Question Bank

CLASS 10 - MATHEMATICS

	GOODS AND SERVICE TAX (GST)
1	A retailer buys an article at its listed price from a wholesaler and sells it to a consumer in the same state after marking up the price by20% . The list price of the article is ₹ 2500 and the rate of GST is 12% . What is the tax liability of the retailer to the central government? a) ₹ 0 b) ₹ 30 c) ₹ 60 d) ₹ 15
2	The marked price of an article is₹ 2,000. Discount = ₹ 500, GST = 12%. The total amount to be paid is: a) ₹ 1370 b) ₹ 1680 c) ₹ 2800 d) ₹ 1740
3	Ankit bought an electrical fan which has a marked price of₹ 800. If the GST on the goods is 7% , then the SGST is a) ₹ 56 b) ₹ 24 c) ₹ 80 d) ₹ 28
4	The cost of certain services is₹ 10,000, GST = ₹ 1,800. The rate of GST is: a) 5% b) 18% c) 28% d) 12%
5	An article which is marked at is available at a discount of 20% and the rate of GST is 18%. The amount of SGST is a) ₹ 86.40 b) ₹ 172.80 c) ₹ 216.00 d) ₹ 108.00
6	A shopkeeper bought a machine from a distributor at a discount of 25% of the listed price of₹ 32000. The shopkeeper sells the machine to a consumer at listed price. If

	the sales are intra - state and the rate of GST is 18%, then the tax (under GST) paid by the shopkeeper to the Central Government is: a) ₹ 2880 b) ₹ 1440 c) ₹ 2160 d) ₹ 720
7	A retailer purchases a fan for₹ 1500 from a wholesaler and sells it to a consumer at 10% profit. If the sales are intra - state and the rate of GST is 12%, the selling price of the fan including tax (under GST) by the retailer is: a) ₹ 1830 b) ₹ 1800 c) ₹ 1650 d) ₹ 1848
8	**Assertion (A):** Manufacturer A sells a washing machine to dealer B for . If the rate of GST is 18% , then the amount of input SGST of dealer B is ₹ 900. **Reason (R):** Rate of SGST $= \frac{1}{2} \times$ Rate of CGST a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.
9	A dealer buys an article for₹ 1,500. He sells it to a customer at 10% profit. The rate of GST is 18%. **Assertion (A):** The price which the customer pays for the article is ₹ 1,650 (excluding GST). **Reason (R):** GST is charged on the cost price of the article. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.
10	**Assertion (A):** The taxable value of shoes is ₹ 700, rate of GST is 12% , then the price of shoes is ₹ 784. **Reason (R):** $Discount = \frac{Rate of discount \times Marked price}{100}$ a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.

11	**Assertion (A):** A shopkeeper in Agra sells a mobile phone to a customer in Agra at ₹ 8,400. If the rate of GST is 18%, then SGST is ₹ 756. **Reason (R):** For any intrastate supply (supply within the state) of goods or services CGST is levied. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) Both A and R are true. d) A is false but R is true.
12	For a trader X, GST paid is₹ 600 and GST collected is ₹ 720. **Assertion (A):** GST paid by the trader to the Government is ₹ 120. **Reason (R):** GST deposited with the Government = Output Tax - Input tax = GST collected - GST paid. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.
	Answers

(b) ₹ 30

Explanation:
For retailer,
Cost price
$= ₹2500$ and rate of GST $= 12\%$
$\therefore$ CGST $= \frac{12}{2}\% = 6\%[\because \text{CGST} = \frac{\text{GST}}{2}]$
Since, retailer sells the article to consumer in the same state after marking up the price by 20%.
$\therefore$ Selling price $= 2500 + 20\%$ of 2500
$= 2500 + \frac{20}{100} \times 2500 = 2500 + 500 = ₹3000$
Now, CGST charged $= \frac{6}{100} \times 3000 = ₹180[\because \text{CGST} = 6\%]$
Thus, tax liability = CGST charged - CGST
$= 180 - 150 = ₹30$

2.(b) ₹ 1680

Explanation:
Given,
M.P. = ₹ 2000

Discount $= ₹500$
Rate of G.S.T. $= 12\%$
Discounted price = M.P. - Discount
= ₹ 2000 - ₹ 500
$= ₹1500$

G.S.T. on discounted price
$= \frac{G \cdot S \cdot T.}{100}\% \times$ Discounted price $= \frac{12}{100} \times 1500 = ₹180.$
Money paid for article = Discounted price + G.S.T.
$= ₹1500 + ₹180 = ₹1680.$

3. (d) ₹ 28

Explanation:
Given, marked price of an electrical fan $= ₹800$
Rate of GST on goods $= 7\%$
Now, SGST on the goods $= \frac{7}{2}\%\left[\because \text{SGST} = \frac{\text{GST}}{2}\right]$
$\Rightarrow$ SGST on the goods $= 3.5\%$
$\therefore$ SGST charged $= \frac{3.5}{100} \times 800 = ₹28$

4. (b) 18%

Explanation:
Given,
C.P. of articles $= ₹10{,}000$

We know that,
$\text{GST} = \frac{\text{Rate of G.S.T.}}{100} \times C.P.$
Substituting values we get:
$\Rightarrow 1800 = \frac{\text{Rate of G.S.T.}}{100} \times 10000$
$\Rightarrow$ Rate of G.S.T. $= \frac{1800 \times 100}{10000}$
$\Rightarrow$ Rate of G.S.T. $= 18$

5. (a) ₹ 86.40

Explanation:

Given, marked price of an article $= ₹1200$
Rate of discount $= 20\%$ and rate of GST $= 18\%$
Now, rate of SGST $= \frac{1}{2} \times$ Rate of GST $= \frac{1}{2} \times 18\% = 9\%$
$\because$ Discount $= 1200 \times \frac{20}{100} = ₹240$
$\therefore$ Discounted price $= 1200 - 240 = ₹960$
Hence, the amount of SGST $= 9\%$ of 960
$= \frac{9}{100} \times 960$
$= 9.6 \times 9 = ₹86.40$

6. (d) ₹ 720

Explanation:

Given:
Selling Price of shopkeeper without tax to consumer = Listed Price = ₹ 32000
As the sales are intra-state and the rate of GST is 18%, so GST comprises of 9% as CGST

and 9% as SGST. Shopkeeper sells the machine to consumer for ₹ 32000 , amount of SGST collected by shopkeeper from consumer(or paid by consumer):

$SGST = 9\%$ of $32000 = \frac{9}{100} \times 32000 = ₹2880$

$CGST = 9\%$ of $32000 = \frac{9}{100} \times 32000 = ₹2880$

The Output Tax(under GST) for shopkeeper:

Output CGST = 2880

Output SGST = 2880

Given:

Listed price of machine $= ₹32000$

Discount given by distributor to shopkeeper $= 25\%$ of Listed price $= \left(\frac{25}{100}\right) \times 32000$

$= 0.25 \times 32000$

$= ₹8000$

Selling price for distributer excluding tax (or cost price for shopkeeper) = Listed Price - Discount

$= 32000 - 8000$

= ₹24000

As the sales are intra-state and the rate of GST is 18%, so GST comprises of 9% as CGST and 9% as SGST. Distributor sells the machine to shopkeeper for ₹ 24000, amount of GST collected by distributor from shopkeeper(or paid by shopkeeper):

$CGST = 9\%$ of $24000 = \frac{9}{100} \times 24000 = ₹2160$

$SGST = 9\%$ of $24000 = \frac{9}{100} \times 24000 = ₹2160$

The Input Tax(under GST) for shopkeeper:

Input CGST = 2160

Input SGST = 2160

The tax (under GST) paid by the shopkeeper to the Central Government = Output CGST - Input CGST $= 2880 - 2160$

7. (d) ₹1848

Explanation:

Cost price (CP) of fan for retailer $= ₹1500$

Profit $= 10\%$ of CP

Profit $= 10\% \times 1500 = 150$

3. Selling price before GST

SP (before tax) $= 1500 + 150 = 1650$

4. GST rate $= 12\%$ (intra-state $\rightarrow$ 6% CGST $+6\%$ SGST)

GST amount $= 12\% \times 1650 = 198$

5. Selling price including GST

Final price $= 1650 + 198 = 1848$

Selling price including GST $= ₹1848$

8. (c) *A* is true but *R* is false.

Explanation:

Price of washing machine $= ₹10000$
Rate of GST $= 18\%$
$\therefore$ Rate of SGST $= \frac{18}{2} = 9\%[\because \text{SGST} = \frac{1}{2} \times \text{GST}\ ]$
$\therefore$ SGST $= 9\%$ of ₹ $10000 = \frac{9}{100} \times 10000 = ₹900$
Hence, *A* is true, *R* is false.

9. (c) *A* is true but *R* is false.

Explanation:

Given,
Cost price for dealer $= ₹1{,}500$
Profit % of dealer on cost price = 10%
$\therefore$ Selling price of the article by dealer (excluding tax) = Cost Price + Profit
$= 1{,}500 + 10\%$ of 1,500
$= 1{,}500 + \frac{10}{100} \times 1500$
$= 1{,}500 + 150$
= ₹ 1,650
GST% = 18%
So, assertion (A) is true.
GST is charged on the selling price.
So, reason (R) is false.
Thus, Assertion (A) is true, and Reason (R) is false.

10. (b) Both A and R are true but R is not the correct explanation of A .

Explanation:

Taxable value of shoes $= ₹700$
Rate of GST $= 12\%$
$\therefore$ GST charged $= \frac{12}{100} \times 700 = ₹84$
$\therefore$ Price of shoes $= 700 + 84 = ₹784$
Thus, *A* is true.
Also, *R* is true.
Both A and R are true but R is not the correct explanation of A .

