

TST Math Practice
- with solutions -

1) 32 is 40% of what #?
Solution -

To find the whole number, just divide.

$$\frac{32}{0.40} = 80 \checkmark$$

2) $3\frac{1}{3} - 2\frac{2}{5} = ?$
Solution -

$3\frac{1}{3} - 2\frac{2}{5}$; Rewrite as improper fractions

$$\frac{3 \times 3 + 1}{3} - \frac{2 \times 5 + 2}{5}$$
$$\frac{10}{3} - \frac{12}{5}$$

Multiply the denominators
by each other
and cross multiply
from left to right.

$$\frac{10 \times 5 - 12 \times 3}{15} = \frac{50 - 36}{15} = \frac{14}{15} \checkmark$$

3, $2\frac{1}{2} + 4\frac{2}{3} = ?$

- Solution -

Add the whole numbers first:

$$2 + 4 = 6.$$

Now add $\frac{1}{2} + \frac{2}{3}$

Multiply the denominators
and cross multiply from
left to right.

$$\frac{1 \times 3 + 2 \times 2}{6} = \frac{3 + 4}{6} = \frac{7}{6} = 1\frac{1}{6}.$$

Add both results. $6 + 1\frac{1}{6} = 7\frac{1}{6}$ ✓

4, Three of 4 numbers have a sum of 22.
If the average of the 4 numbers is 8, what
is the 4th number?

A. 4

B. 6

C. 8

D. 10

- Solution -

Since the average of the 4 numbers is 8

$$\Rightarrow \text{Sum of the numbers} = 8 + 8 + 8 + 8 = 32$$

Since 3 of them have a sum of 22 \Rightarrow

$$4^{\text{th}} \text{ number} = 32 - 22 = 10 \checkmark$$

5, If $\frac{3}{2} \div \frac{1}{4} = n \Rightarrow n$ is between —.

- Solution -

$$\frac{\frac{3}{2}}{\frac{1}{4}} = \frac{3 \times 4}{2 \times 1} = \frac{12}{2} = 6.$$

6, What is 12% of 120?

- Solution -

$$= 0.12 \times 120 = 14.40 \checkmark$$

7, A box in a college bookstore contains books, and each book in the box is a history book, an English book or a science book. If $\frac{1}{3}$ of these books are history books and $\frac{1}{6}$ are English books, what fraction of the books are science books?

- Solution -

Total books = 1.

$$\text{History books} + \text{English books} = \frac{1}{3} + \frac{1}{6}$$

$$= \frac{1 \times 2 + 3 \times 1}{6} = \frac{2 + 3}{6} = \frac{5}{6} = \frac{1}{2}$$

$$\Rightarrow \text{Science books} = 1 - \frac{1}{2} = \frac{1}{2} \checkmark$$

8, The measure of 2 angles of a triangle are 35° and 45° . What is the measure of the third angle of the triangle?

Solution -

Sum of the angles in a triangle = 180° .

Sum of the 2 angles = $35^\circ + 45^\circ = 80^\circ$

Therefore the 3rd angle = $180^\circ - 80^\circ = 100^\circ$.

9, Jen wants to tile the floor of her kitchen. The floor is rectangular and measures 12 ft by 8 ft. If it costs \$2.50 per square foot for the materials, what is the total cost of the materials for tiling the kitchen floor?

Solution -

Area of the floor = $l \times w$

$$= 12 \times 8 = 96 \text{ ft}^2$$

$$\text{Total cost} = 96 \times 2.50 = \$240 \checkmark$$

10) If A represents the number of apples purchased at 15¢ each, and B represents the number of bananas purchased at 10¢ each, which of the following represents the total value of the purchases in cents?

A. $A + B$

B. $25(A + B)$

C. $10A + 15B$

D. $15A + 10B$

- Solution -

Since A represents the number of apples and each apple costs 15¢.
Answer is: $15A + 10B$.

11) $\sqrt{2} \times \sqrt{15} = ?$

- Solution -

Rule: $\sqrt{a} \times \sqrt{b} = \sqrt{a \times b}$

$\sqrt{2} \times \sqrt{15} = \sqrt{30}$ ✓

12, What is the value of the expression

$$2x^2 + 3xy - 4y^2$$

when $x = 2$ and $y = -4$

- Solution -

Replace x with 2 and y with -4 in parenthesis:

$$\begin{aligned} & 2(2)^2 + 3(2)(-4) - 4(-4)^2 \\ & = 2(4) - 24 - 4(16) \\ & = 8 - 24 - 64 = -80 \checkmark \end{aligned}$$

13, $(3x - 2y)^2 = ?$

- Solution -

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

$$\begin{aligned} 3x(3x - 2y) &= 9x^2 - 6xy \\ -2y(3x - 2y) &= -6xy + 4y^2 \end{aligned} \left. \vphantom{\begin{aligned} 3x(3x - 2y) \\ -2y(3x - 2y) \end{aligned}} \right\} \text{Combine}$$

$$9x^2 - 6xy - 6xy + 4y^2 = 9x^2 - 12xy + 4y^2 \checkmark$$

14, If $x > 2$, then $\frac{x^2 - x - 6}{x^2 - 4} =$

- Solution -

Factor the numerator $x^2 - x - 6$.

