

Aptitude & Mental Ability**Tnpsc Previous Questions With Explanation - Part 5****Important Download Links**

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1. A and B together can do a piece of work in 8 days, but A alone can do it in 12 days. How many days would B alone take to do the same work?

A)24 days

B)16 days

C)32 days

D)10 days

Let B's work unknown be x,

$$1/a + 1/b = 1 ;$$

$$1/12 + 1/x = 1/8$$

$$1/x = 1/8 - 1/12$$

$$1/x = 4/96 = 1/24$$

so B's alone can do the work in 24 days.

2.Total surface area of solid hemisphere is 675π sq. cm. Then the curved surface area of the solid hemisphere is

A)225 π sq. cm

B)452 π sq. cm

C) 450 sq. cm

D) 225 sq. cm

Total surface area of solid hemisphere = $3\pi r^2$

$$\text{So , } 3\pi r^2 = 675 \pi$$

$$r^2 = 225 \text{ sq. cm}$$

$$r = 15 \text{ cm}$$

Curved surface area of solid hemisphere = $2\pi r^2$

$$\text{So, } = 2\pi r^2$$

$$= 2 * \pi * 15 * 15$$

$$= 450\pi \text{ sq. cm}$$

3. A train running at 80 km/hr , reaches a place in 6 hours . In what speed should it run in order to reach the place in 4 hours ?

A) 90km/hr

B) 100km/hr

C) 110km/hr

D) 120km/hr

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

Given ,Speed = 80; Time = 6 hr, Distance =?

Distance = Speed * Time

$$= 80 * 6 = 480 \text{ km}$$

If the train covers 480 km in 4 hours , then the speed would be

Speed = 480/4

$$= 120 \text{ km/hr}$$

4. The sum of the digits of a two digit number is 13. When the digits are interchanged, the value of the number is increased by 45? What is the number?

A)67

B)97

C)58

D)94

Let the two digit number be x and y,

The sum is $x+y=13$

If x and y are interchanged the value increases by 45 then,

$$xy = yx + 45$$

The number which satisfies this is 94

$$94 = 49 + 45$$

So the answer is 94

(OR)

Go from the options .

5. Simplify : $\frac{2 \sin 30^\circ}{\cos 60^\circ} + \frac{3 \sec 10^\circ}{\operatorname{cosec} 80^\circ} + \frac{\cot 15^\circ}{\tan 75^\circ}$

A) 0

B) 6

C) 3

D) 4

$$\sin (90^\circ + \theta) = \cos \theta$$

$$\operatorname{cosec} (90^\circ + \theta) = \sec \theta.$$

$$\tan (90^\circ + \theta) = -\cot \theta$$

$$\cos (90^\circ + \theta) = -\sin \theta.$$

$$\sec (90^\circ + \theta) = -\operatorname{cosec} \theta.$$

$$\cot (90^\circ + \theta) = -\tan \theta.$$

Then,

$$= \frac{2 \sin 30^\circ}{\cos 60^\circ} + \frac{3 \sec 10^\circ}{\operatorname{cosec} 80^\circ} + \frac{\cot 15^\circ}{\tan 75^\circ}$$

$$= \frac{2 \sin 30^\circ}{\sin 30^\circ} + \frac{3 \sec 10^\circ}{\sec 10^\circ} + \frac{\cot 15^\circ}{\cot 15^\circ}$$

$$= 2 + 3 + 1$$

$$= 6$$

(OR)

$$= \frac{2 \sin 30^\circ}{\cos 60^\circ} + \frac{3 \sec 10^\circ}{\operatorname{cosec} 80^\circ} + \frac{\cot 15^\circ}{\tan 75^\circ}$$

$$= \frac{2 \cos 60^\circ}{\cos 60^\circ} + \frac{3 \operatorname{cosec} 80^\circ}{\operatorname{cosec} 80^\circ} + \frac{\tan 75^\circ}{\tan 75^\circ}$$

$$= 2 + 3 + 1$$

$$= 6$$

6. What is the G.C.D of $6(2x^2-3x-2)$, $8(4x^2+4x+1)$ and $12(2x^2+7x+3)$?

A) $4(x+3)$

B) $2(2x+1)$

C) $8(2x+3)$

D) $8(x+3)$

To find the greatest common divisor ,

We can take HCF of the numbers and Common factors for the polynomials,

H.C.F of 6,8,12 is 2

Factorizing,

$$(2x^2-3x-2) = 0;$$

$$\begin{aligned}(2x^2-3x-2) &= (2x^2-4x-x-2) \\ &= (2x(x-2)-1(x-1)) \\ &= (2x+1)(x-1)\end{aligned}$$

$$(4x^2+4x+1) = 0;$$

$$\begin{aligned}(4x^2+4x+1) &= (4x^2+2x+2x+1) \\ &= (2x(2x+1)+1(2x+1)) \\ &= (2x+1)(2x+1)\end{aligned}$$

$$(2x^2+7x+3) = 0;$$

$$\begin{aligned}(2x^2+7x+3) &= (2x^2+6x+x+3) \\ &= 2x(x+3)+1(x+3) \\ &= (2x+1)(x+3)\end{aligned}$$