11. (c) Both A and R are true.

Explanation:

We know that,
For any intrastate supply (supply within the state) of goods or services GST is divided into two parts CGST and SGST.
$\therefore$ Reason (R) is true.
Given,
A shopkeeper in Agra sells a mobile phone to a customer in Agra at ₹ 8,400.
Rate of GST = 18%
This is an intra-state transaction.
CGST rate = SGST rate $= \frac{GST}{2} = \frac{18}{2}\% = 9\%$.

SGST $= \frac{9}{100} \times 8400 = ₹756.$
∴ Assertion (A) is true.

12. (a) Both A and R are true and R is the correct explanation of A .

Explanation:

Given,
Output tax $= ₹720$
Input tax $= ₹600$
Tax liability = Output tax - Input tax
$= ₹(720 - 600) = ₹120$
Hence, Both *A* and *R* are true and *R* is the correct reason for *A*.

	BANKING
1	₹ 50 per month is deposited for 20 months in a recurring deposit account. If the rate of interest is 10%, the maturity value is: a) ₹ 87.50 b) ₹ 2175 c) ₹ 1087.50 d) ₹ 187.50
2	If Shahrukh opened a recurring deposit account in a bank and deposited₹ 800 per month for $1\frac{1}{2} yr$, then the total money deposited in the account is a) ₹ 11400 b) ₹ 14400 c) ₹ 13680 d) ₹ 12500
3	A certain money is deposited every month for 8 months in a recurring deposit account at 12% p.a. simple interest. If the interest at the time of maturity is₹ 36, the monthly installment is: a) ₹ 200 b) ₹ 500 c) ₹ 100 d) ₹ 1000
4	A man deposited₹ 1200 in a recurring deposit account for 1 yr at 5% per annum simple interest. The interest earned by him on maturity is a) ₹ 780 b) ₹ 4680

	c) ₹ 390 d) ₹ 14790
5	₹ 800 per month is deposited in an R.D. account for one and a half years. If the depositor gets ₹ 2,280 as interest at the time of maturity, the rate of interest is: a) 15% b) 10% c) 12% d) 20%
6	Ganesh opened a Recurring Deposit Account with State Bank of India. He deposited₹ 900 per month at 7.5% per annum. He received ₹ 1687.5 as interest. Then, the time period of his deposit will be a) 3.5 yr b) 2 yr c) 5 yr d) 3 yr
7	₹ 50 per month is deposited for 20 months in a recurring deposit account. If the rate of interest is 10%, the maturity value is: a) ₹ 87.50 b) ₹ 2175 c) ₹ 1087.50 d) ₹ 187.50
8	**Assertion (A):** If a man deposited ₹ 112 per month for 12 months at 2% per annum, then in 1 yr, he will get ₹ 224 as interest. **Reason (R):** Formula for calculating interest in recurring deposit account is given by Interest $(I) = P \times \frac{n(n+1)}{2\times12} \times \frac{r}{100}$ a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.
9	**Assertion (A):** Ramesh deposited ₹ 500 per month for 60 months in a bank's recurring deposit account. If the bank pays interest at the rate of 6% per annum, then the amount he gets on maturity is . **Reason (R):** Maturity value is calculated by $n + I$. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false.

	d) A is false but R is true.
10	**Assertion (A):** Mrs. Asha Mehta deposits ₹ 250 per month for 1 yr in a bank's recurring deposit account. If the rate of (simple) interest is 8% per annum, then the interest earned by her on this account is ₹ 130. **Reason (R):** In calculation of recurring deposit account, the time is always taken in years. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.
11	Jena has a cumulative deposit account in Indian Bank. She deposit₹ 500 per month for 2 years. Bank pays interest at the rate of 6% p.a. **Assertion (A):** Money received by Jena at maturity is ₹ 12,750. **Reason (R):** Maturity value = money deposit + interest. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.
12	**Assertion (A):** In a cumulative deposit account, a man deposited ₹ 5,000 per month for 6 months and received ₹ 33,000 on maturity. The interest received by him is ₹ 3,000. **Reason (R):** Interest received in a cumulative deposit account = Maturity value - Total sum deposited. a) Both A and R are true. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.

ANSWERS

(c) ₹ 1087.50

Explanation:

Given,
Deposited per month = ₹50
Time (n) = 20 months
Rate of interest = 10%
By formula,
Interest $= P \times \frac{n(n+1)}{2\times12} \times \frac{r}{100}$
Substituting values we get :
$\Rightarrow$ Interest $= 50 \times \frac{20\times(20+1)}{2\times12} \times \frac{10}{100}$

$= 87.5$
Maturity value = Sum deposited + Interest
$= P \times n +$ Interest
$= ₹(50 \times 20) + ₹87.5$
$= ₹1000 + ₹87.5$
$= ₹1087.5$

2. (b) ₹ 14400

Explanation:

We have, $P = ₹800, n = 1\frac{1}{2} yr$
$= \left(\frac{3}{2} \times 12\right) = 18$ months
$\therefore$ Total money deposited in the account $= P \times n$
$= 800 \times 18$
$= ₹14400$

3. (c) ₹ 100

Explanation:

Given,
Time (n) = 8 months

Rate (r) = 12%
Interest = ₹ 36
Let monthly installment be ₹ P .
By formula,
Interest $= P \times \frac{n(n+1)}{2\times12} \times \frac{r}{100}$
Substituting values we get:
$\Rightarrow 36 = P \times \frac{8 \times (8+1)}{2 \times 12} \times \frac{12}{100}$
$\Rightarrow 36 = P \times \frac{8 \times 9}{24} \times \frac{3}{25}$
$\Rightarrow 36 = P \times \frac{24 \times 9}{24 \times 25}$
$\Rightarrow P = \frac{36 \times 25 \times 24}{24 \times 9}$
$\Rightarrow P = 4 \times 25$
$\Rightarrow P = ₹100.$

4. (c) ₹ 390

Explanation:

Given, principal $(P) = ₹1200$, time period $(n) = 1yr = 12$ months and rate of interest $(r) = 5\%$
So, interest received by him $= P \times \frac{n(n+1)}{2} \times \frac{r}{12\times100}$
$= 1200 \times \frac{12 \times 13}{2} \times \frac{5}{12 \times 100}$

= ₹ 390

5. (c) 9.6%

Explanation:

Deposit per month $(P) = ₹500$
Time (n) = 24 months
Total deposit $= ₹500 \times 24 = ₹12000$
Given,
Interest earned is one-tenth of total deposit.
Interest $= \frac{1}{10} \times 12000 = ₹1200.$
Let rate of interest be $r\%$.
By formula,
Interest $= P \times \frac{n(n+1)}{2\times12} \times \frac{r}{100}$
Substituting values we get :

$$\Rightarrow 1200 = 500 \times \frac{24 \times (24+1)}{2 \times 12} \times \frac{r}{100}$$

$$\Rightarrow 1200 = 500 \times \frac{24 \times 25}{24} \times \frac{r}{100}$$

$$\Rightarrow 1200 = 5 \times 25 \times r$$

$$\Rightarrow r = \frac{1200}{125}$$

$$\Rightarrow r = 9.6$$

6. (d) 20%

Explanation:

Given,
Deposit per month $(P) = ₹800$
Time (n) = 18 months (or 1.5 years)
Interest = 2280

Let rate of interest be r%.
By formula,
Interest $= P \times \frac{n(n+1)}{2\times12} \times \frac{r}{100}$
Substituting values we get:

$$\Rightarrow 2280 = 800 \times \frac{18 \times (18+1)}{2 \times 12} \times \frac{r}{100}$$

$$\Rightarrow 2280 = 800 \times \frac{18 \times 19}{24} \times \frac{r}{100}$$

$$\Rightarrow 2280 = 6 \times 19 \times r$$

$$\Rightarrow r = \frac{2280}{6 \times 19}$$

$$\Rightarrow r = \frac{2280}{114}$$

$$\Rightarrow r = 20$$

7.(b) 2 yr

Explanation:

Let the time period be T yr.
Then, Tyr $=$ 12 T months
$\because$ Interest received by him = ₹1687.5

$\therefore \frac{900 \times 75 \times 12T \times (12T+1)}{2400} = 1687.5 \left[\because I = \frac{\mathrm{Prn}(n+1)}{2400}\right]$

$\Rightarrow \frac{9(T)(12T+1)(7.5)}{2} = 1687.5$

$\Rightarrow \mathrm{T}(12\ \mathrm{T}+1) = \frac{1687.5 \times 2}{9 \times 7.5} = 50$

$\Rightarrow 12\ \mathrm{T}^2 + \mathrm{T} - 50 = 0$

$\Rightarrow 12\ \mathrm{T}^2 - 24\ \mathrm{T} + 25\ \mathrm{T} - 50 = 0$

$\Rightarrow 12\ \mathrm{T}(\ \mathrm{T}-2) + 25(\ \mathrm{T}-2) = 0$

$\Rightarrow (12\ \mathrm{T}+25)(\mathrm{T}-2) = 0$

$\Rightarrow \mathrm{T} = \frac{-25}{12}$ or 2[$\because$ cannot be negative]

$\therefore \mathrm{T} = 2\mathrm{yr}$

8. (d) *A* is false but *R* is true.

Explanation:

Let the monthly installment $= ₹P$.
Given, $P = ₹112$, time $(n) = 12$ months and rate of interest, $r = 2\%$ per annum

$\therefore I = P \times \frac{n(n+1)}{2 \times 12} \times \frac{r}{100}$

$= 112 \times \frac{12 \times 13 \times 2}{2 \times 12 \times 100}$

$= 112 \times 0.13 = ₹14.56$

Hence, *A* is false, *R* is true.

