সরকারি ব্যাংকে লিখিত পরীক্ষায় আসা গণিত প্রশ্নের ব্যাখা সহ সমাধান

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বিগত সালে বিভিন্ন সরকারি ব্যাংকে লিখিত পরীক্ষায় আসা গণিত প্রশ্নের ব্যাখা সহ সমাধান

BANGLADESH BANK OFFICER 2001

A trade where selling an item was asking for such a price that would enable him to offer a 10% discount and still make a profit of 20%. If the cost of the product was tk 50, what was his asking price?

Solution:

If the cost price was 50tk then @20% profit selling price is = 50 ✢ 50 ✕20/100 = 60tk

@ 10% discount

If the selling price is 90 then asking price is 100

If the selling price is 1 then asking price is 100/90

If the selling price is 60 then asking price is (100 ✕ 60)/90 = 66.67 Ans.

Mr. X pays 10% tax on all income over 60000tk but he does not pay any tax on interest on postal saving certificate. In 2000 he paid 7500 as tax & he earned 12000 as interest on postal savings account. What is his net income in 2000?

Solution:

Mr. X gives 10% taxes upon his income, so,

If tax is 10tk then income is 100tk

If tax is 7500tk the income is (100 ✕ 7500)/10 = 75000tk

His total income in 2000 = 75000 ✛ 60000 ✛ 12000 = 147000tk

So, his net income in 2000 is = 147000 – 7500 = 139500tk Ans.

A candidate answered all 22q in a test & received 63.5 marks. If the total marks were derived by adding 3.5 marks each correct answer and deducting 1 mark for each incorrect answer, how many q did the student answer correctly?

Solution:

Let, no. of correct answer = x, so incorrect answer = 22 – x

3.5x – 1 ✕ (22 – x) = 63.5

Or, 3.5x – 22 ✛ x = 63.5

Or, 4.5x = 63.5 ✛ 22 = 85.5

Or, x = 85.5/4.5 = 19

So, correct answer was 19 Ans.

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In an organization 30% of all employees live over 10miles away from the place of work & 60% of worker who live who live over 10miles use company transport. If 40% of employees of the company use company transport, what percent of the employees live 10miles or less from work and use company transport?

Solution:

Let total employees = 100, employees live over 10 miles = 30

So, employees live in 10 mile or less = 100 – 30 = 70

Total 40% or 40 employees use transport

Now, employees live over 10miles using transport = 60% of 30 = (60 ✕30)/100 = 18

So, employees live in 10miles or less using transport = 40 – 18 = 22

Here, total 70 employee live in 10miles or less and among them 22 use company transport

So, percentage of using transport of employee who live in 10miles or less = (22 ✕ 100)/70 = 31 ✕ 3/7% Ans.

Mr. Reach sold two properties P1 & P2 for tk 50000 each. He sold property P1 for 20% more then what he paid for it & sold P2 less than 20% what he paid for it. What was his total gain or loss, if any, on the scale of two properties?

Solution:

In case of P1 @ 20% profit

If selling price is 120tk then buying price 100tk

If selling price is 50000tk then cost price = (50000 ✕ 100)/120 = 500000/12 tk = 125000/3

In case of P2 @ 20% loss

If selling price is 80tk then buying price 100tk

If selling price is 50000tk then cost price = (50000 ✕ 100)/80 = 62500tk

Now, total sell price = 50000 ✕ 2 = 100000tk

Total cost price = 125000/3 ✢ 62500 = 312500/3 = 104166.67tk

So, loss = 104166.67 – 100000 = 4166.67tk Ans.

Mr. X has a investable amount of tk 100000, he will invest the amount for two years. He has two options. He can invest at simple interest rate of 12% per annum, alternatively he can invest at compound rate of 10% (semi annually). Calculate the earnings at two option and advice him.

Solution:

At 12% simple interest, Mr. X can get = (12 ✕ 100000 ✕ 2)/100 [formula, I = rpt/100]

= 24000tk

At 10% compound amount = 100000(1✛5/100)^4, [formula, CA = P(1✛r/100)^t](t =2 ✕ 2 = 4 and r = 10/2 = 5% because of rate is applied semi annually)

= 121550.6tk

So, compound interest = 121550.6 – 100000 = 21550.6tk

So, simple interest is better option for Mr. X Ans.

BANGLADESH BANK AD 2002

A total of 50 employees work in a bank branch of these 22 have taken the accounting course, 15 have taken finance, 14 marketing, 9 of them taken exactly 2 of the courses, 1 of them has taken all. How many of the 50 employees have taken none of the course?

Solution:

Here, one of the employees has taken all of the courses

Nine of the employees have taken exactly 2 of the courses

Number of employee have taken only Accounting = 22 – (9 ✛ 1) = 12

Numbers of employee have taken only Finance = 15 – (9 ✛ 1) = 5

Numbers of employee have taken only Marketing = 14 – 1 = 13

Numbers of total employee have taken at least one course = 12 ✛ 5 ✛ 13✛ 9 ✛ 1 = 40

So, employees who have not taken any course = 50 – 40 = 10 Ans

Mr. X, a sales person earns 5% commission on all sales between Tk.20000 and 40000 and 8% on all sales exceeding Tk.40000 in a month. He does not earn any commission if sales in a month amount to less than Tk. 20000. His monthly salary is Tk.60000, he has to pay tax 20% tax on his basic salary, but no tax on commission, in April 2001,the total net income (salary ✢ commission) of the sales person was Tk 65000. How much were the sales in April?