The common divisor among $2x^2-3x-2$, $(4x^2+4x+1)$, $(2x^2+7x+3)$ is $(2x+1)$

So the greatest common divisor is $2(2x+1)$

7. What is the volume of water flowing through a cylindrical pipe?

- A) Area of cross section of the pipe * speed * time
- B) Area of cross section of the pipe * Length of pipe
- C) Area of cross section of the pipe * Time
- D) Length of the pipe * radius of its cross section

Volume is decided by the area of the pipe and the speed of water and time required to flow through the pipe

8. What is the sum of the series $1 + 8 + 27 + 64 + \dots + 1000$?

- A)1100
- B)1064
- C)2027
- D)3025

$$1 + 8 + 27 + 64 + \dots + 1000 = 1^3 + 2^3 + 3^3 + 4^3 + 5^3 + 6^3 + 7^3 + 8^3 + 9^3 + 10^3$$

To find the sum of cube of n series is $\left(\frac{n(n+1)}{2}\right)^2$ where 'n' is 10

$$\text{sum} = ((10 * 11)/2)^2$$

$$= 55^2$$

$$= 3025$$

9. A circle and a sphere are of same radius. What is the ratio of the area of the circle to the surface area of the sphere?

A) 1:1

B) 1:2

C) 1:4

D) 1:3

$$\text{Area of the Circle} = \pi r^2$$

$$\text{Surface area of the sphere} = 4\pi r^2$$

Area of the circle : Surface area of the sphere

$$\pi r^2 : 4\pi r^2$$

$$1 : 4$$

10. A father is now twice as old as his son. Twenty years ago, he was six times as old as his son. What are their ages now?

A) 60,30

B) 40,20

C) 58,29

D) 50,25

Let the present age of father and son be $2x$ and x

$$\Rightarrow \frac{x-20}{2x-20} = \frac{1}{6}$$

$$\Rightarrow 6(x-20) = 2x-20$$

$$\Rightarrow 6x-120 = 2x-20$$

$$\Rightarrow 4x = 100$$

$$x = 25$$

The present age of father and son is 50, 25

11. 20 men working 6 hours a day can finish a work in 4 days. In how many days can 10 men working 8 hours a day finish the work?

A) 8days

B) 6days

C) 4days

D) 10days

$$20 \text{ men work } 6 \text{ hours} = 20 \times 6 = 120 \text{ hrs}$$

Therefore total working hrs = 120 hrs per day

work completed in 4 days = $4 \times 120 = 480$

we get total of 480 hrs to get the work completed.

So for 10 men to complete the same work = $10 * (X) * 8 = 480$

$$X = 480/80 = 6$$

It would take 6 days to get the same amount of work done by 10 men if they work for 8 hrs a day

(OR)

$$\Rightarrow \frac{M_1 * D_1 * H_1}{W_1} = \frac{M_2 * D_2 * H_2}{W_2}$$

$$\Rightarrow \frac{20 * 4 * 6}{1} = \frac{10 * D_2 * 8}{1}$$

$$\Rightarrow D_2 = 6 \text{ days}$$

12. What is the LCM of $4(x+1)$ and $2(x^2-1)$?

A) $2(x+1)$

B) $4(x-1)$

C) $4(x^2-1)$

D) $2(x-1)$

LCM for 4 and 2 is 4

LCM for $(x+1)$ and (x^2-1)

factors for $(x+1) = (x+1)$

factors for $(x^2-1) = (x+1) * (x-1)$

The least common multiples are $(x+1)(x-1) = (x^2-1)$

So the answer would be $4(x^2-1)$

13. A man bought a car for Rs.2,00,000 and spent Rs.50000 on its repair. He sold it for Rs.3,00,000. What is the profit percentage?

