AFCAT 1 2025

MATHS

MISCELLANEOUS TOPICS

LIVE

NAVJYOTI SIR

31 Oct 2024 Live Classes Schedule

8:00AM	OCTOBER 2024 MONTHLY CURRENT AFFAIRS	RUBY MA'AM
9:00AM	OCTOBER 2024 MONTHLY DEFENCE UPDATES	DIVYANSHU SIR

NDA 1 2025 LIVE CLASSES

11:30AM	GK - ANCIENT HISTORY - CLASS 2	RUBY MA'AM
1:00PM	CHEMISTRY MCQ - CLASS 1	SHIVANGI MA'AM
4:00PM	MATHS - VECTOR ALGEBRA - CLASS 1	NAVJYOTI SIR
5:30PM	ENGLISH - CLOZE TEST - CLASS 2	ANURADHA MA'AM

CDS 1 2025 LIVE CLASSES

11:30AM	GK - ANCIENT HISTORY - CLASS 2	RUBY MA'AM
1:00PM	CHEMISTRY MCQ - CLASS 1	SHIVANGI MA'AM
5:30PM	ENGLISH - CLOZE TEST - CLASS 2	ANURADHA MA'AM

AFCAT 1 2025 LIVE CLASSES

4:00PM	STATIC GK - INDIA & UNO	DIVYANSHU SIR
5:30PM	ENGLISH - CLOZE TEST - CLASS 2	ANURADHA MA'AM
7:00PM	MATHS - SDT & CLOCKS	NAVJYOTI SIR

DECIMAL ; FRACTIONS

If all the fractions $\frac{3}{5}, \frac{1}{8}, \frac{8}{11}, \frac{4}{9}, \frac{2}{7}, \frac{5}{12}$ and $\frac{5}{12}$ are arranged in the descending order of their values, which one will be the third?

(a) $\frac{1}{8}$

(b) $\frac{4}{9}$

(c) $\frac{5}{12}$

(d) $\frac{8}{11}$

$\frac{3}{5} = 0.6$ — (2) $\frac{2}{7} = 0.285$

$\frac{1}{8} = 0.125$ $\frac{5}{12} = 0.41$

$\frac{8}{11} = 0.72$ — (1)

$\frac{4}{9} = 0.44$ — (3)

If all the fractions $\frac{3}{5}, \frac{1}{8}, \frac{8}{11}, \frac{4}{9}, \frac{2}{7}, \frac{5}{12}$ and $\frac{5}{12}$ are arranged in the descending order of their values, which one will be the third?

(a) $\frac{1}{8}$

(b) $\frac{4}{9}$

(c) $\frac{5}{12}$

(d) $\frac{8}{11}$

ANSWER : B

If $p = \frac{5}{8}$, $q = \frac{7}{12}$, $r = \frac{13}{16}$ and $s = \frac{16}{29}$ then

(a) $p < q < r < s$ (b) $s < q < p < r$ ✓

(c) $p < r < q < s$ (d) $s < r < p < q$

(p) $\frac{5}{8} = 0.625$ — (2)

(q) $\frac{7}{12} = 0.583$ — (3)

(r) $\frac{13}{16} = 0.81$ — (1)

$\frac{16}{29}$ (s) $= 0.551$ — (4)

$$29 \overline{)160} \quad 0.551$$
$$-145$$
$$150$$
$$-145$$
$$50$$

$s < q < p < r$

If $p = \frac{5}{8}$, $q = \frac{7}{12}$, $r = \frac{13}{16}$ and $s = \frac{16}{29}$ then

(a) $p < q < r < s$

(b) $s < q < p < r$

(c) $p < r < q < s$

(d) $s < r < p < q$

ANSWER : B

$$\frac{1}{30}+\frac{1}{42}+\frac{1}{56}+\frac{1}{72}+\frac{1}{90}+\frac{1}{110}=?$$

(a) $\sqrt{2}\frac{2}{27}$ (b) $\frac{1}{9}$

(c) $\frac{5}{27}$ (d) $\frac{6}{55}$ ✓

$$\frac{1}{6\times5}+\frac{1}{7\times6}+\frac{1}{8\times7}+\frac{1}{8\times9}+\frac{1}{9\times10}+\frac{1}{11\times10}$$

$$\left(\frac{1}{5}-\frac{1}{6}\right)+\left(\frac{1}{6}-\frac{1}{7}\right)+\left(\frac{1}{7}-\frac{1}{8}\right)+\left(\frac{1}{8}-\frac{1}{9}\right)+\left(\frac{1}{9}-\frac{1}{10}\right)+\left(\frac{1}{10}-\frac{1}{11}\right)$$

$$=\frac{1}{5}-\frac{1}{11}=\frac{6}{55}$$

$$\frac{1}{30}+\frac{1}{42}+\frac{1}{56}+\frac{1}{72}+\frac{1}{90}+\frac{1}{110}=?$$

