# Test (3)

Mr.D

1. The solution set of $2x^2 + x - 28 = 0$ is:

(a) $\left\{\frac{7}{2}, -4\right\}$

(b) $\left\{4, -\frac{7}{2}\right\}$

(c) $\{4, 7\}$

(d) $\{-4, 7\}$

1

$$2x^2 + x - 28 = 0$$

$$(2x - 7)(x + 4) = 0$$

$2x - 7 = 0$ or $x + 4 = 0$

$\boxed{x = 7/2}$ | $\boxed{x = -4}$

a

2. The solution set of $|7x+5|+2=0$ is:

(a) $\{-1\}$

(b) $\left\{-\frac{3}{7}\right\}$

(c) $\left\{-1, -\frac{3}{4}\right\}$

(d) None of the previous

(2)

$|7x+5|+2=0$

$|7x+5|=-2 \longrightarrow \phi$

d

3. The solution set of $x^2 + 9 \leq 6x$ is:

(a) $\phi$

(b) $\Re$

(c) $[-3, 3]$

(d) None of the previous

3 $x^2 + 9 \leq 6x$

$x^2 - 6x + 9 \leq 0$

$(x-3)^2 \leq 0$

the complete square can't be $< 0$, but it can be $= 0$

$(x-3)^2 = 0$

$x - 3 = 0$ $\longrightarrow$ $\boxed{x = 3}$

d

4. Let $x$, $y$ be two real numbers such that $x < y$. Then $[(x+y)+|x-y|] =$

(a) $2x$ (c) $2y$

(b) $x-y$ (d) $2(x+y)$

4 If $x < y$ $\xrightarrow{\text{means}}$ $x - y < 0$

$$|x-y| = \begin{cases} (x-y), & x-y \geq 0 \\ \boxed{-(x-y), \quad x-y<0} \end{cases}$$

so, in our case, $|x-y| = -(x-y)$

$$(x+y) + |x-y|$$

$$= (x+y) + -(x-y)$$

$$= \cancel{x} + y - \cancel{x} + y = \boxed{2y} \longrightarrow C$$

OR you can choose any two values for $x, y$ but $x$ should be less than $y$ (like $x=2$, $y=5$) then you try them in each option (a, b, c & d) and see which one will give you the same answer as the original question.

5. $x^3 + y^3 =$

(a) $(x+y)(x^2+xy+y^2)$

(b) $(x+y)(x^2-xy+y^2)$

(c) $(x+y)(x^2+2xy+y^2)$

(d) $(x+y)(x^2-2xy+y^2)$

5 $x^3+y^3=(x+y)(x^2-xy+y^2)$

Factorizing sum of two cubes

b

6. $\frac{1}{x^2+x} - \frac{1}{x} =$

(a) $\frac{-1}{x+1}$

(b) $\frac{x}{x+1}$

(c) $\frac{2-x}{x^2+x}$

(d) $\frac{2-x}{x(x^2+x)}$

6

$$\frac{1}{x^2+x} - \frac{1}{x}$$

$$= \frac{1}{x(x+1)} - \frac{1 \times (x+1)}{x \times (x+1)}$$

$$= \frac{1-1(x+1)}{x(x+1)} = \frac{\cancel{1}-x-\cancel{1}}{x(x+1)}$$

$$= \frac{-\cancel{x}}{\cancel{x}(x+1)} = \frac{-1}{x+1} \rightarrow a$$

7. If you simplify $\dfrac{(x+1)^3-1}{x}$ and then put $x=0$, you obtain:

(a) $\infty$ (c) 0

(b) 3 (d) 1

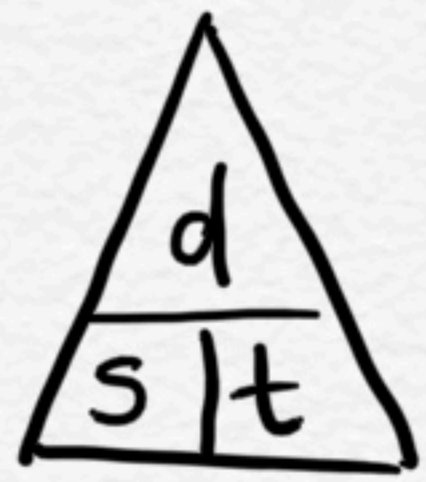
7 $\dfrac{(x+1)(x+1)^2-1}{x} = \dfrac{(x+1)(x^2+2x+1)-1}{x}$