A) 20%

B) 10%

C) 50%

D) 25%

$$\text{Profit percentage} = \frac{\text{Profit}}{\text{C.P}} * 100$$

$$\text{C.P} = 2,00,000 ; \text{Repair} = 50,000$$

$$\text{Total Cost price} = 2,50,000$$

$$\text{Selling price} = 3,00,000;$$

$$\text{Profit} = 50,000$$

$$\text{Profit percentage} = \frac{50,000}{2,50,000} * 100$$

$$= 20\%$$

14. In how many years will a sum of money double itself at 20% simple interest?

A) 4years

B) 5 years

C) 10 years

D) 20 years

Let's assume the original amount = x;

Total Amount = 2x => x+(simple interest);

so simple interest=x

no. of years= n;

Rate of Interest R=20 %

Simple Interest=(p * n * r)/100;

$$x=(x*n*20)/100;$$

$$n=5 \text{ years}$$

(OR)

$$T = (n-1)*100/R ; n= \text{double the year}$$

$$T=((2-1)*100)/(20) = 5 \text{ years}$$

15. What is the difference between the total surface area and the lateral surface area of a solid cylinder of radius 'r' and height 'h' ?

A) $2\pi r^2$

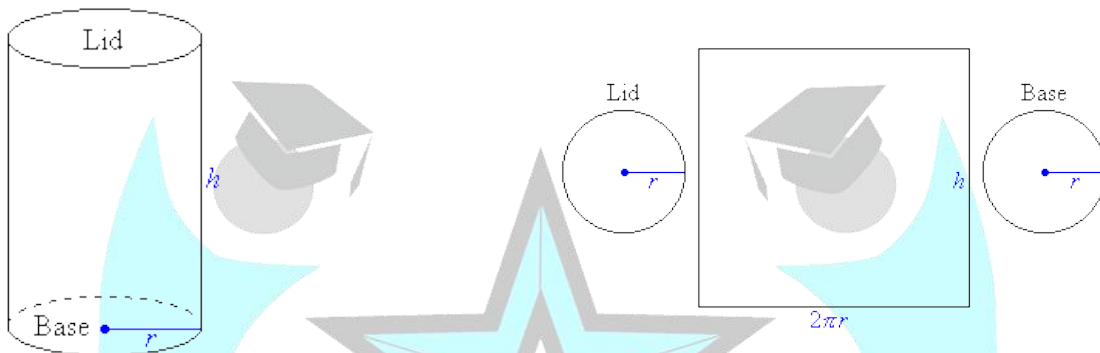
B) $3\pi r^2$

C) $2\pi r$

D) $2\pi rh$

Total surface area of cylinder with radius 'r' and height 'h'

T.S.A of cylinder = Area of the lid + Area of base + CSA of cylinder



Area of the lid = πr^2

Area of the base = πr^2

CSA of the cylinder = $2\pi rh$

TSA of cylinder = $\pi r^2 + \pi r^2 + 2\pi rh$
 $= 2\pi r(r + h)$

LSA of cylinder = $2\pi rh$

Difference of TSA and LSA = $2\pi r(r + h) - 2\pi rh$
 $= 2\pi r^2$

16. $\sin 30^\circ$, $\sin 45^\circ$, and $\sin 90^\circ$ are in what ratio?

A) $1 : \sqrt{2} : 2$

B) $1 : 2 : 3$

C) $1 : \sqrt{2} : 1$

D) $1 : \sqrt{2} : 2\sqrt{2}$

$\sin 30^\circ = \frac{1}{2}$

$$\sin 45^\circ = \frac{1}{\sqrt{2}}$$

$$\sin 90^\circ = 1$$

$$\sin 30^\circ : \sin 45^\circ : \sin 90^\circ$$

$$= \frac{1}{2} : \frac{1}{\sqrt{2}} : 1 \quad \rightarrow (\text{multiply by } 2)$$

$$= 1 : \sqrt{2} : 2$$

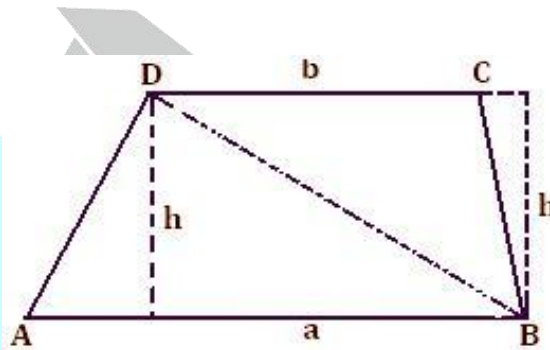
17. What is the area of a Trapezium whose parallel sides are x and x^2 and height is $2x$?