(a) $\sqrt{2}\frac{2}{27}$

(b) $\frac{1}{9}$

(c) $\frac{5}{27}$

(d) $\frac{6}{55}$

ANSWER : D

The value of $(4.7 \times 13.26 + 4.7 \times 9.43 + 4.7 \times 77.31)$ is :

(a) 0.47 (b) 47

(c) 470 (d) 4700

$$4.7 \left(13.26 + 9.43 + 77.31 \right)$$

$$= 4.7 \left(100.00 \right) = 470$$

The value of $(4.7 \times 13.26 + 4.7 \times 9.43 + 4.7 \times 77.31)$ is :

(a) 0.47 (b) 47

(c) 470 (d) 4700

ANSWER : C

Simplify: $\dfrac{0.2 \times 0.2 + 0.2 \times 0.02}{0.044}$

(a) 0.004 (b) 0.4

(c) 1 (d) 2

$$\frac{0.04 + 0.004}{0.044} = \frac{0.044}{0.044} = 1$$

Simplify: $\frac{0.2 \times 0.2 + 0.2 \times 0.02}{0.044}$

(a) 0.004 (b) 0.4

(c) 1 (d) 2

ANSWER : C

$$\frac{(36.54)^2 - (3.46)^2}{?} = 40 .$$

(a) 3.308 (b) 4

(c) 33.08 ✓ (d) 330.8

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

$$\frac{(36.54)^2 - (3.46)^2}{40} = \frac{(36.54+3.46)(36.54-3.46)}{40}$$

$$= 33.08$$

$$\frac{(36.54)^2 - (3.46)^2}{?} = 40 .$$

(a) 3.308
(b) 4
(c) 33.08
(d) 330.8

ANSWER : C

The value of $\left(\frac{0.1\times0.1\times0.1+0.02\times0.02\times0.02}{0.2\times0.2\times0.2+0.04\times0.04\times0.04}\right)$ is:

(a) 0.0125 (b) 0.125

(c) 0.25 (d) 0.5

$$\frac{a^3+b^3}{c^3+d^3} = \frac{(a+b)(a^2-ab+b^2)}{(c+d)(c^2-cd+d^2)}$$

$$= \frac{(0.1+0.02)(0.01-0.002+0.0004)}{(0.2+0.04)(0.04-0.008+0.0016)}$$

$$\frac{0.12}{0.24}\times\frac{0.0084}{0.0336}$$

$$= \frac{1}{2}\times\frac{84}{336}$$

$$= \frac{1}{8} = 0.125$$

$$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$$

$$a^3 - b^3 = (a-b)(a^2 + ab + b^2)$$

The value of $\left(\frac{0.1 \times 0.1 \times 0.1 + 0.02 \times 0.02 \times 0.02}{0.2 \times 0.2 \times 0.2 + 0.04 \times 0.04 \times 0.04}\right)$ is:

(a) 0.0125
(b) 0.125
(c) 0.25
(d) 0.5

ANSWER : B

The value of $\left(\frac{8.94 \times 8.94 \times 8.94 - 3.56 \times 3.56 \times 3.56}{8.94 \times 8.94 + 8.94 \times 3.56 + 3.56 \times 3.56}\right)$ is:

(a) 0.538
(b) 5.38 ✓
(c) 0.0538
(d) 53.8

$$\frac{a^3 - b^3}{a^2 + ab + b^2} = a - b = 8.94 - 3.56$$

$$= 5.38$$

The value of $\left(\frac{8.94 \times 8.94 \times 8.94 - 3.56 \times 3.56 \times 3.56}{8.94 \times 8.94 + 8.94 \times 3.56 + 3.56 \times 3.56}\right)$ is:

(a) 0.538
(b) 5.38
(c) 0.0538
(d) 53.8

ANSWER : B

The value of $\frac{(0.06)^2 + (0.47)^2 + (0.079)^2}{(0.006)^2 + (0.047)^2 + (0.0079)^2}$ is :

(a) 0.1 (b) 10

(c) 100 (d) 1000

The value of $\frac{(0.06)^2 + (0.47)^2 + (0.079)^2}{(0.006)^2 + (0.047)^2 + (0.0079)^2}$ is :