$= \dfrac{x^3+2x^2+x+x^2+2x+\cancel{1}-\cancel{1}}{x} = \dfrac{x^3+3x^2+3x}{x} = \dfrac{\cancel{x}(x^2+3x+3)}{\cancel{x}}$

$= (0)^2+3(0)+3 = 3 \longrightarrow$ b

8. The road between two cities A and B is 300 km long. A car leaves city A towards B at a constant speed of 80 km/hour. At the same time another car leaves B towards A at a constant speed of 70 km/hour. After how many minutes do the two cars meet?

(a) 150 min. (c) 120 min.
(b) 300 min. (d) 180 min.


$d_A = S \times t$

$d_A = 80t$

$d_B = S \times t$

$d_B = 70t$

when they meet, their total distances = 300 km

$80t + 70t = 300$

$150t = 300 \longrightarrow t = \frac{300}{150} \rightarrow t = 2h$

$t = 2h \xrightarrow{\times 60} \boxed{120}$ min. C

9. In January, prices went up by 20%, then went up again by 10% in February. If the price of an item was 100 KD on the first of January, what is the price of this item on the first of March?

(a) 130 KD
(b) 132 KD
(c) 128 KD
(d) 136 KD

9 $100 + 20\%$ of $100 = 120$

$120 + 10\%$ of $120$

$= 120 + 12 = \boxed{KD\ 132}$ b

10. A shopkeeper bought 20 kg of apples for 200 fils per kilo. He found that 4 kg of the apples are rotten and cannot be sold. Find the selling price of each kilogram of the rest if he wants 100% profit.

(a) 500 fils/kg
(b) 400 fils/kg
(c) 300 fils/kg
(d) 600 fils/kg

(10) Cost price = 200 fils × 20 kg = 4000 fils

to get 100% profit, the income must be 8 000 fils

$$16 \text{ kg} \times \boxed{?} = 8\,000$$

$$\boxed{?} = \frac{8\,000}{16}$$

$$\boxed{?} = \boxed{500 \text{ fils}} \longrightarrow \text{a}$$

11. The working day in a factory is 8 hours long. To cut the workforce by $x\%$ without affecting the daily production output, the management had to raise the working hours to 10hours per day. Find $x$.

(a) 25 (c) 10
(b) 8 (d) 20

No. of workers and working hours are inversely prop. If the production is the same.

Let the original no. of workers be 100 and we will see the change

no. workers : working hours

$100 \xleftrightarrow{\times} 8$

$\boxed{?}$ : 10

$\boxed{?} = \dfrac{10\cancel{0} \times 8}{1\cancel{0}} = 80$ (It was 100, now it's 80)

so decreased by 20%

$x = \boxed{20} \longrightarrow$ d

12. Let $x, y$ be two positive real numbers whose product is 100. What is the maximum value that $x$ can take?

(a) 100
(b) 200
(c) 10
(d) None of the previous

(12) Remembe "Real number"

means → it can be: positive, negative, decimal, fracti, ..