Solution:

Tax on salary = 60000 ✕ 20% = 12000

Net salary = 60000 – 12000 = 48000

So, commission found in April = 65000 – 48000 = 17000

Let the sales in April = x

According to the ⍰ Question,

40000 ✕ 5% ✢ (x – 40000) ✕ 8% = 17000

Or, 2000 ✢ 0.08x – 3200 = 17000

Or, 0.08x – 1200 = 17000

Or, 0.08x = 18200

Or, x = 227500

So, the sales in April = Tk. 227500 Ans

A trader sells on an average 18 pencils and 12 pens per day. The profit comes from pencil is 1/3rd of the profit made from selling a pen. If he makes profits of tk 900 in a month by selling pencils, how much profit does he make per month by selling pens? The trader sells 30ds in a month.

Solution:

Let, Profit from 1 pen = x tk

So, in a month he gets profit = 12 × 30 × x = 360x tk.

Again, profit from 1 pencil = x/3 tk

Then monthly profit = 18 × 30 × x/3 = 540x/3 = 180x tk.

According to ques. 180x = 900 or, x = 5 tk

So, profit from pen = 360 × 5 = 1800 tk. Ans.

Mr. A purchased a house for tk 1000000 tk in 1995, he spent 100000 tk for routine maintenance & upkeep of the house. 1n 1999 he sold the house for 25% of more then what he paid for it. He paid 5% of the proceeds as gain tax & he has to pay 50% of his net profit to the broker, what is his net income?

Solution:

Here, purchasing cost ✛ routine maintenance & upkeep cost

= (10,00,000 ✛ 1,00,000) = 11,00,000 tk

Profit gained @ 25% of total cost = (1100000 ✕ 25)/100 = 275000 tk

5% gain tax = (5 ✕ 275000)/100 = 13750 tk

So, net profit after deducting gain tax = (275000 – 13750) tk

= 261250 tk

Net income after deducting brokers commission = 261250/2

= 130625 tk Ans.

A simple interest rate of a bank was reduced to 5% from 7%. As a consequences Mr. B's income was reduced by tk 2100 in 5 yrs. How much is Mr. B's initial deposit in the bank?

Solution:

Here, reduced interest rate = 7% – 5% = 2%

In 5 yrs interest reduced = 2100 tk

In 1 yr interest reduced = 2100/5 = 420 tk

So, 2% = 420 tk

Or, 100% = (420 × 100)/2 = 21,000 tk Ans.

One fifth of the products made by a company are defective. Four-fifth of the defectives was rejected and one-twentieth of the products were rejected by mistake. What percent of the products sold by the company is defective?

Solution:

Suppose total product = 100.

Total defective products = 100/5 = 20

So, non defective products = 100 – 20 = 80

Defective product rejected = 20 × (4/5) = 16

Defective but not rejected product = 20 – 16 = 4

Rejected by mistake = 80 × (1/20) = 4

Total products sold = 100 – (16 ✢ 4) = 80

Defective in 80 products is 4

Defective in 100 products is (4 × 100)/80 = 5 Ans. 5%

BANGLADESH BANK AD 2004

Karim and Rahim have equal amount of money. Radha has half of Rahim's money and Amena has half of Radha's money. If you add one taka with all the money they have, it will be Tk.100.How much Rahim has?

Solution:

Let, Karim has = x tk = Rahim

So, Radha has = x/2 tk and Amena has = x/4 tk

According to Question, x ✛ x ✛ x/2 ✛ x/4 ✛ 1 = 100

Or, 2x ✛ x/2 ✛ x/4 ✛ 1 = 100

Or, (8x ✛ 2x ✛ x ✛ 4)/4 = 100

Or, 11x ✛ 4 = 400

Or, x = 36 Ans.

A person wishes to accumulate Tk. 5,00,000 by the end of 15 years by making equal half-yearly deposits over the next 15 years. If he/she earns 10% on the investment, how much must he/she deposit at the end of each half year?

Solution:

Here, Future value, FV = 5, 00,000 Tk.

Effective interest rate, r = 10%/2 = .05

Time, n = 15 × 2= 30

Annuity, A = ?

We know,

FV = A × [{(1 + r)n – 1 }/r]

Or, 500000 = A × [{(1 + .05)30 – 1 }/.05]

Or, A = 500000/66.44 = 7525.59 Ans.

Find the value of ‘a’ if (a-3) = 10/a

Solution:

(a – 3) = 10/a

Or, a2 – 3a = 10

Or, a2 – 3a – 10 = 0

Or, a2 -5a + 2a -10 = 0

Or, a(a – 5) ✛ 2(a – 5) = 0

Or, (a – 5)(a ✛ 2) = 0

Or, a = 5

or, a = – 2 Ans.

Find the value of ‘x’ if (2×2-1) = (3×2-2x)

Solution:

Given that, (2×2 – 1) = (3×2 – 2x)

Or, 2x – 1 = 3×2 – 2×2

Or, 2x – 1 = x2

Or, x2 – 2x ✛ 1 = 0

Or, (x – 1)2 = 0

Or, x – 1 = 0

Or, x = 1 Ans.