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

B) x^2+x

C) $(1+x^2)/2$

D) $(x^2+x)/2$



Area of trapezium ABCD = Area of $\triangle ABD$ + Area of $\triangle CBD$

= $\frac{1}{2}$ (sum of parallel sides) \times (perpendicular distance between them)

$$= \frac{1}{2} * h * (a + b)$$

$$= \frac{1}{2} * 2x * (x^2 + x)$$

$$= x^3 + x^2$$

$$= x^2 (1 + x) \text{ sq.units}$$

18. If $\sqrt{x} : 16 = 49 : x^{\frac{3}{2}}$, what is the value of x ?

A) 49

B) 16

C) 64

D) 28

$$\frac{\sqrt{x}}{16} = \frac{49}{x^{\frac{3}{2}}};$$

$$x^{\frac{3}{2}} * x^{\frac{1}{2}} = 16 * 49;$$

$$x^{3/2 + 1/2} = 784;$$

$$x^2 = 784 ;$$

$$x = 28$$

19. Which of the following is not a geometric sequence?

A) 7,56,448,3584....

B) 6,0.6,0.06,0.006.....

C) 1/5,2,20,200.....

D) 4,48,384,3256.....

7,56,448,3584..... = have a common difference of (number*8)

6,0.6,0.06,0.006..... = have a common difference of (number / 0.1)

1/5,2,20,200..... = have a common difference of (number * 10)

4,48,384,3256..... = This number series don't have a common difference so this cannot be a geometric sequence

20. The length of a rectangle is 2 cm greater than the breadth. If the area of the rectangle is 80 cm². What are the length and breadth?

A) 10cm,8cm

B) 8cm,6cm

C) 6cm,4cm

D) 12cm,10cm

Let the length be $x+2$,

Let the breadth be x ,

$$\text{Area} = 80 \text{ cm}^2$$

$$\text{Area of the reactangle} = l * b;$$

$$80 = (x + 2) * x$$

$$x^2 + 2x = 80;$$

$$x^2 + 2x - 80 ;$$

$$x^2 + 10x - 8x - 80 = 0;$$

$$x(x + 10) - 8(x + 10) ;$$

$x = -10$ and 8 . (breadth and length cannot be negative)

$x = 8$;

Breadth = 8cm , Length = 10 cm

21. The HCF and LCM of two numbers are respectively 8 and 7040. If one of the two number is 128, What is the other number?

A) 240

B) 140

C) 440

D) 250

First Number \times Second Number = HCF \times LCM

Let the unknown be x

$$x * 128 = 8 * 7040$$

$$x = (8 * 7040) / 128$$

$$x = 440$$

22. What is the difference between the compound interest and simple interest on a sum of Rs. 1000 at 10% interest for two years?

A)10

B)20

C)100

D)250

$$\text{Compound Interest} = P * [1 + r/100]^n$$

$$= 1000 * (1 + 10/100)^2$$

$$= 1000 * 11/10 * 11/10$$

$$= 1210$$

$$\text{Simple Interest} = (P * N * R) / 100$$

$$= (1000 * 2 * 10) / 100$$

$$= 1200$$

$$\text{Difference between CI and SI for two years} = 1210 - 1200$$

$$= 10$$

(OR)

$$\text{Difference between CI and Si for two years} = \frac{PR^2}{100^2}$$

$$= (1000 * 10 * 10) / 100 * 100$$

$$= 10$$

23. The volume of a cylinder is 81 cm³. What is the volume of the cone that has the same radius and height as the cylinder?

A)27

B)243

C)81

D)162

$$\text{Volume of the cylinder} = \pi r^2 h$$

$$\text{Volume of the cone} = \frac{1}{3} \pi r^2 h$$

$$\text{volume of the cylinder} = 81$$

$$\pi r^2 h = 81;$$

$$\text{Volume of the cone} = \frac{1}{3} \pi r^2 h$$

$$= 81 / 3$$

$$= 27 \text{ cm}^3$$

24. The sum of series 3+5+7+9+11+13+.....+25 is

A) 169

B) 625

C) 3125

D) 168

Total numbers present in the series is t(n)

$$t(n) = a + (n-1)d ; t(n)=25 , a = 3, d=2$$

$$25 = 3 + (n-1) * 2$$

$$2n+1 = 25$$

$$2n = 24$$

$$n = 12;$$

Average of first and last = 14

$$12 * 14 = 168$$

25. The sum of the series $1+2+3+4+5+6+\dots+199$ is

A)1990

B)19900

C)1199

D)199000

The sum of 'n' natural consecutive numbers $(n(n+1))/2$

$$\text{Sum} = \frac{199 * 200}{2}$$

2

$$\text{Sum} = 19900$$