - 3$

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

A. -24

B. -12

C. -2

D. 12

y-intercept $\rightarrow$ $x = 0$

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

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

$y = -24$

8. $x^4 - 1 =$

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

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

C. $(x+1)^3(x-1)^1$

D. $(x-1)^4$

Difference of 2 perfect squares

$x^4 - 1$

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

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

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

A. $3x^5y^6$

B. $9x^6y^9$

C. $27x^5y^6$

D. $27x^6y^9$

$3^3(x^2)^3(y^3)^3$

$27x^6y^9$

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

A. -21

B. -11

C. 1

D. 11

$\sqrt{5-x} = 4$

$(\sqrt{5-x})^2 = 4^2$

$5 - x = 16$

$5 - x = 16$

$-5 \qquad -5$

$-x = 11$

$\boxed{x = -11}$

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

A. -21

B. -19

C. $-\frac{1}{19}$

D. $\frac{1}{21}$

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

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

$x - 1 = 20x$

$-x \qquad -x$

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

$\boxed{-\frac{1}{19} = x}$

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

A. 32
B. 34
C. 36
D. 40

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

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

Max occurs at the vertex

Vertex formula is

$x = \frac{-b}{2a}$ $y = f\left(\frac{-b}{2a}\right)$

in $ax^2 + bx + c$

In this equation

$a = -16$ $b = 32$

So $x = \frac{-32}{2(-16)} = 1$

Plugin to find $f(1) \rightarrow -16(1)^2 + 32(1) + 20$

$= -16 + 32 + 20$

$= \boxed{36}$

36 is the max ht.

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

A. 36
B. 144
C. 243
D. 486

$P = 72$

$2w + 2(w + 18) = 72$

$2w + 2w + 36 = 72$

$4w + 36 = 72$

$-36 \quad -36$

$\frac{4w}{4} = \frac{36}{4}$

$w = 9$

$w + 18 = 27$

$A = 27 * 9 = 243$

City	High Temperature
A	t°F
B	87°F
C	81°F
D	62°F
E	93°F

14. The table above shows the high temperature last Thursday for five cities, A through E. If the median of the Thursday high temperatures for these cities was 81°F, which of the following could NOT have been the high temperature last Thursday for City A?

A. 85°F
B. 75°F
C. 65°F
D. 55°F

High temps in order

D C B E
62 81 87 93

↑
Median

Temp A must be less than or = 81
only choice is **A. 85°** as it is greater
It cannot be the temp for City A

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, and of the girls, 8 do not 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?

A. $\frac{2}{5}$
B. $\frac{1}{2}$
C. $\frac{3}{5}$
D. $\frac{3}{4}$

Of 20 in cast → 8 are boys
So 12 are girls

4 boys have speaking part
8 girls do not have speaking part

So 4 girls have speaking part

Therefore 4 + 4 = 8 speaking parts

Probability of random child having speaking part = $\frac{8}{20}$ or $\boxed{\frac{2}{5}}$