

① If $3t - 7 = 5t$, then $6t =$

$$3t - 7 = 5t$$

$$3t - 7 + 7 = 5t + 7$$

$$3t = 5t + 7$$

$$3t - 5t = 5t + 7 - 5t$$

$$-2t = 7$$

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

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

Subst $6t =$

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

$$3(-7) =$$

$$\underline{-21 =}$$

② y is directly proportional to x and $y = 2$ when $x = 3$. What is the value of y when $x = 9$?

$$y = kx$$

$$2 = k(3)$$

$$2 = 3k$$

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

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

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

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

$$y = 2(3)$$

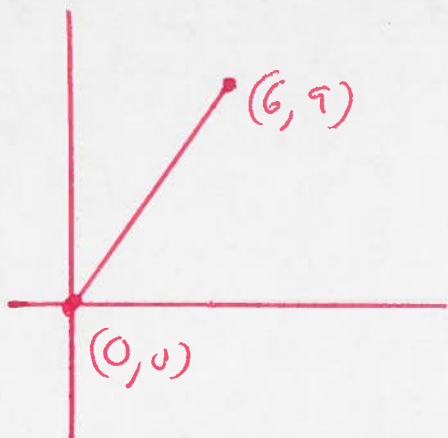
$$\underline{y = 6}$$

(TSI) Step by Step
Solutions for

15 Mathematics Sample
Questions

MO/00 TSI WARM-UPS
11-30-13

3



Find the equation of the line through the points $(0,0)$ and $(6,9)$

$$y - y_1 = \frac{y_2 - y_1}{x_2 - x_1} (x - x_1)$$

$$y - (0) = \frac{(0) - (9)}{(0) - (6)} (x - (0))$$

$$y - 0 = \frac{0 - 9}{0 - 6} (x - 0)$$

$$y = \frac{-9}{-6} (x)$$

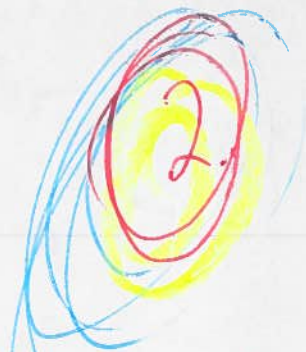
$$y = \frac{3}{2}x$$

4

$$\frac{24x - 16}{3x - 2} =$$

$$\frac{8(3x - 2)}{(3x - 2)} =$$

$$8 =$$



⑤ n = sandwiches at \$7.75 each

$18 - n$ = soups at \$4.50 each

$$7.75n + 4.50(18 - n) = 113.50 \quad \leftarrow \text{Total}$$

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

$$3.25n + 81 = 113.50$$

$$3.25n + 81 - 81 = 113.50 - 81$$

$$3.25n = 32.50$$

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

$$n = 10$$

⑥ which has both 1 and -3 as solutions?