9. (a) Both A and R are true and R is the correct explanation of A .

Explanation:

Clearly, *R* is true.
We have, $P = ₹500, n = 60$ months
and rate of interest, $r = 6\%$ per annum

$\therefore MV = Pn + I$

$= Pn + \frac{Pn(n+1)r}{2 \times 12 \times 100} = Pn\left(1 + \frac{r(n+1)}{2400}\right)$

$= 500 \times 60\left(1 + \frac{6 \times 61}{2400}\right)$

$= 500 \times 60\left(\frac{400+61}{400}\right)$

$= 75 \times 461 = ₹34575$

So, *A* is true.
Hence, both *A* and *R* are true and *R* is the correct reason for *A*.

10.(c) *A* is true but *R* is false.

Explanation:

We have, $P = ₹250$, rate of interest,
$r = 8\%$ per annum
and $n = 12$ months
$\therefore I = \frac{Pn(n+1)r}{2 \times 12 \times 100} = \frac{250 \times 12 \times 13 \times 8}{2 \times 12 \times 100} = ₹130$
So, *A* is true.
We know that in calculation of recurring deposit account, the time is always taken in months.
So, *R* is false.

11. (a) Both A and R are true and R is the correct explanation of A .

Explanation:

Given,
P = ₹ 500/month
$n = 2$ years or 24 months
$r\% = 6\%$

By formula,
M.V. = money deposit + interest

So, reason (R) is true.
M.V. $= P \times n + P \times \frac{n(n+1)}{2 \times 12} \times \frac{r}{100}$

Substituting the values, we get :

$$M.V. = 500 \times 24 + 500 \times \frac{24(24+1)}{2 \times 12} \times \frac{6}{100}$$
$$= 1200 + 500 \times \frac{24 \times 25}{24} \times \frac{6}{100}$$
$$= 1200 + 500 \times 25 \times \frac{6}{100}$$
$$= 1200 + 500 \times \frac{6}{4}$$
$$= 1200 + 125 \times 6$$
$$= 1200 + 750$$
$$= ₹12{,}750$$

So, both Assertion (A) and Reason (R) are correct, and Reason (R) is the correct reason for Assertion (A).

12. (a) Both A and R are true.

Explanation:

Given,
In a cumulative deposit account, a man deposited ₹ 5,000 per month for 6 months and received ₹
33,000 on maturity.

Money deposited $= ₹5{,}000 \times 6 = ₹30{,}000$ Maturity value $= ₹33{,}000$ Interest earned = Maturity value - Money deposited $= ₹33{,}000 - ₹30{,}000 = ₹3{,}000.$ ∴ Assertion is true. By formula, Interest received in a cumulative deposit account = Maturity value - Total sum deposited ∴ Reason is true.	
	SHARES AND DIVIDENDS
1	Mr. Ankit bought₹ 110 shares of a company at a discount of ₹ 10. If the company pays a dividend at the rate of x %per annum and Mr. Ankit earns at the rate of y%per annum on his investment, then x:yis a) 10 : 11 b) 10 : 9 c) 11 : 10 d) 9 : 10
2	If a share of₹ 125 is selling at ₹ 96, then it is said to be selling at ₹ 29: a) Above par b) At par c) Premium d) Below par
3	If₹ 25000 more invested, then 400 more shares can be purchased. The market value of each share a) ₹ 77.50 b) ₹ 63.50 c) ₹ 62.50 d) ₹ 85.00
4	500,₹ 50 shares at par earn a dividend of ₹ 1250 in one year. The rate of dividend is: a) 7.5% b) 10% c) 5% d) 12.5%
5	A man invests₹ 24,000 on ₹ 60 shares at a discount of 20%. If the dividend declared by the company is 10%, then his annual income is: a) ₹ 1,500 b) ₹ 3,000 c) ₹ 2,880

	d) ₹ 2,000
6	Each of₹ 500 shares is available at a discount of ₹ 100. If the dividend on these shares is 8%, the income percent is: a) 10% b) 5% c) 15% d) 8%
7	₹ 40 is distributed between two friends such that the product of their shares is 364. The difference of their shares is: a) ₹ 10 b) ₹ 14 c) ₹ 12 d) ₹ 8
8	**Assertion (A):** Dividend, the profit a shareholder receive from the company, depend upon the market value. **Reason (R):** Dividend is always calculated as a percentage of face value of the share. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.
9	**Assertion (A):** If a man invests ₹ 4200 in share of a company which pay 15% dividend at a time when a ₹ 25 shares cost ₹ 35, then the number of shares he bought is 120. **Reason (R):** The formula for calculating the number of shares purchased is $\frac{Annualincome}{Totalinvestment}$. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.
	(a) 10: 11 **Explanation:** $\because$ Dividend × Face value = Market value × Rate of return $\therefore \frac{x}{100} \times 110 = 100 \times \frac{y}{100}$ $\Rightarrow \frac{x}{y} = \frac{100}{110} = \frac{10}{11}$ $\Rightarrow x : y = 10 : 11$

2. (d) Below par

Explanation:

Given,
Face Value $= ₹125$
Market Value $= ₹96$
Discount = Face Value - Market Value $= 125 - 96 = ₹29$
This means the share is being sold at a discount of ₹ 29 , which is also known as being sold below par.

3. (c) ₹ 62.50

Explanation:

From the given data, 400 shares can be purchased with an investment of ₹ 25000 .
$\therefore$ Market value of each share $= ₹\left(\frac{25000}{400}\right) = ₹62.50$

4. (c) 5%

Explanation:
Given,
N.V. $= ₹50$

No. of shares $= 500$
Dividend = ₹ 1250
By formula,
Dividend = No. of shares × Rate of dividend × N.V. of share
Let rate of dividend be x%.
Substituting values we get :

$$\Rightarrow 1250 = 500 \times x \Rightarrow 1250 = 500 \times \frac{x}{100} \times 50$$

$$\Rightarrow x = \frac{1250 \times 100}{500 \times 50}$$

$$\Rightarrow x = \frac{125000}{25000}$$

$\Rightarrow x = 5.$
Rate of dividend $= 5\%.$

5. (b) ₹ 3,000

Explanation:

Given,
Investment = ₹ 24,000
Face Value $= ₹60$
Dividend rate = 10%
Discount $= 20\%$ of $60 = \frac{20}{100} \times 60 = ₹12$
Market Value = Face Value - Discount $= 60 - 12 = ₹48.$
By formula,

$$\text{Number of shares} = \frac{\text{Investment}}{\text{Market value of each share}}$$

$= \frac{24000}{48}$
$= 500$
Annual dividend = No. of shares × Rate of div. × N.V. of 1 share
$= 500 \times \frac{10}{100} \times 60$
$= ₹3{,}000.$

6. (a) 10%

Explanation:

Given,
N.V. of each share $= ₹500$

Discount = ₹ 100
M.V. = N.V. - Discount
$= ₹500 - ₹100 = ₹400.$
Dividend = 8%
Let income percent be $r\%$.
By formula,
Income percent on M.V. = Dividend on N.V.

Substituting values we get :
$r\%$ of $400 = 8\%$ of 500
$\Rightarrow \frac{r}{100} \times 400 = \frac{8}{100} \times 500$
$\Rightarrow 4r = 40$
$\Rightarrow r = \frac{40}{4} = 10$

7. (c) ₹ 12

Explanation:

Given,
The total amount of money $= ₹40.$
Let the shares of two friends be ₹ x and F y respectively.
$\Rightarrow x + y = 40$

$$\Rightarrow y = 40 - x \quad (1)$$

Given,
The product of two parts of amount distributed is 364.

$$\Rightarrow xy = 364 \quad (2)$$

Substituting value of y from equation (1) in equation (2), we get:

	$\Rightarrow x^2 - 26x - 14x + 364 = 0$ $\Rightarrow x(x - 26) - 14(x - 26) = 0$ $\Rightarrow (x - 14)(x - 26) = 0$ $\Rightarrow (x - 14) = 0$ or $(x - 26) = 0$ [Using zero-product rule] $\Rightarrow x = 14$ or $x = 26$ Substituting value of x in equation (1), we get: Case 1: If $x = 14, y = 40 - 14 = 26$ Case 2: If $x = 26, y = 40 - 26 = 14$. The difference between the two parts of amount is, ₹$26 -$ ₹$14 =$ ₹12. **8. (d) *A* is false but *R* is true.** **Explanation:** Dividends are calculated on the face value (nominal value) of a share and not on its market value. The dividend percentage declared by a company is always applied to the face value, irrespective of the current stock market price of the share. Therefore, Assertion (A) is false. For example, if a company declares a 10% dividend, the shareholder receives 10% of the face value per share, not 10% of its market value. Hence, Reason (R) is true. Thus, the correct conclusion is that Assertion (A) is false, but Reason (R) is true. **9. (c) *A* is true but *R* is false.** **Explanation:** Given, total sum invested by a man = ₹4200 Market value of one share = ₹35 ∴ Number of shares he bought $= \frac{4200}{35} = 120$ So, A is true. The formula for calculating the number of shares purchased is $\frac{\text{Annual income}}{\text{Market value}}$. So, R is false.
	FACTORISATION OF POLYNOMIALS
1	When $6x^3 + 2x^2 - x + 2$ is divided by (x + 2), then remainder is a) - 36 b) 56 c) 36 d) 44
2	If$mx^2 - nx + 8$ has $x - 2$ as a factor, then: a) $2n + m = 4$ b) $2m - n = 4$