At 8:00 A.M a car stared from Dhaka towards Cox's Bazar at a speed of 50 km/hr. After one hour, another car started from Dhaka towards Cox's Bazar at a speed of 60 km/hr. After how much time and at what distance from Dhaka the second car will overtake the first car?

Solution:

1st Train: 8am (Dhaka) —– 50km/hr ———>ctg

2nd Train: 9am (Dhaka) —– 60 km/hr ———->ctg

Both travel same direction

So in each hour 2nd train moves more (60 – 50) km = 10 km.

1st train already travel 1hour means 50 km

Now 2nd train has to cover this distance.

So they will meet = 50/10= 5 hour after 9am. Ans.

BANGLADESH BANK AD 2006

Mr. Zaman won an election where the ratio of his votes and those of his opponent, Mr. Yunus, was 4:3.The total number of voters was 581, of which 91 did not vote. Calculate the margin of votes by which Mr. Yunus was defeated?

Solution:

Total number of voters = 581

Casted votes = 581 – 91 = 490

Mr. Zaman got = 490 × (4/7) = 280

Mr. Yunus got = 490 × (3/7) = 210

The margin of defeat = 280 – 210 = 70 Ans.

The sum of the pay of two officers is Taka 24,000 per month. If the pay of one officer is decreased by 9% and the pay of the second is increased by 17%, their pays become equal. Find the pay of each officer.

Solution:

Let, the payment of first officer = x tk

Payment of second officer = (24000 – x) tk

At 9% decrease, payment of first officer become = x – 9x/100 = 91x/100 tk

At 17% increase, payment of second officer become = (24000 – x) ✛ 17% of (24000–x)

= (24000 – x)(1 ✛ 17/100) = 117(24000 – x)/100

According to the ⍰ Question,

91x/100 = 117(24000 – x)/100

Or, 91x = 117(24000 – x)

Or, 91x = 117 × 24000 – 117x

Or, 91x + 117x = 117 × 24000

Or, 208x = 117 × 24000

Or, x = (117 × 24000)/208

Or, x = 13,500

Payment of first officer = 13500 Tk

Payment of second officer = 24000 – 13500 = 10500 Tk Ans.

A Group of students has hired a bus for Taka 3000 for going to a picnic. They had an understanding that each participant would share the charge in equal amounts. But because of 10 students not turning up, the charged per student increased by Taka 10 over the initial estimates. What was the number of students who originally registered for the picnic?

Solution:

Let, total number of students = x

Per head proposed cost for the picnic = 3000/x Tk

Due to absence of 10 students, average cost charged = 3000/(x – 10) Tk

According to the Question,

3000/x – 3000/(x – 10) = 10

Or, (3000x – 3000x + 30000)/x(x-10) = 10

Or, 10×2 – 10x = 30000

Or, x2 – 10x – 3000 = 0

Or, x2 – 60x + 50x – 3000 = 0

Or, (x – 60)(x + 50) = 0

So, x = 60 (number of students cannot be negative) Ans.

A square office, 1000 feet by 1000 feet, is to be partitioned into two offices by a single interior wall. The difference between the perimeters of the resulting two officers is 400 feet. What are their dimensions?

Solution:

Let, width of first portion after partition = x

So, width of second portion other side = 1000 – x

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According to the Question,

$2(1000 + x) - 2(1000 + 1000 - x) = 400$

Or, $2000 + 2x - 4000 + 2x = 400$

Or, $4x = 2000 + 400$

Or, $x = 600$

So, width of first portion = 600 ft

Width of other side = 1000 – 600 = 400 ft

So, dimensions of 1st office = $1000 \times 600 = 600000$ sq. ft.

And, dimensions of 2nd office = $1000 \times 400 = 400000$ sq. ft. Ans.

Abir can do a piece of work in 80 days. He works for 10 days and then Bashir alone finishes the rest of the work in 42 days. How much time would it take for the two of them together to complete the whole work?

Solution:

In 80 days, Abir can do 1 (whole) portion of work

In 1 day, Abir can do (1/80) part of the work

In 10 days Abir can do (1 × 10)/80 = 1/8 part of the work

Rest of the work = 1 – (1/8) = 7/8 part of the work

Now, in 42 days, Bashir can do 7/8 part of the work

In 1 day, Bashir can do (7/8) × 42 = 1/48 part of the work

In 1 day, Abir and Bashir together can do = (1/80 ✛ 1/48) = (3 ✛ 5)/240 = 1/ 30 part of the work

So, they can do 1/30 works in 1 day

Or, they can do 1 works in 30/1= 30 days Ans.

BANGLADESH BANK AD 2008

Mr. Rahim pays 10% tax on all income earned over 60000Tk but he does not pay any tax on interest on saving certificate. In 2006 he paid 7500 as tax & he earned 12000 as interest on savings certificates. What is his total income in 2006.

Solution:

Here, Mr. Rahim gives 10% taxes upon his income.

So, when tax is 10Tk then income is 100Tk

When tax is 1Tk then income is 100/10Tk

When tax is 7500Tk then income is (100 × 7500)/10 = 75,000Tk

So, his total income = 75000 ✛ 60000 ✛ 12000 = 1,47,000Tk Ans.