$x \times y = 100 \quad (0.1 \times 1000 = 100) \rightarrow$ d

13. The domain of $f(x)=\dfrac{\sqrt{1-x^2}}{\sqrt{1-x}}$ is :

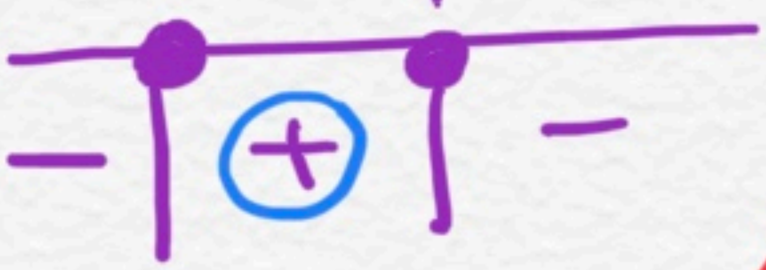
(a) $[-1, 1)$ (c) $[-1, \infty)$
(b) $\Re\setminus\{1\}$ (d) $(-1, 1)$

(13) $\sqrt{1-x^2}$ and $\sqrt{1-x}$

$1-x^2 \geq 0$

$(1+x)(1-x) \geq 0$

$-1 \qquad 1$



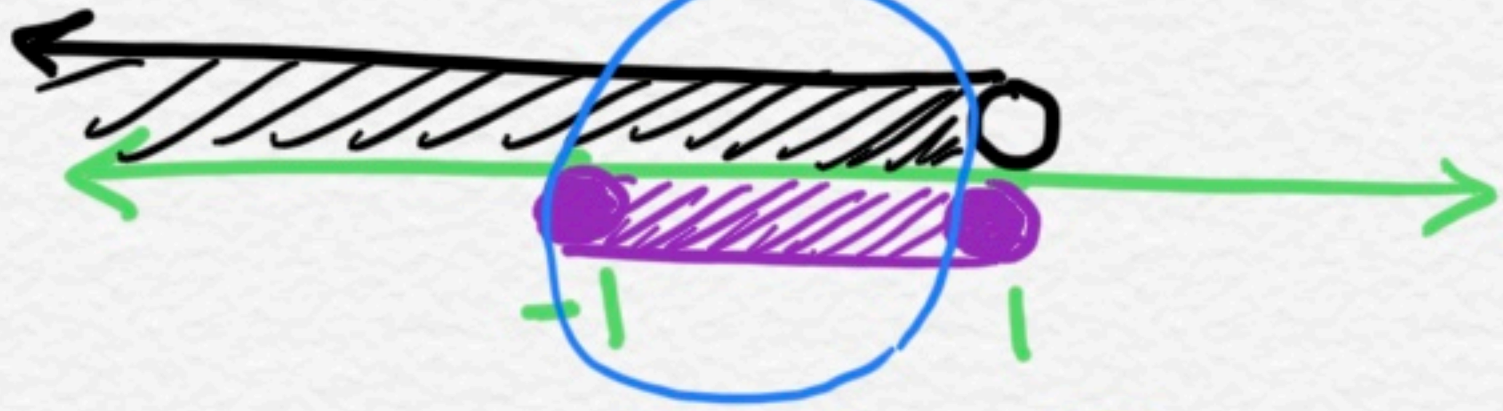

$\boxed{[-1, 1]}$

$1-x > 0$

$1 > x$

$\boxed{(-\infty, 1)}$

$\cap$




Ans. is $[-1, 1) \longrightarrow$ (a)

**OR** You can try the numbers from each option of the answers (a, b, c & d) and avoid any option that leads to undefined answer: $\left(\frac{*}{0}, \sqrt{-ve}\right)$.