	c) $n - 2m = 4$ d) $2m + n = 4$
3	If$(x - a)$ is a factor of $x^3 - ax^2 + x + 5$; the value of a is: a) 5 b) $\frac{1}{5}$ c) $-\frac{1}{5}$ d) - 5
4	If the polynomial$p(x) = x^3 - 4kx + 3$ is divided by $(2x + 1)$, then the remainder obtained is - 3. The value of k is: a) $-\frac{47}{16}$ b) $-\frac{27}{16}$ c) $-\frac{17}{16}$ d) $-\frac{47}{8}$
5	If$(x - p)$ is a factor of $(x^3 - px^2 + 2x + p - 1)$, then the value of p is: a) $-\frac{1}{3}$ b) $\frac{1}{3}$ c) $\frac{1}{2}$ d) $-\frac{1}{2}$
6	If$(x + 2)$ is a factor of the polynomial $x^3 - kx^2 - 5x + 6$, then the value of k is: a) - 2 b) 2 c) 3 d) 1
7	$(x + 2)$ and $(x + 3)$ are two factors of the polynomial $x^3 + 6x^2 + 11x + 6$. If this polynomial is completely factorised, then the third factor is a) $(x - 4)$ b) $(x - 1)$ c) $(x + 1)$ d) $(x + 4)$
8	A polynomial in$x$ is $x^3 + 5x^2 - kx - 24$. Which of the following is a factor of the given polynomial, so that the value of k is 2? a) $(x - 3)$

	b) $(x + 4)$ c) $(x - 4)$ d) $(x + 2)$
9	The factor common to the two polynomials$x^2 - 4$ and $x^3 - x^2 - 4x + 4$ is a) $(x + 1)$ b) $(x + 2)$ c) $(x + 3)$ d) $(x - 1)$
10	$x^3 + 6x^2 + 11x + 6$ is divisible by a) only$(x + 2)$ b) only$(x + 3)$ c) All of these d) only$(x + 1)$
	1. (a) -36 **Explanation:** Let f(x) $= 6x^3 + 2x^2 - x + 2$ Remainder $= f(-2) = 6(-2)^3 + 2(-2)^2 - (-2) + 2$ $= 6(-8) + 2 \times 4 + 2 + 2$ $= -36$ **2.(c) $n - 2m = 4$** **Explanation:** By factor theorem, If $x - a$ is the factor of polynomial $f(x)$, then remainder $f(a) = 0$. Given, $x - 2$ is a factor of $mx^2 - nx + 8$. Then substituting $x = 2$ in polynomial we get, remainder $= 0$: $\Rightarrow m(2)^2 - 2n + 8 = 0$ $\Rightarrow 4\,m - 2n + 8 = 0$ $\Rightarrow 2(2m - n + 4) = 0$ $\Rightarrow 2\,m - n + 4 = 0$ $\Rightarrow n - 2\,m = 4$. **3. (d) -5** **Explanation:**

By factor theorem,
If polynomial $f(x)$ is divided by its factor $(x-a)$ then the remainder $f(a)=0$.

Since, $x-a$ is a factor of x^3-ax^2+x+5.
$\therefore$ On substituting $x=a$ in x^3-ax^2+x+5, remainder $=0$.
$\therefore a^3-a(a)^2+a+5=0$
$\Rightarrow a^3-a^3+a+5=0$
$\Rightarrow a+5=0$
$\Rightarrow a=-5$.

4. (a) $\mathbf{-\frac{47}{16}}$

Explanation:

Let, $f(x)=x^3-4kx+3$
$\Rightarrow 2x+1=0$
$\Rightarrow 2x=-1$
$\Rightarrow x=-\frac{1}{2}$
By remainder theorem,
On dividing $f(x)$ by $2x+1$, remainder $=f\left(-\frac{1}{2}\right)$.
Given,
Remainder $=-3$
$\Rightarrow f\left(-\frac{1}{2}\right)=-3$
$\Rightarrow \left(-\frac{1}{2}\right)^3-4k\left(-\frac{1}{2}\right)+3=-3$
$\Rightarrow \left(-\frac{1}{8}\right)+\frac{4k}{2}=-3-3$
$\Rightarrow -\frac{1}{8}+2k=-6$
$\Rightarrow 2k=-6+\frac{1}{8}$
$\Rightarrow 2k=\frac{-6\times 8+1}{8}$
$\Rightarrow k=\frac{-48+1}{8\times 2}$
$\Rightarrow k=-\frac{47}{16}$.

5.(b) $\mathbf{\frac{1}{3}}$

Explanation:

Given,
Let $f(x)=x^3-px^2+2x+p-1$
By the Factor Theorem,
If $(x-p)$ is a factor of $f(x)$, then $f(p)=0$.

$\Rightarrow 3p - 1 = 0$
$\Rightarrow 3p = 1$
$\Rightarrow p = \frac{1}{3}$

6.(b) 2

Explanation:

Let, $f(x) = x^3 - kx^2 - 5x + 6$.
By factor theorem,
If $(x + 2)$ is a factor of $f(x)$, then $f(-2) = 0$.
$\Rightarrow (-2)^3 - k(-2)^2 - 5(-2) + 6 = 0$
$\Rightarrow -8 - k(4) + 10 + 6 = 0$
$\Rightarrow -4k + 8 = 0$
$\Rightarrow 4k = 8$
$\Rightarrow k = \frac{8}{4}$
$\Rightarrow k = 2$.

7.(c) $(x + 1)$

Explanation:

Let $f(x) = x^3 + 6x^2 + 11x + 6$
Now, let us divide $f(x)$ by ($x + 2$) using long division method.

$$
\begin{array}{r|l}
x+2 & x^3+6x^2+11x+6 \\
 & x^3+2x^2 \\
 & \quad - \quad - \\
 & 4x^2+11x+6 \\
 & 4x^2+8x \\
 & \quad - \quad - \\
 & \qquad 3x+6 \\
 & \qquad -3x+6 \\
 & \qquad\quad - \\
\hline
\end{array}
$$

Hence, $f(x) = x^3 + 6x^2 + 11x + 6$
$= (x + 2)(x^2 + 4x + 3)$
$= (x + 2)(x + 3)(x + 1)$
So, the third factor is $x + 1$.

8.(b) $(x + 4)$

Explanation:

By factor theorem,
$(x - a)$ is a factor of $f(x)$, if $f(a) = 0$
Given, if $k = 2$, then the polynomial
$f(x) = x^3 + 5x^2 - 2x - 24$
From option (a), if ($x + 4$) is a factor of given polynomial, then $f(-4) = 0$.
Now, $f(-4) = (-4)^3 + 5(-4)^2 - 2(-4) - 24$
$= -64 + 80 + 8 - 24 = 0$

	So, $(x+4)$ is a factor of the given polynomial. **9. (b)** $(\boldsymbol{x+2})$ **Explanation:** We have, two polynomials x^2-4 and x^3-x^2-4x+4 By factorisation, $x^2-4=x^2-2^2$ $=(x+2)(x-2)[\because a^2-b^2=(a+b)(a-b)]$ and $x^3-x^2-4x+4=x^2(x-1)-4(x-1)$ $=(x-1)(x^2-4)$ $=(x-1)(x^2-2^2)$ $=(x-1)(x+2)(x-2)$ Therefore, common factors are ($x+2$) and ($x-2$). **10. (c) All of these** **Explanation:** Let $f(x)=x^3+6x^2+11x+6$ Here $f(-1)=(-1)^3+6(-1)^2+11(-1)+6=-1+6-11+6=0$ $\therefore x+1$ is a factor of $f(x)$. $f(-2)=(-2)^3+6(-2)^2+11(-2)+6=-8+24-22+6=0$ $\therefore x+2$ is a factor of $f(x)$ and $f(-3)=(-3)^3+6(-3)^2+11(-3)+6=-27+54-33+6=0$ $\therefore x+3$ is a factor of $f(x)$ Thus $f(x)$ is divisible by $x+1, x+2$ and $x+3$.
	MEASURES OF CENTRAL TENDENCY
1	The mean of 100 observations is 50. If one of the observations was misread as 50 instead of 40, the correct mean is: a) 49.9 b) 50 c) 40 d) 50.1
2	Which of the following cannot be determined graphically for a grouped frequency distribution? a) Mode b) Median c) Mean d) Quartiles
3	The modal class of a given distribution always corresponds to the a) the first interval b) interval with lowest frequency

	c) the last interval d) interval with highest frequency
4	The median class for the given distribution is **Class interval** | $1-5$ | $6-10$ | $11-15$ | $16-20$ **Cumulative frequency** | 2 | 6 | 11 | 18 a) 6 - 10 b) 11 - 20 c) 11 - 15 d) 1 - 5
5	If the mean of$7,5,13,x$ and 9 be 10, then the value of x is: a) 10 b) 14 c) 16 d) 12
6	The median of the following data is: x | f 10 | 2 20 | 3 30 | 2 40 | 3 50 | 1 a) 35 b) 30 c) 40 d) 31
7	Find the mode of the data$15,14,19,20$, $14,15,16,14,15,18,14,19,15,17$ and 15 a) 14 b) 16 c) 17 d) 15
8	Numbers$5,15,20,x,28,30,35$ are in ascending order and have median $= 23$; then the value of x is: a) 17.5 b) 23 c) 24 d) 29