A trader, while selling an item, was asking for such a price that would enable him to offer a 20% discounts and still make a profit of 30% on cost. If the cost of the item was Tk.50 what was his asking price?

Solution:

Here, cost price = 50 Tk

At 30% profit, price will be = 50 ✛ (50 × 30/100) = 50 ✛ 15 = 65 Tk

Let, asking price of the item = 100 Tk.

At 20% discount price = 80 Tk.

So, when discounted price is 80 Tk then asking price is 100 Tk

When discounted price is 65 Tk asking price is (100 × 65)/80 Tk = 81.25 Tk Ans.

A man deposits Tk. 1000 in a bank at 8% interest rate compounded annually. At the end of the 3rd year, what will be the total amount including interest?

Solution:

Here, principal value, p = 1000 tk

Rate of interest, r = 8%

Number of years, n = 3

We know, Compound Amount, CA = p(1 ✛ r)n = 1000(1 ✛ 8/100)3 = 1000 ✕ (1.08)3 = 1259.712 Ans.

BANGLADESH BANK AD 2009

A boy purchased some chocolates from a shop for Tk 120. In the next shop he found that the price of per piece chocolate is Tk 3 less than that charged at the previous shop, as such he could have purchased 2 more chocolates. How many chocolates did he buy from the first shop?

Solution:

Let, the price of one piece chocolate in 1st shop = x

So, total chocolate = 120/x

Price of one piece chocolate in 2nd shop = x – 3

Total chocolate 120/(x – 3)

According to the ⍰ Question,

120/(x – 3) – 120/x = 2

Or, (120x – 120x ✛ 360)/x(x – 3) = 2

Or, 360/x2 – 3x = 2

Or, 2×2 – 6x – 360 = 0

Or, x2 – 3x – 180 = 0

Or, x2 – 15x ✛ 12x – 180 = 0

Or, (x ✛ 12)(x – 15) = 0

So, x = 15

Number of chocolates bought in the first shop = 120/15 = 8 nos. Ans.

A loss of 15% is incurred by selling a watch for Tk. 612. How much is the sum of money by which it is sold to make a profit of 10%?

Solution:

Let, cost price of the watch = 100tk

So, @ 15% loss selling price will be = 85 tk

If selling price is 85 tk then cost price is 100 tk

So, if selling price is 612 tk then cost price is (100 ✕ 612)/85 = 720 tk

Again, @ 10% profit,

If cost price is 100 tk thane selling price is 110 tk

So, if cost price is 720 tk then selling price is (110 ✕ 720)/100 = 792 tk Ans.

Recently Kamal's hourly wage has been increased by 10%. Before this increase, Kamal's total weekly wage was Tk. 137. If his weekly working hours were to decrease by 10% from last week's total working hours, what would be the change, if any, in Kamal's total weekly wage?

Solution:

Let, weekly working time = x hr

Weekly hourly wage = 137/x Tk.

After 10% increase, new hourly wage = 137/x ✛ 10% of (137/x)

= 137/x ✛ (10 ✕ 137)/(100 ✕ x)

= 137/x (1 ✛ 1/10)

= 1507/10x

After 10% decrease, new working hour = x – 10% of x = 9x/10

New weekly total wage = (9x/10) × (1507/10x) = 135.63 Tk.

Weekly wage reduced = 137 – 135.63 = 1.37 Tk. Ans.

BANGLADESH BANK AD 2010

Tanim bought some oranges. He gave 1/2 of them to his sister,1/4 of the remainder to his neighbor, 3/5 of those left to his children and had 6 left in the end. How many oranges did Tanim buy?

Solution:

Let, total oranges = x

Sister got = x/2

Neighbor got = 1/4 of x/2 = x/8

Left = x/2 – x/8 = 3x/8

Children got = 3/5 of 3x/8 = 9x/40

Left = 3x/8 – 9x/40 = 6x/40

According to Question,

6x/40 = 6

Or, x/40 = 1

Or, x = 40 Ans.

The length of rectangular plot is greater than its breadth by 20 meters. If the perimeter of the plot is 160 meters, what is the area of the plot in square meters?

Solution:

Let, breadth be x meters and length be (x ✛ 20) meters

According to the Question,

2x ✛ 2(x ✛ 20) = 160

Or, 4x ✛ 40 = 160

Or, 4x = 160 – 40

Or, x = 120/4 = 30

So, breadth = 30 meters and length =30 ✛ 20 = 50 meters.

Area of the pot = (50 ✕ 30) = 1500 sq. meters. Ans.

Three partners A, B & C start a business. Twice the investment of A is equal to thrice the capital of B is 4 times the capital of C. They share the profit in the ratio of their capital. In a particular year, the gross profit is Tk. 250000 and the administrative expenses are 20 % of the gross profit. Find the share of profit each partner.

Solution:

Let us consider, capital of C = x

So, capital of B = 4x

According to Question,

2A = 3B or, A = 3B/2 = 12x/2 = 6x

Ratio of capital as well as profit of the three partners = 6x : 4x : x = 6 : 4 : 1

Administrative expenses = 20% of 2,50,000 = 20,000

So, net profit = 2,50,000 – 50,000 = 2,00,000

Share of A = (2,00,000 × 6)/11 = 1,09,090.90 Tk.

