Test (4)

Mr.D

1. The solution set of $-2x^2 - 3x + 5 = 0$ contains:

(A) Only 3 elements
(B) Only 2 elements
(C) Only 1 element
(D) No elements

① $b^2 - 4ac = (-3)^2 - 4(-2)(5)$

$= 9 - (-40) = 49 > 0$

so there are 2 solutions B

Remember

$b^2 - 4ac$ → > 0 → 2 different solutions

→ $= 0$ → 2 equal solutions

→ < 0 → No real solutions

2. $\frac{5}{3} - \left(\frac{7}{2} - \frac{7}{5}\right) =$

(A) $-\frac{2}{3}$

(B) $-\frac{1}{30}$

(C) $-\frac{13}{30}$

(D) $-\frac{97}{30}$

② $\frac{5}{3} - \left(\frac{7^{\times 5}}{2_{\times 5}} - \frac{7_{\times 2}}{5_{\times 2}}\right)$

$= \frac{5}{3} - \left(\frac{35}{10} - \frac{14}{10}\right)$

$= \frac{5^{\times 10}}{3_{\times 10}} - \frac{21_{\times 3}}{10_{\times 3}} = \frac{50}{30} - \frac{63}{30} = \boxed{\frac{-13}{30}}$

C

3. $\dfrac{t}{t+s} =$

(A) $\dfrac{1}{1+s}$

(B) $\dfrac{1}{s}$

(C) zero

(D) None of the previous

③ Can't be simplified $\longrightarrow$ D

But if the question was $\dfrac{t+s}{t}$, in this case we can separate $\longrightarrow$ $\dfrac{t+s}{t} = \dfrac{t}{t} + \dfrac{s}{t} = 1 + \dfrac{s}{t}$

4. $\sqrt{x^2 + y^2} =$

(A) $x + y$

(B) $|x + y|$

(C) $|x| + |y|$

(D) None of the previous

④ Can't be simplified $\longrightarrow$ D

Remember

✗ $\sqrt{a \pm b} \neq \sqrt{a} \pm \sqrt{b}$

✓ $\sqrt{ab} = \sqrt{a} \times \sqrt{b}$

✓ $\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$

} If $a, b > 0$

If the question was $\sqrt{x^2 y^2} \rightarrow \sqrt{x^2} \times \sqrt{y^2}$

$= |x|\,|y|$

5. The solution set of the inequality $|x| \geq x$ is:

(A) $\Re$

(B) $[0, \infty)$

(C) $[-1,1]$

(D) None of the previous

⑤ It's always true $\rightarrow (-\infty, \infty)$

$\mathbb{R} \rightarrow$ A

Remember

$|x| = x \rightarrow [0, \infty)$

$|x| = -x \rightarrow (-\infty, 0]$

$|x| \geq x \rightarrow \mathbb{R}$

$|x| < x \rightarrow \phi$

6. $\dfrac{\left(x^{-1}y^{2}z^{-3}\right)^{4}}{\left(x^{4}y^{-5}z^{6}\right)^{3}} =$

(A) $\dfrac{y^{23}}{x^{16}z^{30}}$

(B) $\dfrac{x^{8}y^{23}}{z^{30}}$

(C) $\dfrac{1}{x^{16}y^{7}z^{30}}$

(D) $\dfrac{1}{x^{16}y^{-23}z^{9}}$

6 $\dfrac{(x^{-1}y^{2}z^{-3})^{4}}{(x^{4}y^{-5}z^{6})^{3}} = \dfrac{x^{-4}y^{8}z^{-12}}{x^{12}y^{-15}z^{18}}$

$= x^{-4-12} \times y^{8--15} \times z^{-12-18}$

$= x^{-16} \times y^{23} \times z^{-30}$

$= \dfrac{y^{23}}{x^{16}z^{30}} \longrightarrow$ A

7. If $s = \dfrac{5t-4}{2t+9}$, then $t =$

(A) $\dfrac{-(9s+4)}{2s-5}$

(B) $\dfrac{9s+4}{2s-5}$

(C) $\dfrac{2}{5}s - \dfrac{9}{4}$

(D) $\dfrac{2}{5}s + \dfrac{9}{4}$

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$$s = \frac{5t-4}{2t+9}$$

$$s(2t+9) = 5t-4$$

$$2st + 9s = 5t - 4$$

$$2st - 5t = -4 - 9s$$

$$t(2s-5) = -4-9s$$

$$t = \frac{-4-9s}{2s-5} \rightarrow t = \frac{-(9s+4)}{2s-5} \rightarrow A$$

8. If $x < 0$, then $\sqrt[3]{27x^3} + \sqrt{9x^2} =$

(A) $6x$
(B) zero
(C) $-6x$
(D) None of the previous

8 $\sqrt[3]{27x^3} + \sqrt{9x^2}$

$= \sqrt[3]{27} \times \sqrt[3]{x^3} + \sqrt{9} \times \sqrt{x^2}$

$= 3 \times x + 3 \times |x|$

$= 3x + 3(-x)$

$= 3x - 3x = 0$

B

Remember

$(\sqrt{x})^2 = x$

$\sqrt{x^2} = |x| \to x$, if $x \geq 0$; $\to -x$, if $x \leq 0$

$(\sqrt[n]{x})^n = n$ ....(always)