Think of 2 numbers whose product = -6 and whose sum = -1. They are -3, +2.

$$x^2 - x - 6 = (x - 3)(x + 2).$$

Factor the denominator: $x^2 - 4 = (x + 2)(x - 2)$

Replace:

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

15, If $2x - 3(x + 4) = -5$, then $x = ?$

- Solution -

$$2x - 3(x + 4) = -5$$

Distribute 1st:

$$2x - 3x - 12 = -5$$

$$-x - 12 = -5$$

Add 12 to both sides

$$-x = 7 \Rightarrow x = -7 \checkmark$$

$$16) -3(5-6) - 4(2-3) =$$

- Solution -

$$-3(5-6) - 4(2-3)$$

Do parenthesis 1st:

$$-3(-1) - 4(-1)$$

$$= 3 + 4 = 7 \checkmark$$

$$17) \text{ If } x \neq 0, \text{ then } \frac{u}{x} + \frac{5u}{x} - \frac{u}{5x} =$$

- Solution -

The L.C.D of x , x and $5x$ is $5x$
Multiply $\frac{u}{x}$ and $\frac{5u}{x}$ by $\frac{5}{5}$

$$\frac{5u}{5x} + \frac{25u}{5x} - \frac{u}{5x} = \frac{5u + 25u - u}{5x}$$

$$= \frac{29u}{5x} \checkmark$$

18,

Solve:

$$2x + 6y = 5$$

$$x + 3y = 2$$

— solution —

$$2x + 6y = 5$$

$$x + 3y = 2$$

Multiply the 2nd
equation by -2
so we can get
rid of x.

$$\left. \begin{array}{l} 2x + 6y = 5 \\ -2(x + 3y = 2) \end{array} \right\}$$

$$\left. \begin{array}{l} 2x + 6y = 5 \\ -2x - 6y = -4 \end{array} \right\} \text{Add the results}$$

$0 = 1 \rightarrow$ impossible
therefore, there is no solution.

19, Which of the following is a factor of both $x^2 - x - 6$ and $x^2 - 5x + 6$?

- Solution -

Factor: $x^2 - x - 6$

product = -6, Sum = -1

#'s are: -3, +2

Factors are: $(x-3)(x+2)$.

Factor: $x^2 - 5x + 6$

product = +6, Sum = -5

#'s are: -3, -2.

Factors are: $(x-3)(x-2)$

Factor of both is $(x-3)$ ✓

20,
$$\frac{10x^6 + 8x^4}{2x^2} =$$

- Solution -

Factor the numerator: $10x^6 + 8x^4$
 $= 2x^4(5x^2 + 4)$

Replace in the problem.

$$\frac{2x^4(5x^2 + 4)}{2x^2} = x^2(5x^2 + 4)$$

or $5x^4 + 4x^2$ ✓

21,

$$2^{5/2} - 2^{3/2} = ?$$

- Solution -

$$2^{5/2} = \sqrt{2^5} = \sqrt{2^4 \cdot 2} = 4\sqrt{2}$$

$$2^{3/2} = \sqrt{2^3} = \sqrt{4 \cdot 2} = 2\sqrt{2}$$

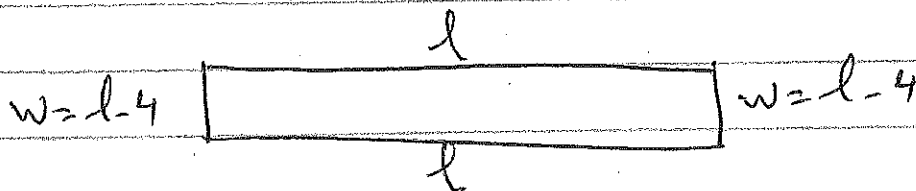
Subtract the results:

$$4\sqrt{2} - 2\sqrt{2} = 2\sqrt{2} \checkmark$$

22,

A rectangular yard has an area of 96 square feet. If the width of the yard is 4 ft less than the length, what is the perimeter, in feet, of the yard?

- solution -



$$\text{Area} = l \times w = l(l - 4) = 96$$

$$\text{Distribute: } l^2 - 4l = 96$$

Make it = 0.