Share of B = (2,00,000 × 4)/11 = 72,727.27 Tk.

Share of C = (2,00,000 × 1)/11 = 18,181.81 Tk Ans.

BANGLADESH BANK AD 2011

Two cars race around a circular track in opposite directions at constant rates. They start at the same point and meet every 30 seconds. If they move in the same direction, they meet every 120 seconds. If the track is 1800 meter long, what is the speed of each car?

Solution:

Let “x” be the speed of the faster car and “y” be the speed of the slower car

In case of same direction,

$(x + y) \times 30 = 1800$

Or, $30x + 30y = 1800$ ..... (1)

In case of opposite direction,

$(x - y) \times 120 = 1800$

Or, $120x - 120y = 1800$ ..... (2)

(1) × 4 + (2) >>>

$240x = 9000$

Or, $x = 37.5$ m/s $= 37.5 \times 18/5$ km/hr $= 135$ km/hr

(1) × 4 – (2) >>>

– 240y = – 5400

Or, y = 22.5 m/s = 22.5 ✕ 18/5 km/hr = 81 km/hr Ans.

A printer quotes a price of taka 7,500 for printing 1,000 copies of a book and Taka 15,000 for printing 2,500 copies. Assuming a linear relationship and 2,000 books are printed, find (a) the variable cost per book, (b) the average cost per book and (c) the fixed cost.

Solution:

(a) 1000 copies need 7500 Tk

2500 copies need 15000Tk

Extra 1500 copies need = 15000 – 7500 = 7500Tk

So, cost for first 1000 copies is fixed and next all are variable

We can get variable cost per book = 7500/1500 = 5 Tk Ans.

(b) As cost function is linear and total cost for printing first 1000 copies is 7500 Tk and the variable cost for per book is 5 Tk.

So, more 1000 copies cost = 5 ✕ 1000 = 5000 Tk

To print 2000 books we need = (7500 ✢ 5000) = 12,500 Tk

Average cost = 12500/2000 = 6.25 Tk Ans.

(c) Fixed cost = (7500 – 5000) = 2500 Tk Ans.

The length of a rectangle is twice its width. If the length is increased by 4 inches and the width is decreased by 3 inches, a new rectangle is formed whose perimeter is 62 inches. What is the length of the original rectangle?

Solution:

Let, width = x

Length = 2x

According to Question,

$2\{(x + 4) + (2x - 3)\} = 62$

Or, $2x + 8 + 4x - 6 = 62$

Or, $6x = 62 - 2$

Or, $6x = 60$

Or, $x = 10$

So, length = $2 \times 10 = 20$ inch. Ans.

BANGLADESH BANK CASH OFFICER 2011

The area of a rectangular plot is 323 square meters. Its perimeter is 72 meters. Find the length and breadth of the plot.

Solution:

Let, length = x and breadth = y.

So, perimeter, 2(x ✛ y) = 72

Or, x ✛ y = 36

Or, x = 36 – y

Again, area, xy = 323

Or, (36 – y)y = 323

Or, 36y – y2 = 323

Or, y2 – 36 ✛ 323 = 0

Or, y2 – 19y – 17y ✛ 323 = 0

Or, y(y – 19) – 17(y – 19) = 0

Or, (y – 19)(y – 17) = 0

If, breadth y = 17 then length x = 323/17 = 19

Again, if, breadth y = 19 then length x = 323/19 = 17

Since breadth must not be more than length so, breadth, y = 17 and length x = 19 Ans.

Mr. Hasan has few notes of Tk. 10 and Tk. 50. A total of his 150 notes amount to Tk.5100. What is the number of each kind of note?

Solution:

Let, the number of 10 taka notes be x

And the number of 50 taka notes be (150 – x)

According to the Question,

10x ✛ 50(150 – x) = 5100

Or, 10x ✛ 7500 – 50x = 5100

Or, 40x = 2400

Or, x = 60

The number of 10 Tk. Notes = 60 and the number of 50Tk. notes = 150 – 60 = 90 Ans.

The length of rectangular plot is greater than its breadth by 20 meters. If the perimeter of the plot is 160 meters, what is the area of the plot in square meters?

Solution:

Let, breadth be x meters and length be (x ✛ 20) meters

So, perimeters =2(x ✛ x ✛2) = (4x ✛ 40) meters.

According to the ⍰ Question,

4x ✛ 40 = 160

Or, 4x = 160 – 40

Or, x = 30

So, breadth = 30 meters and length = 30 ✛ 20 = 50 meters.

Area of the pot = (50 ✕ 30) = 150 sq. meters. Ans.

BANGLADESH BANK AD 2012

A series has 3 numbers a, ar, ar2. In the series, the first term is twice of the second term. What is the ratio of the sum of the first 2 terms to the sum of the last 2 terms?

Solution:

Let, the third term, ar2 = x

So, according to ⍰ Question, second term, ar = 2X and first term, a = 4x

So, (a ✛ ar) : (ar ✛ ar2)

Or, (4x ✛ 2x) : (2x ✛ x)

Or, 6x : 3x

Or, 2 : 1 Ans.

Two alloys A and B are composed of two basic elements. The ratios of the compositions of the two basic elements in the two alloys are 5:3 and 1:2. A new alloy X is formed by mixing the two alloys A & B in the ratio 4:3. What is the ratio of the composition of the two basic elements in alloy X?