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

$$(x+1)(x-3) = 0$$

$$x+1=0 \text{ OR } x-3=0$$

$$x+1-1=0-1 \text{ OR } x-3+3=0+3$$

$$x=-1 \text{ OR } x=3$$

NO X

$$x^2 - 4x + 3 = 0 \quad \text{NO}$$

$$(x-1)(x-3) = 0 \quad X$$

$$x-1=0 \text{ OR } x-3=0$$

$$x-1+1=0+1 \text{ OR } x-3+3=0+3$$

$$x=1 \text{ OR } x=3$$

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

$$(x-1)(x+3) = 0$$

$$x-1=0 \text{ OR } x+3=0$$

$$x-1+1=0+1 \text{ OR } x+3-3=0-3$$

$$x=1 \text{ OR } x=-3$$

YES ✓

$$x^2 + 4x + 3 = 0 \quad X$$

$$(x+1)(x+3) = 0 \quad \text{NO}$$

$$x+1=0 \text{ OR } x+3=0$$

$$x+1-1=0-1 \text{ OR } x+3-3=0-3$$

$$x=-1 \text{ OR } x=-3$$

⑦ Find the y-intercept

$$Y = 2(X+3)(X-4)$$

Let $X=0$

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

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

$$Y = 2(-12)$$

$$Y = -24$$



⑧ Factor

$$a^2 - b^2 = (a+b)(a-b)$$

$$X^4 - 1 =$$

$$(X^2)^2 - (1)^2 =$$

$$(X^2+1)(X^2-1) =$$

$$(X^2+1)((X)^2 - (1)^2) =$$

$$(X^2+1)(X+1)(X-1) =$$

⑨ $(3X^2y^3)^3 =$

$$(3^1 X^2 y^3)^3 =$$

$$3^{1(3)} X^{2(3)} y^{3(3)} =$$

$$3^3 X^6 y^9 =$$

$$(3)(3)(3) X^6 y^9 =$$

$$27 X^6 y^9 =$$

⑩ If $\sqrt{5-x} = 4$, then $x =$

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

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

$$5-x = (4)(4)$$

$$5-x = 16$$

$$\cancel{5} - x - \cancel{5} = 16 - 5$$

$$-x = 11$$

$$\frac{-x}{-1} = \frac{11}{-1}$$

$$x = -11$$



⑪ If $\frac{x-1}{x} = 20$, then $x =$

$$\text{LCD} = x$$

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

$$x-1 = 20x$$

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

$$-1 = 19x$$

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

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

(12) Find Max

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

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

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

$$\text{Max} = \text{Vertex} = \left(-\frac{b}{2a}, f\left(-\frac{b}{2a}\right)\right)$$

$$= \left(-\frac{(32)}{2(-16)}, f\left(\frac{-32}{2(-16)}\right)\right)$$

$$= \left(-\frac{32}{-32}, f\left(-\frac{32}{-32}\right)\right)$$

$$= (1, f(1))$$

$$= (1, -16(1)^2 + 32(1) + 20)$$

$$= (1, -16(1)(1) + 32(1) + 20)$$

$$= (1, -16(1) + 32 + 20)$$

$$= (1, -16 + 32 + 20)$$

$$= (1, 16 + 20)$$

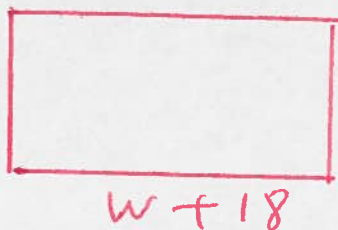
$$= (1, 36)$$

$$\text{Max} = 36$$



(13)

w



w = width

L = w + 18 Length

Perimeter is 72 find area,

$$P = 2L + 2W$$

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

$$72 = 2w + 36 + 2w$$

$$72 = 4w + 36$$

$$72 - 36 = 4w + 36 - 36$$

$$36 = 4w$$

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

$$9 = w$$

$$w + 18 = L$$

$$(9) + 18 = L$$

$$27 = L$$

$$A = LW$$

$$A = (27)(9)$$

=

$$\begin{array}{r} 27 \\ \times 9 \\ \hline 243 \end{array}$$



14. For 6, 87, 81, 62, 93 the median is 81. Which number is not possible

$\square, 62, \square, 81, 87, 93$

~~85, 75, 65, 55~~

$\square, 62, \square, 81, 87, 93$

Good ✓

$\square, 62, \square, 81, 87, 93$

Good ✓

$\square, 62, \square, 81, 87, 93$

Good ✓

$\square, 62, \square, 81, \square, 87, 93$

NOT

15. 20 children in a class and 8 are boys

$$20 - 8 = 12 \text{ are girls}$$

Boys $8 - 4 = 4$ no speaking part

Girls $12 - 8 = 4$ speaking parts

4 boys have speaking parts

4 girls have speaking parts

Probability that a child has a speaking part

$$\frac{4+4}{20} = \frac{8}{20} = \frac{4}{10} = \frac{2}{5}$$

$\frac{2}{5}$