14. Let $f(x)=2x+1,\ g(x)=x^2-3$. Then $g\circ f(x)=$

(a) $4x^2+2x-3$

(b) $4x^2+4x-3$

(c) $4x^2+4x-2$

(d) $4x^2+x-2$

(14) $g\circ f(x) = g(f(x))$

$f(x) = 2x+1$

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

$= (2x+1)^2-3$

$= 4x^2+4x+1-3$

$= \boxed{4x^2+4x-2} \longrightarrow \boxed{C}$

15. The solution set of $\frac{1}{x} < x$ is:

(a) $(1, \infty)$ (c) $(-\infty, -1)$

(b) $(-1, 0) \cup (1, \infty)$ (d) $(-1, 1)$

(15)

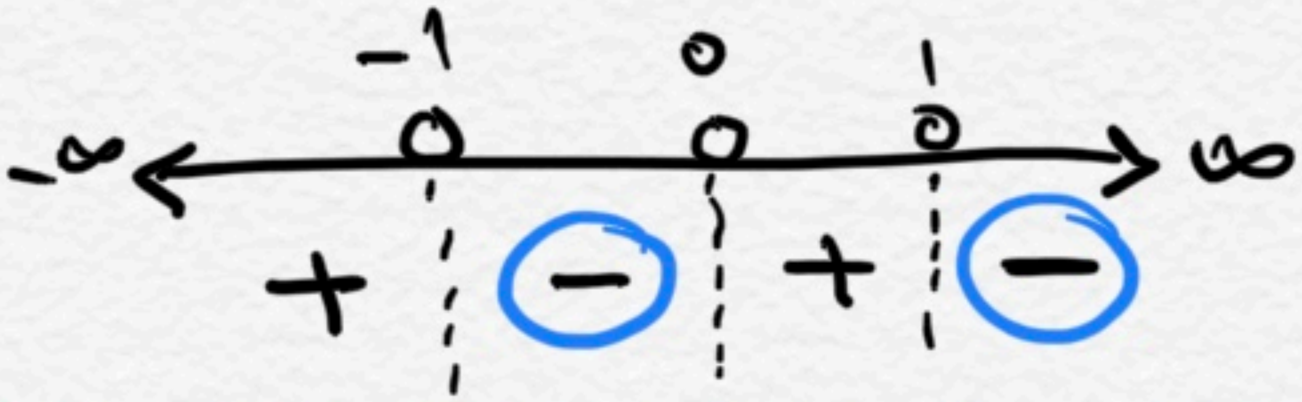
$$\frac{1}{x} < x$$

$$\frac{1}{x} - x < 0$$

$$\frac{1}{x} - \frac{x \times x}{1 \times x} < 0$$

$$\frac{1 - x^2}{x} < 0$$

$$\frac{\overset{\boxed{1}}{(1-x)}\,\overset{\boxed{-1}}{(1+x)}}{\underset{\boxed{0}}{x}} < 0$$




$\boxed{(-1, 0) \cup (1, \infty)}$ b

OR you can try each option of the answers (a, b, c & d)

16. The solution set of $\frac{1}{2}x^{\frac{-1}{2}} + \frac{1}{3}x^{\frac{1}{2}} = 0$ is:

(a) $\{6\}$

(b) $\{3,\ 2\}$

(c) $\left\{\frac{-3}{2}\right\}$

(d) $\phi$

(16) $\frac{1}{2}x^{-1/2} + \frac{1}{3}x^{1/2} = 0$

$\times(x^{1/2})$

$\frac{1}{2}(1) + \frac{1}{3}x = 0$

$\times(6)$

$6 \times \frac{1}{2} + 6 \times \frac{1}{3}x = 0$

$3 + 2x = 0$

$2x = -3$

$x = -1.5$ Rejected

but, remember $x^{1/2} \xrightarrow{\text{means}} \sqrt{x}$ and we can't accept negative answer inside the square root

$\phi$

17. The volume of a right circular cylinder is $36\pi$ cubic feet. If the height of the cylinder is 4 ft, then find the radius of the base.

(a) 2 ft (c) 4 ft
(b) 3 ft (d) 5 ft

(17) V. of cylinder $= \pi r^2 \times h$

$$36\pi = \pi \times r^2 \times 4$$

$$36\pi = 4\pi \times r^2$$

$\div$

$$\frac{36\cancel{\pi}}{4\cancel{\pi}} = r^2$$

$$9 = r^2$$

$r = \sqrt{9}$

$\boxed{r = 3}$

b

18. A rectangular box, open at the top, has a square base, and its height is 2 cm. Find the length of the side of the base knowing that the total surface area of the box is 9 $cm^2$.