(a) 0.1 (b) 10

(c) 100 (d) 1000

ANSWER : C

The value of

$$\frac{0.1\times0.1\times0.1+0.2\times0.2\times0.2+0.3\times0.3\times0.3-3\times0.1\times0.2\times0.3}{0.1\times0.1+0.2\times0.2+0.3\times0.3-0.1\times0.2-0.2\times0.3-0.3\times0.1}$$ is

(a) 0.006 (b) 0.6 ✓

(c) 0 (d) 0.2

$$\frac{a^3+b^3+c^3-3abc}{a^2+b^2+c^2-ab-bc-ca} = (a+b+c)$$

$$a^3+b^3+c^3-3abc = (a+b+c)(a^2+b^2+c^2-ab-bc-ca)$$

The value of

$$\frac{0.1\times0.1\times0.1+0.2\times0.2\times0.2+0.3\times0.3\times0.3-3\times0.1\times0.2\times0.3}{0.1\times0.1+0.2\times0.2+0.3\times0.3-0.1\times0.2-0.2\times0.3-0.3\times0.1}$$ is

(a) 0.006
(b) 0.6
(c) 0
(d) 0.2

ANSWER : B

SPEED DISTANCE AND TIME

Q) A scooterist completes a certain journey in 10 h. He covers half the distance at 30 km/h and the rest at 70 km/h. What is total distance of the journey ?

(a) 210 km (b) 400 km

(c) 420 km (d) 500 km

Let x,

$$\frac{x/2}{30} + \frac{x/2}{70} = 10$$

Q) A scooterist completes a certain journey in 10 h. He covers half the distance at 30 km/h and the rest at 70 km/h. What is total distance of the journey ?

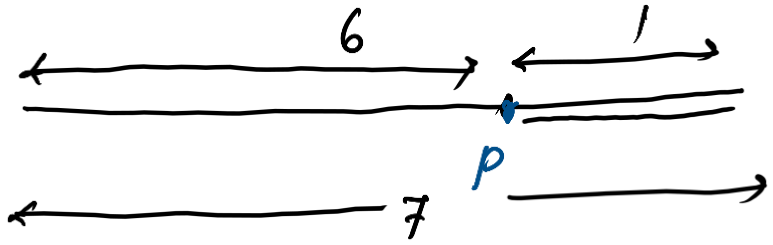
(a) 210 km (b) 400 km

(c) 420 km (d) 500 km

Ans: (c)

Q) B starts 4 minutes after A from the same point, for a place at a distance of 7 miles from the starting point. A on reaching the destination turns back and walks a mile where he meets B. If A's speed is a mile in 8 minutes then B's speed is a mile in ____ minutes.

(a) 9 (b) 12 (c) 10 (d) 8



A

dist. = 7 + 1 = 8 miles

Time = 8 × 8 = 64 min

(1 miles — 8 min)

speed = $\frac{1}{8}$ mile/min

$4 + \frac{6}{x} = 64$ min

Q) B starts 4 minutes after A from the same point, for a place at a distance of 7 miles from the starting point. A on reaching the destination turns back and walks a mile where he meets B. If A's speed is a mile in 8 minutes then B's speed is a mile in _____ minutes.

(a) 9 (b) 12 (c) 10 (d) 8

Ans: (c)

Q) The speeds of three buses are in the ratio 2 : 3 : 4. The time taken by these buses to travel the same distance will be in the ratio

(a) 2 : 3 : 4
(b) 4 : 3 : 2
(c) 4 : 3 : 6
(d) 6 : 4 : 3

$2x : 3x : 4x$

(d)

reciprocal of speed, / Time $\rightarrow \frac{d}{2x} : \frac{d}{3x} : \frac{d}{4x}$

$\frac{1}{2} : \frac{1}{3} : \frac{1}{4}$

$= 6 : 4 : 3$

Q) The speeds of three buses are in the ratio 2 : 3 : 4. The time taken by these buses to travel the same distance will be in the ratio

(a) 2 : 3 : 4
(b) 4 : 3 : 2
(c) 4 : 3 : 6
(d) 6 : 4 : 3

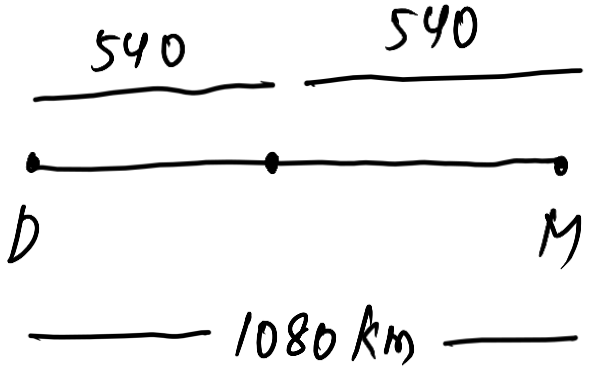
Ans: (d)