Solution:

Let F = the first basic element and S = the second basic element.

Alloy A: Since F:S = 5:3, so amount of F = 5/8 & amount of S = 3/8

Alloy B: Since F:S = 1:2, so amount of F = 1/3 & amount of S = 2/3

Now, ratio of alloy A & B in new alloy X is 4:3

amount of F in the new alloy X = (5/8) ✕ 4 ✢ (1/3) ✕ 3 = 7/2

amount of S in the new alloy X = (3/8) ✕ 4 ✢ (2/3) ✕ 3= 7/2

so ratio of F & S in new alloy X = (7/2)/(7/2) = 1/1 = 1:1 Ans.

BANGLADESH BANK AD 2013

A, B and C do a job alone in 20, 30 and 60 days respectively. In how many days can A do the job if he is assisted by B & C?

Solution:

(A✢B✢C) work 1 days = 1/20 ✢ 1/30 ✢ 1/60 = 1/10

With help of B & C, A can do 1/10 part work in 1 day

,, ,, ,, ,, ,, ,, ,, 1 (whole) part in 10 days Ans.

A bus is traveling with 52 passengers. When it arrives at a stop, Y passengers get off and 4 get inside at the next stop one-third of the passengers get off and 3 get on. There are 25 passengers. Find out how many passengers got off at the first stop?

Solution:

52 passengers

Y passengers get off making it 52 – y

4 get on making it 52 – y ✛ 4

At the next stop one-third of the passengers get off and 3 get on to make it 25

(52 – y ✛ 4) – 1/3(52 – y ✛ 4) ✛ 3 = 25

=> {2(52 – y ✛ 4) ✛ 9}/3 = 25

=> 104 – 2y ✛8 ✛ 9 = 75

=> – 2y = – 46

=> y = 46/2

So, y=23

Hence, 23 passengers got off at the first stop. Ans.

An Eskimo leaves its igloo and travels 3 km north, then 8 km east and finally 3 km north to reach the north pole. How many km does he have to travel to return to his igloo in a straight line?

Solution:

Suppose, the Eskimo started from the point O, traveled 3km north to R, then from R, traveled 8km east to S, and finally from S traveled 3km north to A.

By joining A with O with a direct line (the blue line) and rearranging OR to PS and RS to OP, we get the right angle triangle AOP of which AP = 3✛3 = 6, OP = 8.

Therefore, AO = √(AP² ✛ OP²) = √(8²✛ 6²) = 10

BANGLADESH BANK AD 2014

a, b, c, d, e are 5 consecutive numbers in increasing order, deleting one of them from the set decreased the sum of the remaining numbers by 20% of the sum of 5. Which one of the number is deleted from the set?

Solution:

Let, the consecutive numbers are,

a =1, b = 1 ✛ 1 = 2, c = 1 ✛ 2 = 3, d = 1 ✛ 3 = 4 & e = 1 ✛ 4 = 5

So, total = 1 ✛ 2 ✛ 3 ✛ 4 ✛ 5 = 15

Deleting 1 of the 5 numbers from the set then decreased 20% of the sum.

20% of the sum = (15 x 20)/100 = 3

So, the deleted number is the 3rd as c from the set Ans.

Rahim bought 2 varieties of rice costing tk 5 & 6 per kg each. Then he sold the mixture at tk7/kg, making profit of 20%. What was the ratio of the mixture?

Solution:

Let, Rahim bought x kg rice at tk 5 & y kg rice at tk 6/kg

So, total cost = 5x ✛ 6y and sale price = 7x ✛ 7y

20% profit = 20 ✕ (5x ✛ 6y)/100 = (5x ✛ 6y)/5

According to Question, 7x ✛ 7y – (5x ✛ 6y) = (5x ✛ 6y)/5

Or, 2x ✛ y = (5x ✛ 6y)/5

Or, 10x ✛ 5y = 5x ✛ 6y

Or, 5x = y

Or, x/y = 1/5 Ans.

A team of 2 men and 5 women completed 1/4th of a job in 3ds. After that another man joined them and they all complete the next 1/4th of the job in 2ds. How many men can complete the whole job in 4 days?

Solution:

Here, in 3ds, 2 men & 5 women do 1/4 part

So, in 1 d 2 men & 5 women do 1/12 part

Again, in 2ds, 3 men & 5 women do 1/4 part

or in 1d 3 men & 5 women do 1/8 part

1 mans' 1 day work = 1/8 – 1/12 = 1/24 part

So, in 24ds the whole job can be done by 1 man

In 4ds the whole job can be done by = 24/4 = 6 men' Ans.

BANGLADESH BANK OFFICER 2015

A shop stocks four types of caps, there are 1/3 as many red caps as blue caps and 1/2 as many green caps as red caps. There are equal number of green caps and yellow caps. If there are 42 blue caps, then what percent of the total caps in the shop are blue?

Solution:

Given that, blue caps = 42

Red caps = 42/3 = 14

Green caps = 14/2 = 7

Yellow caps = 7

Total caps = 42 ✢ 14 ✢ 7 ✢ 7 = 70

Percentage of blue caps = (42/70)100 = 60% Ans.