$\sqrt[n]{x^n}$ — If n is odd $\to n$; If n is even $\to |n|$

9. $6x^2 - x - 12 =$

(A) $(x-2)(6x+6)$

(B) $(3x-4)(2x+3)$

(C) $(2x-3)(3x+4)$

(D) None of the previous

⑨ Just check the middle term of each option of the answers (A, B & C): (as all of them give 1st term $6x^2$ and last term -12)

A) $(x-2)(6x+6)$

$-12x$

$+$

$6x$

$-6x$ ✗

B) $(3x-4)(2x+3)$

$-8x$

$+$

$9x$

x ✗

C) $(2x-3)(3x+4)$

$-9x$

$+$

$8x$

$-x$ ✓

→ C

10. The solution set of $\dfrac{(x-1)(x-2)}{x} > 0$ is :

(A) $\Re \setminus \{0\}$

(B) $(-\infty,1) \cup (2,\infty) \setminus \{0\}$

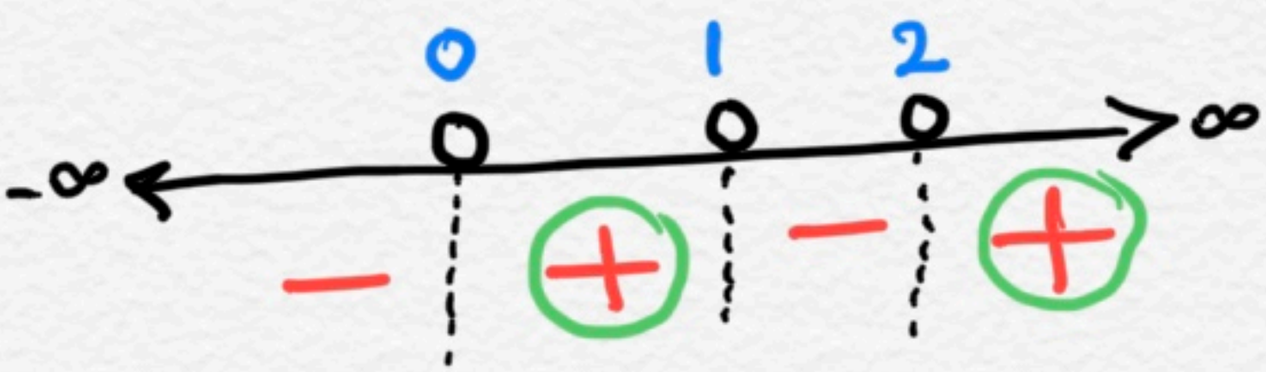
(C) $(-\infty, 0) \cup (1,2)$

(D) $(0,1) \cup (2,\infty)$

(10)

$$\frac{(x-1)\,(x-2)}{x} > 0$$

$1 \to \boxed{1}$, $2 \to \boxed{2}$, $x \to \boxed{0}$



$\boxed{(0,1) \cup (2,\infty)} \to$ D

Remember

we use the no. line sign way in two cases:

* Higher degree inequalities (If the power is 2 or more)
* Rational inequalities (like $\frac{\square}{\square} \geq \cdots$)

11. The domain of the function $f(x) = \dfrac{x^{\frac{3}{2}} - 1}{x}$ is:

(A) $\Re \setminus \{0\}$

(B) $[1, \infty)$

(C) $(0, \infty)$

(D) None of the previous

(11) $f(x) = \dfrac{(\sqrt{x})^3 - 1}{x}$

$x \geq 0 \rightarrow [0, \infty)$

$x \neq 0$

$[0, \infty) / \{0\} = \boxed{(0, \infty)}$

C

12. If $f(x) = 3x^2 - 8$, then $f(2x-1) =$

(A) $12x^2 - 12x - 5$

(B) $12x^2 + 12x - 9$

(C) $6x^2 + 2x - 9$

(D) $6x^2 - 2x - 5$

12 $f(2x-1) = 3(2x-1)^2 - 8$

$= 3\left[4x^2 - 4x + 1\right] - 8$

$= 12x^2 - 12x + 3 - 8$

$= \boxed{12x^2 - 12x - 5} \rightarrow$ A

13. The side of square A is 4cm more than the side of square B. Then the area of A increases the area of B by :

(A) $4\ cm^2$
(B) $8\ cm^2$
(C) $16\ cm^2$
(D) None of the previous

(13) It's easier here to assume numbers:

let the side of square B be $\boxed{5}$
the side of square A be $5+4 = \boxed{9}$