9	Find the mean of the data when it is given that mode$= 50.5$ and median $= 45.5$. a) 43 b) 43.5 c) 43.2 d) 44
10	Consider the following frequency distribution. x | **Frequency** | **Cumulative frequency** 1 | 6 | 6 2 | 13 | a 3 | b | 27 4 | 5 | c 5 | 11 | d 6 | e | 50 Which of the following combination is correct? a) $a = 13, c = 32, e = 9$ b) $\mathrm{a} = 19, \mathrm{c} = 31, \mathrm{e} = 17$ c) $\mathrm{b} = 9,\ \mathrm{d} = 38, \mathrm{a} = 19$ d) $\mathrm{b} = 8,\ \mathrm{d} = 43, \mathrm{e} = 7$
11	**Assertion (A):** For the data 5, 9, 7, 13, 10, 11, 10, the median is 13. **Reason (R):** For a collection of 11 arrayed data, the median is the middle number. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.
12	**Assertion (A):** The arithmetic mean of the following given frequency distribution table is 13.81. x | 4 | 7 | 10 | 13 | 16 | 19 f | 7 | 10 | 15 | 20 | 25 | 30 **Reason (R):** $\bar{x} = \frac{\sum f_t x_t}{\sum f_t}$ a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.
13	**Assertion (A):** The first quartile of the observations 15, 14, 21, 11, 19, 10, 18 is 10. **Reason (R):** For an ungrouped data, containing n observations, lower quartile is given by $Q_1 = \frac{n-1}{4}$ th observation, if n is odd.

	a) Both A and R are false b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.
14	**Assertion (A):** For a grouped frequency distribution, we use Mean $= A + \left(\frac{\Sigma ft}{\Sigma f}\right) \times h$ to find the mean using step deviation method. **Reason (R)** : Here $t = \left(\frac{x-A}{h}\right)$. a) Both A and R are true. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.
15	<table><tr><td>C.I.</td><td>$0-10$</td><td>$10-20$</td><td>$20-30$</td></tr><tr><td>Frequency</td><td>15</td><td>25</td><td>b</td></tr><tr><td>Cumulative frequency</td><td>15</td><td>a</td><td>50</td></tr></table> **Assertion(A):** a = 15 + 25 = 40 b = 50 - a **Reason(R):** a + 15 = 25 a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.
	1. (a) 49.9 **Explanation:** Sum of observations when observations were misread = Number of observations × Initial Mean $= 100(50)$ $= 5000$ To find the correct sum We need to subtract the wrong value and add the correct value, Sum $= 5000 - 50 + 40$ $= 4990$ $\therefore$ Mean $= \frac{4990}{100} = 49.9$ **2.(c) Mean** **Explanation:** Mean cannot be determined graphically. $\therefore$ Mean is the sum of the values of a subject divided by number of values. As it is a single value and cannot be compared and represented in different values. Therefore, the determination of mean by the graphical method is not possible.

So, mean cannot be determined graphically.

3. (d) interval with highest frequency

Explanation:

The modal class of a given distribution always corresponds to the interval with highest frequency.

4.(c) $11 - 15$

Explanation:

Here, $N = 18$
$\Rightarrow \frac{N}{2} = \frac{18}{2} = 9$
Since, the cumulative frequency just greater than 9 is 11 and the corresponding class interval is $11 - 15$.
$\therefore$ Median class $= 11 - 15$

5.(c) 16

Explanation:

By formula,
$\Rightarrow$ Mean $= \frac{\Sigma x_i}{n}$
$\Rightarrow 10 = \frac{7 + 5 + 13 + x + 9}{5}$
$\Rightarrow 10 \times 5 = 34 + x$
$\Rightarrow 50 = 34 + x$
$\Rightarrow x = 50 - 34$
$\Rightarrow x = 16$

6.(b) 30

Explanation:

Cumulative frequency distribution table is:

x	f	Cumulative frequency
10	2	2
20	3	$5(2 + 3)$
30	2	$7(5 + 2)$
40	3	$10(7 + 3)$

50	1	$11(10+1)$

Here, $n = 11$, which is odd.
By formula,
Median $= \frac{n+1}{2}$ th observation $= \frac{11+1}{2}$ th observation $= \frac{12}{2}$ th observation $= 6$ th observation From table, 6th observation corresponds to 30.
$\therefore$ Median $= 30$

7.(d) 15

Explanation:

Arranging the given data in ascending order we have,
14,14,14,14,15,15,15,15,15,16,17,18,19,19,20
Here the observation 15 is repeated maximum no. of times i.e. 5 times.
$\therefore$ Mode $= 15$

8.(b) 23

Explanation:

Given, numbers:
$5,15,20, x, 28,30,35$
The number of terms (n) are 7 , which is odd.
$\therefore$ Median $= \frac{n+1}{2}$ th term
Substituting value we get :
$\Rightarrow 23 = \frac{7+1}{2}$ th term
$\Rightarrow 23 = \frac{8}{2}$ th term
$\Rightarrow 4$ th term $= 23$
$\Rightarrow x = 23.$

9. (a) 43

Explanation:

By formula,
Mode $= 3$ Median -2 Mean
$\Rightarrow 50.5 = 3 \times 45.5 - 2$ Mean
$\Rightarrow 50.5 = 136.5 - 2$ Mean
$\Rightarrow 2$ Mean $= 136.5 - 50.5$
$\Rightarrow 2$ Mean $= 86$
$\Rightarrow$ Mean $= \frac{86}{2}$
$\Rightarrow$ Mean $= 43.$

10.(d) $\mathbf{b = 8}$, $\mathbf{d = 43}$, $\mathbf{e = 7}$

Explanation:

x	Frequency	Cumulative frequency
1	6	6
2	13	$a(6+13=19)$
3	b	$27(a+b)$
4	5	$c(27+5)$
5	11	$d(c+11)$
6	e	$50(e+d)$

From above table,
$a = 6 + 13 = 19$
$a + b = 27$
$\Rightarrow 19 + b = 27$
$\Rightarrow b = 27 - 19 = 8$
$c = 27 + 5 = 32$
$d = c + 11 = 32 + 11 = 43$
$50 = e + d$
$\Rightarrow e = 50 - d$
$\Rightarrow e = 50 - 43$
$\Rightarrow e = 7$

11.(d) A is false but R is true.

Explanation:

Given observations are 5,9,7,13,10,11, 10 .
Arranging the given observations in ascending order, we get 5,7,9,10,10,11,13
$\therefore$ Number of observations, $n = 7$ (odd)
So, median $= \left(\frac{n+1}{2}\right)$ th observation
$= \left(\frac{7+1}{2}\right)$ th observation
$= 4$ th observation $= 10$
So, A is false.
We know that if number of observations in a data is odd, then the median is the middle number. So, R is true.

12. (a) Both A and R are true and R is the correct explanation of A .

Explanation:

We know, mean of a frequency distribution is calculated by:

$\bar{x} = \frac{\sum f_i x_i}{\sum f_i}$

Hence, for the given terms:

$\sum f_i x_i = (4 \times 7) + (7 \times 10) + (10 \times 15) + (13 \times 20) + (16 \times 25) + (19 \times 30)$

$= 28 + 70 + 150 + 260 + 400 + 570 = 1478$

and $\sum f_i = 7 + 10 + 15 + 20 + 25 + 30 = 107$

∴ Arithmetic mean $\bar{x} = \frac{\sum f_i x_i}{\sum f_i} = \frac{1478}{107} = 13.81$

Thus, both assertion and reason are true and reason is the correct explanation of the assertion.

13. (a) Both A and R are false

Explanation:

Observations arranging in ascending order $= 10,11,14,15,18,19,21$

Here, $n = 7$

We know that,

If the variates are arranged in ascending order, then the observation lying midway between the lower extreme and the median is called the Lower quartile or First quartile.

$Q_1 = \frac{n+1}{4}$ th observation, if n is odd.

$= \frac{7+1}{4} = \frac{8}{4} = 2.$

∴ Assertion (A) is false.

For an ungrouped data, containing n observations, lower quartile is given by

$Q_1 = \frac{n+1}{4}$ th observation, if n is odd.

∴ Reason (R) is false.

14. (a) Both A and R are true.

Explanation:

The standard formula to calculate the mean ($\bar{x}$) using the step-deviation method is:

$\bar{x} = A + \left(\frac{\sum ft}{\sum f}\right) \times h$

Therefore, Assertion (A) is true.

The step-deviation is defined as the difference between the class mark (x) and the assumed mean

(A), divided by the class size (h):

$t = \frac{x - A}{h}$

Reason (R) is true.

15.(c) *A* is true but *R* is false.

Explanation:

Cumulative frequency represents the running total of frequencies up to a certain class interval. For instance, the cumulative frequency for the class interval $10 - 20$

	includes all frequencies from the previous intervals as well. Therefore, the cumulative frequency for the $10-20$ interval is the sum of the frequencies for the $0-10$ and $10-20$ intervals. The cumulative frequency for the $10-20$ interval is the sum of the frequencies for the $0-10$ and $10-20$ intervals: $$a = 15 + 25 = 40$$ The cumulative frequency for the $20-30$ interval is 50 , which includes all previous frequencies. Therefore, the frequency for the 20-30 interval is: $b = 50 - a = 50 - 40 = 10.$ $\therefore$ A is true, R is false.
	QUADRATIC EQUATIONS IN ONE VARIABLE
1	The sum of the squares of two consecutive odd natural numbers is 74. The greater number is: a) 9 b) 7 c) 6 d) 5
2	If 3 is a root of the quadratic equation$x^2 - px + 3 = 0$, then p is equal to a) 5 b) 3 c) 2 d) 4
3	Neha's father is 28 years older than her. The product of their ages (in years) 4 years ago was 245. If present age of Neha is$x$ years, then the algebraic representation of this information in the form of quadratic equation is: a) $x^2 - 20x + 341 = 0$ b) $x^2 + 20x + 341 = 0$ c) $x^2 + 20x - 341 = 0$ d) $x^2 - 20x - 341 = 0$
4	Which of the following quadratic equations has 2 and 3 as its roots? a) $x^2 + 5x - 6 = 0$ b) $x^2 + 5x + 6 = 0$ c) $x^2 - 5x - 6 = 0$ d) $x^2 - 5x + 6 = 0$