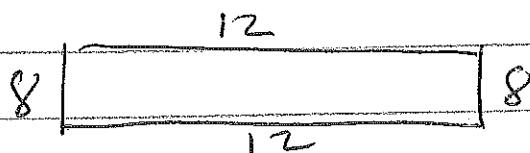
$$l^2 - 4l - 96 = 0 \quad \text{Factor.}$$

$$(l - 12)(l + 8) = 0$$

$$l = 12 \checkmark \quad l = -8 \times$$

$$w = l - 4 = 12 - 4 = 8$$

$$l = 12 \quad \text{and} \quad w = 8$$



$$P = 12 + 8 + 12 + 8 = 40 \quad \checkmark$$

23 If $a \neq b$ and $\frac{1}{x} + \frac{1}{a} = \frac{1}{b}$, then
 $x = \underline{\hspace{2cm}}$

- Solution -

$$\frac{1}{x} + \frac{1}{a} = \frac{1}{b} \quad \text{L.C.D is } x \cdot a \cdot b = xab$$

multiply each term by xab .

$$xab \cdot \frac{1}{x} + xab \cdot \frac{1}{a} = xab \cdot \frac{1}{b}$$

$$ab + xb = xa$$

Subtract xb
from both sides

$$ab = xa - xb$$

Take x as a
common factor.

$$ab = x(a - b) \quad \text{Divide by } a - b$$

$$x = \frac{ab}{a - b} \quad \checkmark$$

24, The graph of which the following equations is a straight line parallel to the graph $y = 2x$?

A. $4x - y = 4$

B. $2x - 2y = 2$

C. $2x - y = 4$

D. $2x + y = 2$

E. $x - 2y = 4$

Solution

2 lines are parallel if they have the same slope.

$y = 2x$ has a slope = 2.

Try choice B.

$$2x - 2y = 2$$

Solve for y

$$-2y = -2x + 2 \quad \text{Divide by } -2$$

$$y = x - 1 \quad ; \text{ slope} = 1$$

Therefore choice B is wrong.

Try choice C.

$$2x - y = 4$$

Solve for y.

$$-y = -2x + 4$$

Divide by -1

$$y = 2x - 4 \quad ; \text{ slope} = 2 \quad \checkmark$$

25,

An equation of the line that contains the origin and the point $(1, 2)$ is:

A. $y = 2x$

B. $2y = x$

C. $y = x - 1$

D. $y = 2x + 1$

E. $\frac{y}{2} = x - 1$

- Solution -

Equation of the line that contains the origin is: $y = mx$

So, choices C, D and E have to be discarded.

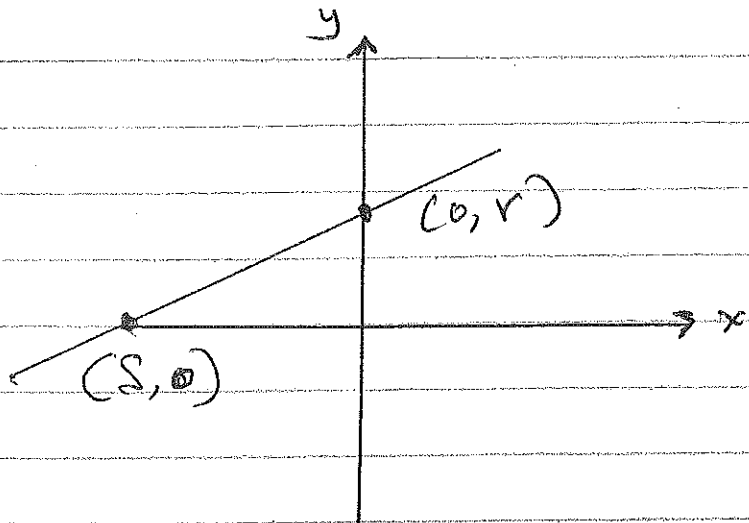
Try choice A. $y = 2x$

since it crosses point $(1, 2) \Rightarrow x=1, y=2$
replace x with 1 and y with 2.

$$2 = 2(1) \Rightarrow 2 = 2 \checkmark$$

Correct answer is "A" \checkmark

26,



Find the slope.

— Solution —

$$\begin{pmatrix} 0 \\ x_1 \end{pmatrix}, \begin{pmatrix} r \\ y_1 \end{pmatrix}$$

$$\begin{pmatrix} S \\ x_2 \end{pmatrix}, \begin{pmatrix} 0 \\ y_2 \end{pmatrix}$$

$$\text{slope} = m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{0 - r}{S - 0} = \frac{-r}{S} \checkmark$$