(a) 2 cm (c) 9 cm
(b) 1 cm (d) –9 cm

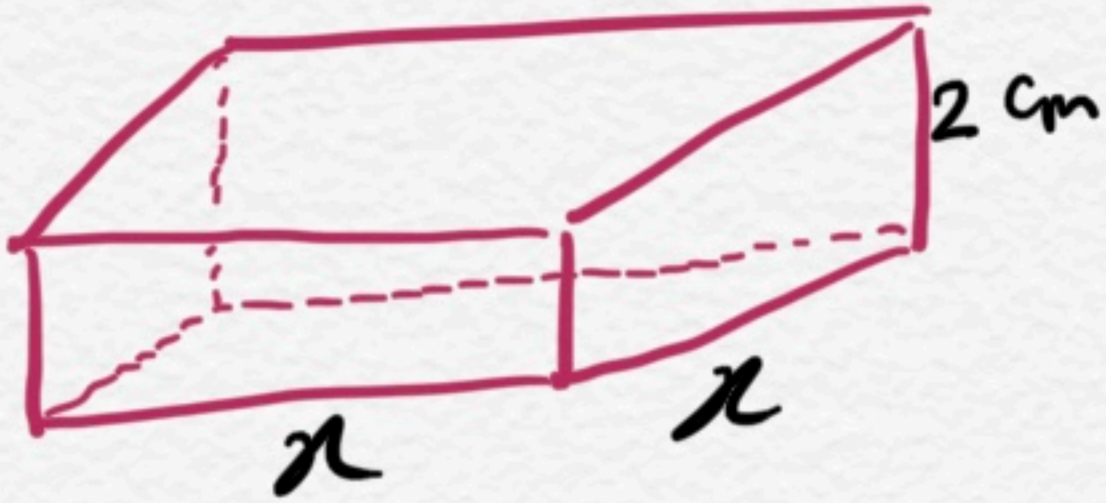
18

$S.A = x^2 + 2x \times 4$

$S.A = x^2 + 8x$

$9 = x^2 + 8x$

$0 = x^2 + 8x - 9$




$x^2 + 8x + 9 = 0$

$(x+9)(x-1) = 0$

$x + 9 = 0$ or $x - 1 = 0$

$x = -9$ ✗ $\boxed{x = 1}$ ✓

but length can't be negative.

b

19. In the imperial measures of weight, pounds and stones are used. We know that one stone is equal to 14 pounds, and each pound is approximately 450 grams. If a man weighs 10 stones and 10 pounds, then what is his weight in kilograms?

(a) 67.5 kg
(b) 77.5 kg
(c) 87.5 kg
(d) 57.5 kg

(19) 10 st. + 10 p.

= 10×14 p. + 10 p.

= 140 p. + 10 p. = 150 pound $\xrightarrow{\times 450}$ 67500g

= $\boxed{67.5\text{ kg}}$

a

20. In a certain store, the revenue in November is $\frac{2}{5}$ the revenue in December. The revenue in January is $\frac{1}{4}$ the revenue in November. If the total revenue of the three months is 3000 KD, then what is the revenue in November?

(a) 700 KD (c) 800 KD
(b) 900 KD (d) 200 KD

20

Nov. : Dec : Jan.

$\boxed{2 \times 4}$ : 5 : 1

8 : 20 : 2

$\div 2$

4 : 10 : 1

N : D : J : Total

4 : 10 : 1 : 15

$\boxed{x}$ : : : 3000

$$x = \frac{\overset{2}{\cancel{30}}00 \times 4}{\cancel{15}}$$

$$x = \frac{200 \times 4}{1}$$

$$\boxed{x = 800}$$

C