Q) A passenger train departs from Delhi at 6 pm, for Mumbai. At 9 p.m., an express train, whose average speed exceeds that of the passenger train by 15 km/hour leaves Mumbai for Delhi. Two trains meet each other mid-route. At what time do they meet, given that the distance between the cities is 1080 km ?

(a) 4 pm.
(b) 2 am.
(c) 12 midnight
(d) 6 am

Speed of passenger train = x

" " express " = $x+15$



$$\left(\frac{540}{x}\right) = 3 + \left(\frac{540}{x+15}\right)$$

(6PM – 9PM)

Q) A passenger train departs from Delhi at 6 pm, for Mumbai. At 9 p.m., an express train, whose average speed exceeds that of the passenger train by 15 km/hour leaves Mumbai for Delhi. Two trains meet each other mid-route. At what time do they meet, given that the distance between the cities is 1080 km ?

(a) 4 pm.
(b) 2 am.
(c) 12 midnight
(d) 6 am

Ans: (d)

Q) A boat goes 24 km upstream and 28 km downstream in 6 hours. It goes 30km upstream and 21 km downstream in 6 hours and 30 minutes. The speed of the boat in still water is :

(a) 10 km/h (b) 4 km/h

(c) 14 km/h (d) 6km/h

Speed of boat in still water = x

Speed of stream = y

$$\frac{24}{x-y} + \frac{28}{x+y} = 6$$

$$\frac{30}{x-y} + \frac{21}{x+y} = 6.5$$

Let $\frac{1}{x-y} = A$ and $\frac{1}{x+y} = B$

$$24A + 28B = 6$$

$$30A + 21B = 6.5$$

Q) A boat goes 24 km upstream and 28 km downstream in 6 hours. It goes 30km upstream and 21 km downstream in 6 hours and 30 minutes. The speed of the boat in still water is :

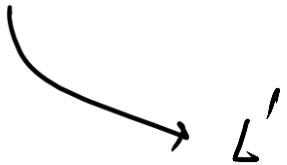
(a) 10 km/h
(b) 4 km/h
(c) 14 km/h
(d) 6km/h

Ans: (a)

Q) A train is travelling at 48 km/hour completely crosses another train having half its length and travelling in opposite direction at 42 km/hour in 12 s. It also passes a railway platform in 45 s. What is the length of the platform?

(a) 600 m (b) 400 m

(c) 300 m (d) 200 m



Let first train's length be L m.

$$\frac{L + L/2}{(48+42) \times \frac{5}{18}} = 12$$

L

$$\frac{L + L'}{48 \times \frac{5}{18}} = 45$$

(solve for L')

Q) A train is travelling at 48 km/hour completely crosses another train having half its length and travelling in opposite direction at 42 km/hour in 12 s. It also passes a railway platform in 45 s. What is the length of the platform?

(a) 600 m (b) 400 m

(c) 300 m (d) 200 m

Ans: (b)

Q) The distance between two points (A and B) is 110 km. X starts running from point A at a speed of 60 km/h and Y starts running from point B at a speed of 40 km/h at the same time. They meet at a point C, somewhere on the line AB. What is the ratio of AC to BC ?

(a) 3 : 2

(b) 2 : 3

(c) 3 : 4

(d) 4 : 3

Q) The distance between two points (A and B) is 110 km. X starts running from point A at a speed of 60 km/h and Y starts running from point B at a speed of 40 km/h at the same time. They meet at a point C, somewhere on the line AB. What is the ratio of AC to BC ?

(a) 3 : 2 (b) 2 : 3

(c) 3 : 4 (d) 4 : 3

Ans: (a)

Q) A man starts from a place P and reaches the place Q in 7 hours. He travels $1/4^{th}$ of the distance at 10 km/hour and the remaining distance at 12 km/hour. The distance, in kilometre, between P and Q is

(a) 72 (b) 80

(c) 90 (d) 70

Q) A man starts from a place P and reaches the place Q in 7 hours. He travels $1/4^{th}$ of the distance at 10 km/hour and the remaining distance at 12 km/hour. The distance, in kilometre, between P and Q is

(a) 72 (b) 80

(c) 90 (d) 70

Ans: (b)

Q) A train after travelling 150 km meets with an accident and then proceeds with 3/5 of its former speed and arrives at its destination 8 h late. Had the accident occurred 360 km further, it would have reached the destination 4 h late. What is the total distance travelled by the train?