Area of square A $= 5^2 = 25$
Area of square B $= 9^2 = 81$

the difference is 56

$\longrightarrow$ D

14. Right–angled triangle A has base b, height h and area x. Rectangle B with length $2b$ and width $2h$ has an area equal to:

(A) $4x$
(B) $8x$
(C) $16x$
(D) None of the previous

(14) Area of $\Delta = \frac{1}{2}bh$

$x = \frac{1}{2}bh$

$\times$

$2x = 1bh$

$2x = bh$

$\frac{2x}{b} = \boxed{h}$

Area of $\square = l \times w$

$A. = 2b \times 2\boxed{h}$

$A = 2\cancel{b} \times 2 \times \boxed{\frac{2x}{\cancel{b}}}$

$A = 8x \longrightarrow$ B

15. Ahmad and Ali took a road trip and shared the driving. Ahmad drove four times as many kilometers as Ali drove. What percentage of the total kilometers of the trip did Ali drive?

(A) 25 %
(B) 80 %
(C) 20 %
(D) 5 %

(15) Ali $\longrightarrow x$
Ahm. $\longrightarrow 4x$ } Total $= 5x$

percentage of Ali $= \frac{\cancel{x}^{1}}{5\cancel{x}} \times 100\,\% = \frac{1}{5} \times 100\,\% = \frac{\cancel{100}^{20}}{\cancel{5}}\,\%$

$= 20\,\% \longrightarrow$ C

16. If 3kg of rose petals are needed to produce 5g of perfume, then how much rose petals are needed to produce 870g of perfume?

(A) 1450 kg
(B) 2610 kg
(C) 522 kg
(D) None of the previous.

(16) Rose (Kg) : perfume (g)

$3 : 5$

$x : 870$

$\longrightarrow x = \frac{3 \times \cancel{870}^{174}}{\cancel{5}}$

$x = 3 \times 174$

$x = 522$ kg

C

$$\begin{array}{r} 174 \\ \times\ 3 \\ \hline 522 \end{array}$$

17. A company was able to sell one third of the washing machines they had imported. After selling 10 additional washing machines, they were left with half of the imported machines. How many washing machines did the company import?

(A) 42
(B) 60
(C) 50
(D) None of the previous.

let the original imported quantity be x

(17) $x - \frac{1}{3}x - 10 = \frac{1}{2}x$

$6 \times x - \frac{x^{\times 2}}{3_{\times 2}} - \frac{x^{\times 3}}{2_{\times 3}} = 10$

$6 \times$

$\frac{6x}{6} - \frac{2x}{6} - \frac{3x}{6} = 10$

$\frac{6x - 2x - 3x}{6} = 0 \longrightarrow \frac{x}{6} = 10$ $\times$

$\boxed{x = 60} \longrightarrow$ B

18. If 200% of 40% of x is equal to 40% of y, then x is what percent of y?

(A) 20 %
(B) 40 %
(C) 50 %
(D) None of the previous.

(18) 200% of 40% of x = 40% of y

$$\frac{200}{100} \times \frac{40}{100} \times x = \frac{40}{100} \times y$$

$$\frac{8}{10} \times x = \frac{4}{10} \times y$$

$$x = \frac{10}{8} \times \frac{4}{10} y$$

$$x = \frac{1}{2} y$$

so x is 50% of y

$$A\% = \frac{A}{100}$$

C

19. The average of 8, 13, x and y is 6. The average of 15, 9, x and x is 8. What is the value of y?

(A) -1
(B) 4
(C) 6
(D) None of the previous.

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$$\frac{15+9+x+x}{4} = 8$$

$$\frac{24+2x}{4} = 8$$

$$24 + 2x = 32$$

$$2x = 8$$

$$x = 4$$

$$\frac{8+13+x+y}{4} = 6$$

$$21 + x + y = 24$$

$$x + y = 3$$

$$4 + y = 3$$

$$y = -1$$

$\rightarrow$ A

$$\text{Average} = \frac{\text{sum of values}}{\text{no. of values}}$$

20. If $\frac{a}{b} + a = 6$, then $\sqrt{\frac{a + ab - 2b}{b}} =$

(A) $\sqrt{6}$

(B) 2

(C) 4

(D) None of the previous.

20 $\frac{a}{b} + a = 6$

$\times(b)$

$\frac{a}{\cancel{b}} \times \cancel{b} + a \times b = 6 \times b$

$a + ab = \boxed{6b}$

$\sqrt{\frac{a+ab-2b}{b}} = \sqrt{\frac{6b-2b}{b}} = \sqrt{\frac{4\cancel{b}}{\cancel{b}}} = \sqrt{4} = 2$

B