5	A quadratic equation$2x^2 + 5x - 3 = 0$. **Assertion (A):** The roots of equation $2x^2 + 5x - 3 = 0$ are real and unequal. **Reason (R):** For the equation $x^2 + bx + c = 0$, the roots are real and unequal if $b^2 - 4ac > 0$. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.
6	**Assertion**(A) **:** $(x + 2)^2 = 4(x + 3)$ is not a quadratic equation. **Reason (R):** An equation of the form $x^2 + bx + c = 0$, $a \neq 0$, where $a, b, c \in R$ is called a quadratic equation. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.
7	**Assertion (A):** The quadratic equation $3kx^2 - 4kx + 4 = 0$ has equal roots, if $= 3$. **Reason (R):** For equal roots of a quadratic equation, we must have $= 0$. a) Both A and R are true. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.
8	The equation$\sqrt{15 - 2x} = x$. **Assertion (A):** x = 3 . **Reason (R):** $\sqrt{15 - 2x} = x \Rightarrow 15 - 2x = x^2$ $\Rightarrow x^2 - 2x - 15 = 0$ $\Rightarrow x = -5 or 3$ a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.
9	**Assertion (A):** $4x^2 - 12x + 9 = 0$ has repeated roots. **Reason (R):** The quadratic equation $ax^2 + bx + c = 0$ have repeated roots if discriminant D = 0. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A.

	c) A is true but R is false. d) A is false but R is true.
	1.(b) 7 **Explanation:** Let the two consecutive odd natural numbers be x and $x + 2$. Given, Sum of the squares of two consecutive odd natural numbers is 74. $\Rightarrow x^2 + (x + 2)^2 = 74$ $\Rightarrow x^2 + x^2 + 4 + 4x = 74$ $\Rightarrow 2x^2 + 4x + 4 - 74 = 0$ $\Rightarrow 2x^2 + 4x - 70 = 0$ $\Rightarrow 2x^2 + 14x - 10x - 70 = 0$ $\Rightarrow 2x(x + 7) - 10(x + 7) = 0$ $\Rightarrow (2x - 10)(x + 7) = 0$ $\Rightarrow (2x - 10) = 0$ or $(x + 7) = 0$ [Using zero-product rule] $\Rightarrow 2x = 10$ or $x = -7$ $\Rightarrow x = \frac{10}{2}$ or $x = -7$ $\Rightarrow x = 5$ or $x = -7$ Since the number required is natural number, thus $x \neq -7$. $x + 2 = 5 + 2 = 7$. The greater number among the two numbers is 7 . **2.(d) 4** **Explanation:** The given quadratic equation is $x^2 - px + 3 = 0$ ... (i) $\because$ 3 is a root of this equation. So, $x = 3$ will satisfy this equation. On putting $x = 3$ in Eq. (i), we get $3^2 - p(3) + 3 = 0$ $\Rightarrow 9 - 3p + 3 = 0$ $\Rightarrow 12 - 3p = 0$ $\Rightarrow -3p = -12 \Rightarrow p = 4$ **3.(c) $x^2 + 20x - 341 = 0$** **Explanation:** Let Neha's present age be x and the age of her father be y . Given, Neha's father is 28 years older than her. $y = 28 + x$ Given, Product of their ages 4 years ago was 245. $\Rightarrow (x - 4)(y - 4) = 245$ Substituting value of y from equation (1) in equation (2), we get:

$\Rightarrow (x-4)(28+x-4)=245$
$\Rightarrow (x-4)(x+24)=245$
$\Rightarrow x^2+24x-4x-96=245$
$\Rightarrow x^2+20x-96-245=0$
$\Rightarrow x^2+20x-341=0$

4.(d) $x^2-5x+6=0$

Explanation:

Since, 2 and 3 are the two roots of the quadratic equation. Then, we get
$x=2$ or $x=3$
$\Rightarrow x-2=0$ or $x-3=0$
$\therefore (x-2)(x-3)=0 \Rightarrow x^2-3x-2x+6=0$
$x^2-5x+6=0$
Hence, the required quadratic equation is
$x^2-5x+6=0$.

5. (a) Both A and R are true and R is the correct explanation of A .

Explanation:

Given, $2x^2+5x-3=0$
As we know that the roots of equation $ax^2+bx+c=0$ are real and unequal if $b^2-4ac>0$.
$\Rightarrow b^2-4ac=5^2-4\times 2\times(-3)$
$=25+24=49>0$
So, Assertion (A) is true.

And, Reason(R) is also true and it clearly explain assertion as a positive discriminant $(b^2-4ac>0)$ guarantees that the roots are real and unequal.

6.(d) *A* is false but *R* is true.

Explanation:

We have,
$(x+2)^2=4(x+3)$
$\Rightarrow x^2+4+4x=4x+12[\because (a+b)^2=a^2+b^2+2ab]$
$\Rightarrow x^2-8=0$
$\Rightarrow x^2-0x-8=0$,
which is the form of $ax^2+bx+c=0$.
Thus, the given equation represents a quadratic equation.
Hence, *A* is false, *R* is true.

7. (a) Both A and R are true.

Explanation:

Given,
$\Rightarrow 3kx^2-4kx+4=0$
when $k=3$

	$\Rightarrow 3 \times (3) \times x^2 - 4 \times (3) \times x + 4 = 0$ $\Rightarrow 9x^2 - 12x + 4 = 0$ Comparing $9x^2 - 12x + 4 = 0$ with $ax^2 + bx + c = 0$ we get, $a = 9, b = -12$ and $c = 4$. We know that, Discriminant $(D) = b^2 - 4ac$ $= (-12)^2 - 4 \times (9) \times (4)$ $= 144 - 144 = 0.$ Therefore, the equation has rational and equal roots. So, Assertion (A) is true. The Discriminant is given by $b^2 - 4ac$, if the discriminant of any quadratic equation is zero. Then it is said have equal and real roots. So, Reason (R) is true. Thus, both A and R are true. **8.(c) *A* is true but *R* is false.** **Explanation:** Given, $\Rightarrow \sqrt{15 - 2x} = x$ $\Rightarrow 15 - 2x = x^2$ $\Rightarrow x^2 + 2x - 15 = 0$ $\Rightarrow x^2 + 5x - 3x - 15 = 0$ $\Rightarrow x(x + 5) - 3(x + 5) = 0$ $\Rightarrow (x + 5)(x - 3) = 0$ $\Rightarrow (x + 5) = 0$ or $(x - 3) = 0$ $\Rightarrow x = -5$ or $x = 3$ The quadratic equation mentioned in the reason is $x^2 - 2x - 15 = 0$ whereas we see that the correct quadratic equation is $x^2 + 2x - 15 = 0$ ∴ Reason (R) is false. Our solution shows that one of the roots is 3 . ∴ Assertion (A) is true. **9. (a) Both A and R are true and R is the correct explanation of A .** **Explanation:** Assertion: $4x^2 - 12x + 9 = 0$ $\mathrm{D} = \mathrm{b}^2 - 4\mathrm{ac}$ $= (-12)^2 - 4(4)(9)$ $= 144 - 144 = 0$ Roots are repeated.
	MATRICES
1	If,$x \begin{bmatrix} 2 \\ 3 \end{bmatrix} + y \begin{bmatrix} -1 \\ 1 \end{bmatrix} = \begin{bmatrix} 10 \\ 5 \end{bmatrix}$, then the value of xy is:

	a) 15 b) 3 c) - 12 d) - 6
2	If $\begin{bmatrix}2 & 0\\0 & 4\end{bmatrix}\begin{bmatrix}x\\y\end{bmatrix} = \begin{bmatrix}2\\-8\end{bmatrix}$, the values of x and y respectively are: a) $1, -2$ b) $-2,1$ c) $-2, -1$ d) 1,2
3	If $A = \begin{bmatrix}3 & 5\\1 & 4\end{bmatrix}, B = \begin{bmatrix}2 & 4\\0 & 3\end{bmatrix}$ and $C = \begin{bmatrix}1 & -1\\2 & 1\end{bmatrix}$, then $5A - BC$ is equal to a) $\begin{bmatrix}-2 & 8\\-3 & 3\end{bmatrix}$ b) $\begin{bmatrix}-5 & -23\\1 & 17\end{bmatrix}$ c) $\begin{bmatrix}5 & 23\\1 & 17\end{bmatrix}$ d) $\begin{bmatrix}5 & 23\\-1 & 17\end{bmatrix}$
4	If $X = \begin{bmatrix}1 & -2\\0 & 3\end{bmatrix}$ and I is a 2×2 matrix, then $X^2 - 2X + 3I$ is equal to which one of the following? a) 4X b) 2X c) - I d) - 2X
5	If $2\begin{bmatrix}1 & 3\\0 & x\end{bmatrix} + \begin{bmatrix}y & 0\\1 & 2\end{bmatrix} = \begin{bmatrix}5 & 6\\1 & 8\end{bmatrix}$,then the value of $(x + y)$ is: a) 6 b) 4 c) - 4 d) 8
6	**Assertion (A):** If $A = \begin{bmatrix}-2 & 5\\3 & 4\end{bmatrix}$ and $B = \begin{bmatrix}4 & -3\\1 & 5\end{bmatrix}$, then the value of $A + B$ is $\begin{bmatrix}2 & 2\\4 & 9\end{bmatrix}$. **Reason (R):** Two matrices can be added only, if they have same order. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A.