(a) 840km
(b) 960km
(c) 870km
(d) 1100km

Q) A train after travelling 150 km meets with an accident and then proceeds with 3/5 of its former speed and arrives at its destination 8 h late. Had the accident occurred 360 km further, it would have reached the destination 4 h late. What is the total distance travelled by the train?

(a) 840km (b) 960km

(c) 870km (d) 1100km

Ans: (c)

CLOCKS

At what time between 3 and 4 o' clock , the hands of the clock coincide ?

$$\theta = \frac{11m - 60h}{2}$$

coincide $\longrightarrow$ angle in between $= 0^\circ$

$$0^\circ = \frac{11m - 60h}{2}$$

$$m = \frac{60h}{11} = \frac{60 \times 3}{11} = \frac{180}{11} =$$

$3 : \frac{180}{11}$

$3 : 1636$

$\sim$ 3 : 16 (approx.)

At what time between 7 and 8 o' clock , the hands of the clock will be in opposite side ?

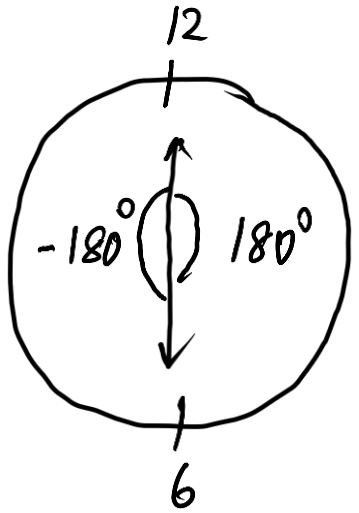
angle in between = 180°

$$\theta = \frac{11m - 60h}{2}$$

$$\pm 180^\circ = \frac{11m - 60h}{2}$$

$$\pm 360^\circ = 11m - 60h$$

$$11m = 60h \pm 360^\circ = 60(h \pm 6)$$



1 – 5 ⟶ (+)

6 – 12 ⟶ (−)

≡

7 – 8 — (−)

$$m = \frac{60}{11}(h-6) = \frac{60}{11}(7-6) = \frac{60}{11}$$

$$11m = 60h \pm 360^\circ$$

$$m = \frac{1}{11}60(h \pm 6)$$

$$= \frac{60}{11}(h \pm 6)$$

use + for 1 – 5

use – for 6 – 12 ✓

7 – 8

$$\frac{60}{11}(h-6) = \frac{60}{11}(7-6) = \frac{60}{11} \sim 5.4$$

7:05 PM (approx.)

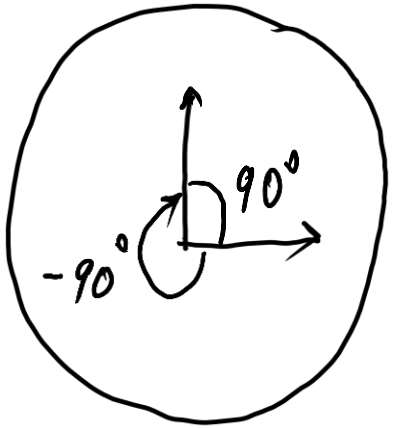
At what time between 5 and 6 o' clock , the hands of the clock will be in opposite side ?

$$m = \frac{60}{11}(h + 6)$$

$$= \frac{60}{11}(5+6) = 60 \longrightarrow 60 \text{ mins after } 5.$$

At 6 PM

At what time between 7 and 8 o' clock , the hands of the clock will be at right angles ?



$$\pm 90^\circ = \frac{11m - 60h}{2}$$

$$\pm 180^\circ = 11m - 60h$$

$$m = \frac{60}{11}(h \pm 3)$$

$$\frac{60}{11}(7+3) = \frac{600}{11}$$

$$\frac{60}{11}(7-3) = \frac{240}{11}$$

7 : 54.54

~ 7 : 55

or, 7 : 21.8

~ 7 : 22

Two times for right angles in 1 hour.

At what time between 3 and 4 o' clock , the hands of the clock will be 4 mins apart ?

1 min $\longrightarrow 6^\circ$

4 min $\longrightarrow 24^\circ$

} by minute hand

$$\pm 24^\circ = \frac{11m - 60h}{2}$$