The annual incomes and expenditures of a man and his wife are in the ratios 5:3 and 3:1, respectively. If they decide to save equally and find a balance of Tk. 4000 at the end of the year, what was their income?

Solution:

Let, their income be 5x and 3x and their expenditure be 3x and x.

According to the Question,

(5x + 3x) – (3x + x) = 4000

Or, 4x = 4000

Or, x = 1000

So, Man's income 5x = 5 × 1000 =Tk. 5000

Woman's income 3x = 3 × 1000 =Tk. 3000 Ans.

A person sold two articles each for the same price of Tk. 1040. He incurs 20% loss on the first and 10% loss on the second. Find his overall percentage of loss.

Solution:

Let, Price be Tk. 100

At, 20% loss, selling price = 100 – 20 =Tk. 80

And at 10% loss selling price = 100 – 10 =Tk. 90

So, cost of 1st item = (1040/80)100 =Tk. 1300

And cost of 2nd item = (1040/90)100 = Tk. 1155.55

Total cost of two items =Tk. (1300 ✛ 1155.55) = Tk. 2455.55

But selling price = 1040 ✛ 1040 =Tk. 2080.

So, loss =Tk. (2455.55 -2080) =Tk. 375.55

So, overall loss percentage = (375.55/2455.55)100 = 15.29% Ans.

If the sum of five consecutive integers is S, what is the largest of those integers in terms of S?

Solution:

Let, consecutive integers are x, x✛1, x✛2, x✛3, x✛4.

According to the ⍰ Question,

X ✛ x ✛ 1 ✛ x ✛ 2 ✛ x ✛ 3 ✛ x ✛ 4 = s

Or, 5x ✛ 10 = s

Or, x = (s – 10)/5

Or, x ✛ 4 = (s – 10)/5 ✛ 4 [Add 4 both side]

Or, x ✛ 4 = (s ✛ 10)/5.

Or, x ✛ 4 = s/5 ✛ 2

So, the largest integer = s/5 ✛ 2 Ans.

The difference between two numbers is five and the difference of their squares is 65. What is the larger number?

Solution:

Let, Larger number be x and smaller number be y According to the Question,

x – y = 5……..(i)

x2 – y2 = 65 ……..(ii)

Or, (x ✛ y) (x – y) = 65

Or, (x ✛ y)5 = 65

Or, x ✛ y = 13……(iii)

From, (i) ✛ (ii) we get,

2x = 18

Or, x = 9

Putting the value of x in (i) we get,

9 – y = 5

Or, y = 4

So, larger number = 9 Ans.

Robi drove 100 miles to visit a friend. If he had driven 8 miles per hour faster than he did, he would have arrived in 5/6 of the time, he actually took. How many minutes did the trip take?

Solution:

Let, Robi took x hours to cover 100 miles

Actual speed = 100/x mph [mph= Mile per hour]

New speed =(100/x ✛ 8) mph

New time taken=x ✕ (5/6) = 5x/6 hours.

We know,

Speed ✕ Time =Distance

(100/x ✢ 8) ✕ (5x/6) = 100

Or, x = 5/2 hrs = 5 ✕ 60/2 = 150 mins. Ans.

Of the three numbers, second is twice the first and is also thrice the third. If the average of the three numbers is 44, then what will be the largest number?

Solution:

Let,1st Number = x,

2nd Number = 2x and 3rd Number = 2x/3

According to the ⍰ Question,

x ✢ 2x ✢ 2x/3 = 44 ✕ 3

Or, (3x ✢ 6x ✢ 2x)/3= 132

Or, 11x =396

Or, x=36.

So, the largest number is = 2 ✕ 36 = 72 Ans.

BANGLADESH BANK AD 2015

A bus hired at the cost of Tk. 2400 and it was decided that every student would share the cost equally. But 10 more students joined as a result the fare decreased by Tk. 8 per person. How many students were travelling in the bus?

Solution:

Let, total students = x, so average fair = 2400/x

Later, 10 more students have come, so average fair = 2400/(x ✛ 10)

According to Question,

2400/x – 2400/(x ✛ 10) = 8

Or, {2400(x ✛ 10) – 2400x}/x(x ✛ 10) = 8

Or, (2400x ✛ 24000 – 2400x)/x(x ✛ 10) = 8

Or, 24000/x(x ✛ 10) = 8

Or, 2400 = 8×2 ✛ 80x

Or, 8×2 ✛ 80x – 24000 = 0

Or, x2 ✛ 10x – 3000 = 0

Or, x2 ✛ 60x – 50x – 3000 = 0

Or, (x ✛ 60)(x – 50) = 0

Or, x = 50 Ans.

The average age of students of a class is 15.8 years. The average age of boys in the class is 16.4 years and of the girls is 15.4 years. Find the ratio of number of boys to girls in the class.

Solution:

Let us consider, number of boys = x and girls = y

According to Question,

15.8(x ✛ y) = 16.4x ✛ 15.4y

Or, 15.8x ✛ 15.8y = 16.4x ✛ 15.4y

Or, 16.4x – 15.8x = 15.8y – 15.4y

Or, 0.6x = 0.4y

Or, x/y = 0.4/0.6 = 4/6 = 2/3 Ans.

If (x ✛ 1/x) = 3 then the value of (x2 ✛ 1/x2) = ?