	c) A is true but R is false. d) A is false but R is true.
7	**Assertion (A):** For any two square matrices A and B of same order, AB and BA both exist. **Reason (R):** For any two matrices A and B, the product AB exists only when number of rows in A = number of columns in B. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.
8	**Assertion (A):** If $A = \begin{bmatrix} 7 & 18 \\ -1 & 3 \end{bmatrix}$; $k = 3$, then $KA = \begin{bmatrix} 21 & 54 \\ -3 & 9 \end{bmatrix}$. **Reason (R):** When a matrix is multiplied by a scalar (a number), then each element of matrix is multiplied by the given scalar. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.
9	Matrix$A = [x \quad y]$ and Matrix $B = \begin{bmatrix} a \\ b \end{bmatrix}$. **Assertion (A):** Product BA is possible and order of resulting matrix is 2×2 . **Reason (R):** The product BA of two matrices A and B is possible only if number of rows in matrix B Is same as number of columns in matrix . a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.
10	If$A = [3 \quad -2]$ and $B = \begin{bmatrix} -1 & 4 \\ 2 & 0 \end{bmatrix}$ **Assertion (A):** Product AB of the two matrices A and B is possible. **Reason (R):** Number of columns of matrix A is equal to number of rows in matrix . a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.
	1.(c) -12 **Explanation:**

Solving for x and y :

$\Rightarrow x\begin{bmatrix}2\\3\end{bmatrix} + y\begin{bmatrix}-1\\1\end{bmatrix} = \begin{bmatrix}10\\5\end{bmatrix}$

$\Rightarrow \begin{bmatrix}2x\\3x\end{bmatrix} + \begin{bmatrix}-y\\y\end{bmatrix} = \begin{bmatrix}10\\5\end{bmatrix}$

$\Rightarrow \begin{bmatrix}2x-y\\3x+y\end{bmatrix} = \begin{bmatrix}10\\5\end{bmatrix}$

$\therefore 2x - y = 10$ ... (1)

$\therefore 3x + y = 5$ (2)

Adding equations (1) and (2), we get:

$\Rightarrow 2x - y + 3x + y = 10 + 5$

$\Rightarrow 2x + 3x = 15$

$\Rightarrow 5x = 15$

$\Rightarrow x = \frac{15}{5}$

$\Rightarrow x = 3$

Substituting value of x in $2x - y = 10$, we get :

$\Rightarrow 2(3) - y = 10$

$\Rightarrow 6 - y = 10$

$\Rightarrow y = 6 - 10$

$\Rightarrow y = -4$

$\therefore xy = (3)(-4) = -12$

2. (a) $1, -2$

Explanation:

Given,

$\begin{bmatrix}2 & 0\\0 & 4\end{bmatrix}\begin{bmatrix}x\\y\end{bmatrix} = \begin{bmatrix}2\\-8\end{bmatrix}$

Solving,

$\Rightarrow \begin{bmatrix}2(x)+0(y)\\0(x)+4(y)\end{bmatrix} = \begin{bmatrix}2\\-8\end{bmatrix}$

$\Rightarrow \begin{bmatrix}2x\\4y\end{bmatrix} = \begin{bmatrix}2\\-8\end{bmatrix}$

$\therefore 2x = 2$

$\Rightarrow x = \frac{2}{2}$

$\Rightarrow x = 1$

$\therefore 4y = -8$

$\Rightarrow y = \frac{-8}{4}$

$\Rightarrow y = -2$

3.(d) $\begin{bmatrix}\mathbf{5} & \mathbf{23}\\\mathbf{-1} & \mathbf{17}\end{bmatrix}$

Explanation:

Given, $A = \begin{bmatrix} 3 & 5 \\ 1 & 4 \end{bmatrix}, B = \begin{bmatrix} 2 & 4 \\ 0 & 3 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & -1 \\ 2 & 1 \end{bmatrix}$

$\therefore 5A - BC = 5\begin{bmatrix} 3 & 5 \\ 1 & 4 \end{bmatrix} - \begin{bmatrix} 2 & 4 \\ 0 & 3 \end{bmatrix}\begin{bmatrix} 1 & -1 \\ 2 & 1 \end{bmatrix}$

$= \begin{bmatrix} 15 & 25 \\ 5 & 20 \end{bmatrix} - \begin{bmatrix} 10 & 2 \\ 6 & 3 \end{bmatrix} = \begin{bmatrix} 5 & 23 \\ -1 & 17 \end{bmatrix}$

4.(b) $2X$

Explanation:

$X^2 = X \cdot X = \begin{bmatrix} 1 & -2 \\ 0 & 3 \end{bmatrix}\begin{bmatrix} 1 & -2 \\ 0 & 3 \end{bmatrix} = \begin{bmatrix} 1+0 & -2-6 \\ 0+0 & 0+9 \end{bmatrix} = \begin{bmatrix} 1 & -8 \\ 0 & 9 \end{bmatrix}$

$\therefore X^2 - 2X + 3I = \begin{bmatrix} 1 & -8 \\ 0 & 9 \end{bmatrix} - 2\begin{bmatrix} 1 & -2 \\ 0 & 3 \end{bmatrix} + 3\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

$= \begin{bmatrix} 1 & -8 \\ 0 & 9 \end{bmatrix} - \begin{bmatrix} 2 & -4 \\ 0 & 6 \end{bmatrix} + \begin{bmatrix} 3 & 0 \\ 0 & 3 \end{bmatrix}$

$= \begin{bmatrix} 1-2+3 & -8+4+0 \\ 0-0+0 & 9-6+3 \end{bmatrix} = \begin{bmatrix} 2 & -4 \\ 0 & 6 \end{bmatrix} = 2\begin{bmatrix} 1 & -2 \\ 0 & 3 \end{bmatrix} = 2X$

5. (a) 6

Explanation:

Given,

$2\begin{bmatrix} 1 & 3 \\ 0 & x \end{bmatrix} + \begin{bmatrix} y & 0 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 5 & 6 \\ 1 & 8 \end{bmatrix}$

Solving:

$\Rightarrow \begin{bmatrix} 2 & 6 \\ 0 & 2x \end{bmatrix} + \begin{bmatrix} y & 0 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 5 & 6 \\ 1 & 8 \end{bmatrix}$

$\Rightarrow \begin{bmatrix} 2+y & 6 \\ 1 & 2x+2 \end{bmatrix} = \begin{bmatrix} 5 & 6 \\ 1 & 8 \end{bmatrix}$

$\therefore 2 + y = 5$

$\Rightarrow y = 5 - 2$

$\Rightarrow y = 3$

$\therefore 2x + 2 = 8$

$\Rightarrow 2x = 8 - 2$

$\Rightarrow 2x = 6$

$\Rightarrow x = \frac{6}{2} = 3$

$\therefore x + y = 3 + 3 = 6$

6. (a) Both *A* and *R* are true and *R* is the correct explanation of *A*.

Explanation:

Given, $A = \begin{bmatrix} -2 & 5 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & -3 \\ 1 & 5 \end{bmatrix}$

$\therefore A + B = \begin{bmatrix} -2 & 5 \\ 3 & 4 \end{bmatrix} + \begin{bmatrix} 4 & -3 \\ 1 & 5 \end{bmatrix}$

$= \begin{bmatrix} -2+4 & 5-3 \\ 3+1 & 4+5 \end{bmatrix} = \begin{bmatrix} 2 & 2 \\ 4 & 9 \end{bmatrix}$

So, A is true.

and R is also true.
Hence, both A and R are true and R is the correct reason for A .

7.(c) A is true but R is false.

Explanation:

If A and B are square matrices of the same order (say $\times n$), then :
Thus, for AB, no. of columns in $A =$ no. of rows in B.
Thus, AB is possible.
For BA, no. of columns in B = no. of rows in A.
Thus, BA is possible.
Assertion (A) is true.
The rule for matrix multiplication is: AB exists if the number of columns of $A =$ number of rows of B.
Reason (R) is false.
A is true, R is false.

8. (a) Both A and R are true and R is the correct explanation of A .

Explanation:

We have, $A = \begin{bmatrix} 7 & 18 \\ -1 & 3 \end{bmatrix}$ and $k = 3$
We know that when a matrix is multiplied by a scalar (a number), then it is called scalar multiplication of matrix. Here, each element of matrix is multiplied by the given scalar.

$$\text{Then, } kA = 3A = 3\begin{bmatrix} 7 & 18 \\ -1 & 3 \end{bmatrix} = \begin{bmatrix} 3 \times 7 & 3 \times 18 \\ 3 \times (-1) & 3 \times 3 \end{bmatrix}$$
$$= \begin{bmatrix} 21 & 54 \\ -3 & 9 \end{bmatrix}$$

Hence, both A and R are true and R is the correct reason for A.

9.(c) A is true but R is false.

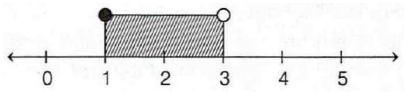
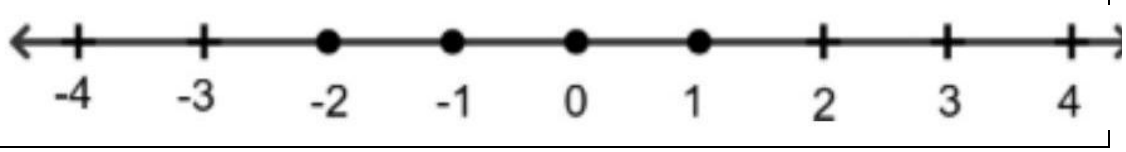
Explanation:

$\therefore$ The order of matrix $A = 1 \times 2$
$\therefore$ The order of matrix $B = 2 \times 1$
The product of two matrices is possible only when the number of columns of the first matrix is equal to the number of rows of the second matrix.

Here,
Number of columns in B = 1
Number of rows in A = 1
$\therefore$ The product BA is possible.
We also know that the resulting matrix has the same number of rows as the first matrix and the same number of columns as the second matrix.
$\therefore$ The order of matrix $BA = 2 \times 2$.
Hence, the Assertion is true.
However, the Reason states that the product BA is possible only if the number of

	rows in matrix B is equal to the number of columns in matrix A, which is incorrect. Therefore, the Assertion is true but the Reason is false. **10. (a) Both A and R are true and R is the correct explanation of A .** **Explanation:** We have, $A = [3 \quad -2]$ and $B = \begin{bmatrix} -1 & 4 \\ 2 & 0 \end{bmatrix}$ The order of matrix A is 1×2 and the order of matrix B is 2×2. Here, the number of columns in matrix A is equal to the number of rows in matrix B. Therefore, their product AB is possible. Hence, both A and R are true and R is the correct reason for A.
	LINEAR INEQUATIONS
1	If $x \in I$, then the solution set of the inequation $1 < 3x + 5 \leq 11$ is: a) $\left\{x: x \in R, -\frac{4}{3} < x \leq 2\right\}$ b) $\{-2, -1, 0, 1\}$ c) $\{-1, 0, 1, 2\}$ d) $\{-1, 0, 1\}$
2	Graphical representation of following inequation on the number line is $\{x: -3 < x < 2, x \in \text{I}\}$ a)  b)  c)  d) 
3	If x is a negative integer, then the solution set of $3 + 2(x + 1) > -1$ is: a) $\{-4, -3, -2, -1\}$ b) $\{-3, -2, -1\}$ c) $\{-2, -1\}$ d) $\{-1\}$
4	If $-3 \leq -4x + 5$ and $x \in W$, then the solution set is a) $\{0,1,2\}$ b) $\{2,34,5\}$ c) $\{1,2\}$ d) $\{\ldots -3, -2, -1, 0, 1, 2, 3, \ldots\}$
5	The solution set for the inequation $x - 3 \geq -5, x \in R$ is

	a) $\{x: x \leq -2, x \in R\}$ b) $\{x: x > -2, x \in R\}$ c) $\{-2, -1, 0, 1, 2\}$ d) $\{x: x \geq -2, x \in R\}$
6	What is the solution set for the inequation represented by the following number line?  a) $\{x \in R: -3 \leq x < 4\}$ b) $\{x \in R: -3 \leq x \leq 4\}$ c) $\{x \in R: -3 < x < 4\}$ d) $\{x \in R: -3 < x \leq 4\}$
7	The largest value of$x$ for which $3(x-2) \leq 6 - x$, where $x \in W$, is: a) 3 b) 2 c) 6 d) 4
8	**Assertion (A):** If a < b, c < 0, then $\frac{a}{c} < \frac{b}{c}$. **Reason (R):** If both sides are divided by the same negative quantity, then the inequality is reversed. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.
9	$-\frac{3}{2} \leq -\frac{2x}{3} where x \in R$. **Assertion (A):** The largest value of x is $\frac{9}{4}$. **Reason (R):** When the signs of both the sides of an inequalities are changed, the sign of inequality reverses. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.
10	Inequation$5 - 2x \geq x - 10$, where $x \in N$ (Natural numbers) **Assertion (A):** $5 - 2x \geq x - 10 \Rightarrow -3x \geq -15 \Rightarrow x \geq 5$ $\therefore$ Solution set $= \{5,6,7,8, \ldots \ldots \ldots\}$ **Reason (R):** $5 - 2x \geq x - 10 \Rightarrow 5 + 10 \geq 3x \Rightarrow x \leq 5$ $\therefore$ Solution set $= \{1,2,3,4,5\}$ a) Both A and R are true and R is the correct explanation of A.

	b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.
11	**Assertion (A):** The common solution set of $3x + 6 \geq 9$ and $-5x > -15, x \in R$ on the number line is  **Reason (R):** On the number line, the dark circle marks the end of a range involving an equality as well as i.e. $\leq$ or $\geq$ and blank circle marks the end of range with a strict inequality i.e. < or >. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.
	ANSWERS
	1.(c) $\{-\mathbf{1}, \mathbf{0}, \mathbf{1}, \mathbf{2}\}$ **Explanation:** $x \in I$ Given, $1 < 3x + 5 \leq 11$ Solving left side, $\Rightarrow 1 < 3x + 5$ $\Rightarrow 1 - 5 < 3x$ $\Rightarrow -4 < 3x$ $\Rightarrow 3x > -4$ $\Rightarrow x > -\frac{4}{3}$ Solving right side, $3x + 5 \leq 11$ $\Rightarrow 3x \leq 11 - 5$ $\Rightarrow 3x \leq 6$ $\Rightarrow x \leq 2$ $\therefore -\frac{4}{3} < x \leq 2$ Solution set $= \{-1,0,1,2\}$. **2. (a)** 

Explanation:

For $-3 < x < 2$ and $x \in I$
Solution set $= \{-2, -1, 0, 1\}$

3.(c) $\{\mathbf{-2}, \mathbf{-1}\}$

Explanation:

Given,
$\Rightarrow 3 + 2(x + 1) > -1$
$\Rightarrow 3 + 2x + 2 > -1$
$\Rightarrow 2x + 5 > -1$
$\Rightarrow 2x > -1 - 5$
$\Rightarrow 2x > -6$
Dividing 2 on both sides we get,
$\Rightarrow x > -3$
Since, x is a negative integer
$\Rightarrow$ Solution set $= \{-2, -1\}$

4. (a) $\{\mathbf{0}, \mathbf{1}, \mathbf{2}\}$

Explanation:

Given, $-3 \leq -4x + 5, x \in W$
$\Rightarrow -3 + 3 \leq -4x + 5 + 3$ [adding 3 both sides]
$\Rightarrow 0 + 4x \leq -4x + 8 + 4x$ [adding $4x$ both sides]
$\Rightarrow 4x \leq 8 \Rightarrow x \leq 2$ [dividing both sides by 4]
$\because x \in W$
$\therefore x \in \{0,1,2\}$
$\therefore$ The solution set is $\{0,1,2\}$.

5.(d) $\{\boldsymbol{x}: \boldsymbol{x} \geq \mathbf{-2}, \boldsymbol{x} \in \boldsymbol{R}\}$

Explanation:

Given, $x - 3 \geq -5, x \in R$
$\Rightarrow x - 3 + 3 \geq -5 + 3, x \in R$ [adding 3 both sides]
$\Rightarrow x \geq -2, x \in R$
So, the solution set is $\{x: x \geq -2, x \in R\}$.

6.(d) $\{\boldsymbol{x} \in \boldsymbol{R}: \mathbf{-3} < \boldsymbol{x} \leq \mathbf{4}\}$

Explanation:

The number line represents a solution set $= \{x \in R: -3 < x \leq 4\}$

7. (a) 3

Explanation:

Given,

$\Rightarrow 3x - 6 \leq 6 - x$
$\Rightarrow 3x + x \leq 6 + 6$
$\Rightarrow 4x \leq 12$
$\Rightarrow x \leq \frac{12}{4}$
$\Rightarrow x \leq 3$
So, the largest whole number value of $x = 3$.

8.(d) *A* is false but *R* is true.

Explanation:

Assertion is false, Reason is true because if $a < b, c < 0$, then $\frac{a}{c} > \frac{b}{c}$.

9. (a) Both A and R are true and R is the correct explanation of A .

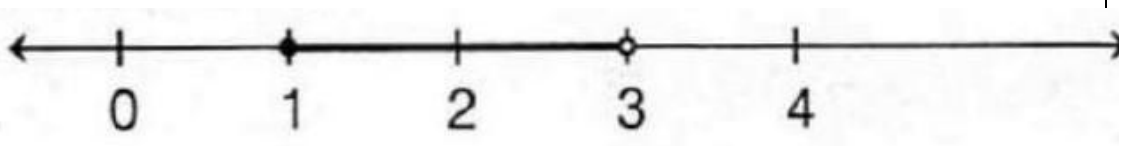
Explanation:

According to the assertion:
$\Rightarrow -\frac{3}{2} \leq -\frac{2x}{3}$
$\Rightarrow \frac{3}{2} \geq \frac{2x}{3}$
$\Rightarrow x \leq \frac{3 \times 3}{2 \times 2}$
$\Rightarrow x \leq \frac{9}{4}$
So, Assertion (A) is true.
According to the reason:
When you multiply or divide both sides of an inequality by a negative number, the direction of the inequality sign must be reversed to maintain the validity of the inequality
So, Reason (R) is true.

10.(d) *A* is false but *R* is true.

Explanation:

According to Assertion: $5 - 2x \geq x - 10$
$\Rightarrow 5 - 2x + 10 \geq x$
$\Rightarrow -2x + 15 \geq x$
$\Rightarrow 15 \geq x + 2x$
$\Rightarrow 15 \geq 3x$
$\Rightarrow x \leq \frac{15}{3}$
$\Rightarrow x \leq 5$
$\therefore$ Solution set $= \{1,2,3,4,5\}$
So, Assertion (A) is false.
According to Reason:
Solution set $= \{1,2,3,4,5\}$

	So, Reason (R) is true. Hence, A is false, R is true. **11. (a) Both A and R are true and R is the correct explanation of A .** **Explanation:** Given, $3x + 6 \geq 9$ and $-5x > -15$ Now, $3x + 6 \geq 9$ $\Rightarrow 3x + 6 - 6 \geq 9 - 6$ [subtracting 6 from both sides] $\Rightarrow 3x \geq 3$ $\Rightarrow x \geq 1$ ... (i) [dividing both sides by 3] Also, $-5x > -15$ $x < 3$ ... (ii) [dividing both sides by -5] From Eqs. (i) and (ii), we get $1 \leq x < 3$ $\therefore$ Solution set is $\{x: 1 \leq x < 3, x \in R\}$. On number line,  Hence, both A and R are true and R is the correct reason for A .