Solution:

(x ✛ 1/x) = 3

Or, (x ✛ 1/x)2 = 32

Or, x2 ✛ 2.x.1/x ✛ 1/x2 = 9

Or, x2 ✛ 1/x2 = 9 – 2 = 7 Ans.

The percentage profit earned by selling an article for Tk. 1920 is equal to the percentage loss incurred by selling the same article for Tk. 1280. At what price should the article be sold to make 25% profit?

Solution:

Here, both the article is same as well as cost price and percentage of profit and loss.

Let cost price of the article = x Tk.

In case of first condition,

Percentage of profit = {(1920 – x)100}/x

In case of second condition,

Percentage of loss = {(x – 1280)100}/x

According to Question,

{(1920 – x)100}/x = {(x – 1280)100}/x

Or, 1920 – x = x – 1280

Or, x + x = 1920 + 1280

Or, 2x = 3200

Or, x = 1600

So, cost price = 1600 Tk.

At 25% profit, sell price will be = 1600 + 1600 × 25/100

= 1600 + 400

= 2000 Tk. Ans.

A can do a piece of work in 10 days while B can do it in 15 days. They work together for 5 days and the rest of the work is done by C in 2 days. If they get Tk. 4500 for the whole work, how should they divide the money?

Solution:

Here, in 1 day A can do 1/10 part

So, in 5 days A do = 5/10 = 1/2 part

Again, in 5 days B do = 5/15 = 1/3 part

Rest of the work done by C = 1 – (1/2 ✛ 1/3) = 1 – 5/6 = 1/6

So, A's share = 4500/2 = 2250 Tk.

B's share = 4500/3 = 1500 Tk.

C's share = 4500/6 = 750 Tk. Ans.

ABCD is a square and one of its sides AB is also a chord of the circle as shown in the figure. What is the area of the square?

Solution: Here, ABO is a right triangle

So, AB2 = BO2 ✛ AO2

= 9 ✛ 9

= 18

Or, Ab = √18 = 3√2

So, area of the square ABCD = (3√2)2 = 18 sq. unit Ans.

Pubali Bank Officer Written Exam 2016

 Question1: A retailer buys 40 pens at the market price of 36 pens from a wholesaler. If he sells these pens giving a discount of 1%, what is the profit percent???

Solution:

Let, market price of each pen be 1 taka

=Market price of 36 pen be 36 taka

So, cost price of 40 pens= 36 taka

After 1% discount on market price, selling price of 40 pens= $\frac{99}{100} \times 40 = 39.60$ taka

Profit = Selling Price- Cost price

= 39.6 -36= 3.6

So, profit percentage = $\frac{3.6}{36} \times 100 = 10\ \%$

Answer: 10% profit

 Question2: A, B, C started a business by investing taka 120,000 taka 1,35,ooo and taka 1,50,000 respectively. Find the share of each, out of an annual profit of 56,700 taka

Solution:

Ratio of the investment of A, B,C = A:B:C

= 1,20,000: 1,35,000 : 150,000

= 8:9:10

Total profit = 56,700

A's profit = 56,700 × 827 =16,800 taka

B's profit = 56,700 × 927 = 18,900 taka

C's profit = 56,700 × 1027 = 21,000 taka

Answer: A's profit 16,800 taka . B's profit 18,900 taka . C's profit 21,000 taka

 Question3: The simple interest on a certain sum of money for 212 years at 12% per annum is 4o taka less than the simple interest on the same sum for 3 12 years at 10% per annum. Find the sum.

Solution:

Let, principle or certain sum of money = x taka

According to the Question:

(x × 10% × 7/2) – (x × 12% × 5/2) = 40

or, (x × 7 × 10)/200 – (x × 12 × 5)/200 = 40

or, 70x−60x/200 = 40

or, 10 x = 8000

or, x= 800

Answer: 800 taka

SEBL wrtten Exam 2016

A book and a pen were sold for tk 3040 making a profit of 25% on the book and 10% on the pen. By selling them for tk 3070, the profit realizes would have been 10% on the book and 25% on the pen. Find the cost of each.

Solution:

Let, x= CP of pen

y= CP of book

First condition 110x/100 ✛ 125y/100 = 3040

Or, 110x ✛ 125y = 304000

Or, 22x ✛ 25y = 60800……..(1)

Second condition 125x/100 ✛ 110y/100 = 3070

Or, 125x ✛ 110y = 307000

Or, 25x ✛ 22y = 61400 ……..(2)

(1) ✕ 25 – (2) ✕ 22

550x ✛ 625y = 1520000

550x ✛ 484y = 1350800

Or, 141y = 169200

Or, y = 1200

Putting the value of y in (1)

we get 22x ✢ 25 ✕ 1200 = 60800

Or, 22x = 60800-30000

Or, x = 30800/22= 1400 Ans:

price of pen =1200 tk ,

price of book = tk 1400

2.A man's income from interest and wages is tk 500. He doubles his investment and also gets increase of 50% in wages and his income increases to tk 800. What was his original income separately in terms of interest wages?

Solution:

The income increases only due to increase in the wage not the interest

Hence, The tk 300 increase is due to 50% increase in the wage Now 1.5W = 800-500 = 300

Or, w = 200

So, income from wage tk 200 and income from interest tk 500-200 = tk300 (ans)