Exercise 1.6

Multiple choice questions

1. If $n(A \times B) = 6$ and $A = \{1,3\}$ then $n(B)$ is

   (A) 1 (B) 2 (C) 3 (D) 6

2. $A = \{a,b,p\}$, $B = \{2,3\}$, $C = \{p,q,r,s\}$ then $n[(A \cup C) \times B]$ is

   (A) 8 (B) 20 (C) 12 (D) 16

3. If $A = \{1,2\}$, $B = \{1,2,3,4\}$, $C = \{5,6\}$ and $D = \{5, 6, 7, 8\}$ then state which of the following statement is true.

   (A) $(A \times C) \subset (B \times D)$ (B) $(B \times D) \subset (A \times C)$

   (C) $(A \times B) \subset (A \times D)$ (D) $(D \times A) \subset (B \times A)$

4. If there are 1024 relations from a set $A = \{1, 2, 3, 4, 5\}$ to a set B, then the number of elements in B is

   (A) 3 (B) 2 (C) 4 (D) 8

5. The range of the relation $R = \{(x,x^2) \mid x$ is a prime number less than 13$\}$ is

   (A) $\{2,3,5,7\}$ (B) $\{2,3,5,7,11\}$

   (C) $\{4,9,25,49,121\}$ (D) $\{1,4,9,25,49,121\}$

6. If the ordered pairs $(a+2,4)$ and $(5,2a+b)$ are equal then (a,b) is

   (A) (2, –2) (B) (5,1) (C) (2,3) (D) (3, –2)

7. Let $n(A) = m$ and $n(B) = n$ then the total number of non-empty relations that can be defined from A to B is

   (A) m^n (B) n^m (C) $2^{mn} - 1$ (D) 2^{mn}

8. If $\{(a,8),(6,b)\}$ represents an identity function, then the value of a and b are respectively

   (A) (8,6) (B) (8,8) (C) (6,8) (D) (6,6)

9. Let $A=\{1,2,3,4\}$ and $B=\{4,8,9,10\}$. A function $f: A \to B$ given by $f=\{(1,4),(2,8),(3,9),(4,10)\}$ is a

(A) Many-one function (B) Identity function
(C) One-to-one function (D) Into function

10. If $f(x)=2x^2$ and $g(x)=\frac{1}{3x}$, then $f \circ g$ is

(A) $\frac{3}{2x^2}$ (B) $\frac{2}{3x^2}$ (C) $\frac{2}{9x^2}$ (D) $\frac{1}{6x^2}$

11. If $f: A \to B$ is a bijective function and if $n(B)=7$, then $n(A)$ is equal to

(A) 7 (B) 49 (C) 1 (D) 14

12. Let f and g be two functions given by

$f=\{(0,1),(2,0),(3,-4),(4,2),(5,7)\}$

$g=\{(0,2),(1,0),(2,4),(-4,2),(7,0)\}$ then the range of $f \circ g$ is

(A) $\{0,2,3,4,5\}$ (B) $\{-4,1,0,2,7\}$ (C) $\{1,2,3,4,5\}$ (D) $\{0,1,2\}$

13. Let $f(x)=\sqrt{1+x^2}$ then

(A) $f(xy)=f(x).f(y)$ (B) $f(xy) \geq f(x).f(y)$
(C) $f(xy) \leq f(x).f(y)$ (D) None of these

14. If $g=\{(1,1),(2,3),(3,5),(4,7)\}$ is a function given by $g(x)=\alpha x+\beta$ then the values of α and β are

(A) $(-1,2)$ (B)$(2,-1)$ (C) $(-1,-2)$ (D) $(1,2)$

15. $f(x)=(x+1)^3-(x-1)^3$ represents a function which is

(A) linear (B) cubic (C) reciprocal (D) quadratic

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Exercise 2.10

UMQCA

Multiple choice questions

1. Euclid's division lemma states that for positive integers a and b, there exist unique integers q and r such that $a = bq + r$, where r must satisfy.
   (A) $1 < r < b$ (B) $0 < r < b$ (C) $0 \leq r < b$ (D) $0 < r \leq b$
2. Using Euclid's division lemma, if the cube of any positive integer is divided by 9 then the possible remainders are
   (A) 0, 1, 8 (B) 1, 4, 8 (C) 0, 1, 3 (D) 1, 3, 5
3. If the HCF of 65 and 117 is expressible in the form of $65m - 117$, then the value of m is
   (A) 4 (B) 2 (C) 1 (D) 3
4. The sum of the exponents of the prime factors in the prime factorization of 1729 is
   (A) 1 (B) 2 (C) 3 (D) 4
5. The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is
   (A) 2025 (B) 5220 (C) 5025 (D) 2520
6. $7^{4k} \equiv$_____ (mod 100)
   (A) 1 (B) 2 (C) 3 (D) 4
7. Given $F_1 = 1$, $F_2 = 3$ and $F_n = F_{n-1} + F_{n-2}$ then F_6 is
   (A)3 (B)5 (C)8 (D)11
8. The first term of an arithmetic progression is unity and the common difference is 4. Which of the following will be a term of this A.P.
   (A) 4551 (B) 10091 (C) 7881 (D) 13531

9. If 6 times of 6^{th} term of an A.P. is equal to 7 times the 7^{th} term, then the 13^{th} term of the A.P. is

(A) 0 (B) 6 (C) 7 (D) 13

10. An A.P. consists of 31 terms. If its 16^{th} term is m, then the sum of all the terms of this A.P. is

(A) 16 m (B) 62 m (C) 31 m (D) $\frac{31}{2}$ m

11. In an A.P., the first term is 1 and the common difference is 4. How many terms of the A.P. must be taken for their sum to be equal to 120?

(A) 6 (B) 7 (C) 8 (D) 9

12. If $A = 2^{65}$ and $B = 2^{64} + 2^{63} + 2^{62} + \cdots + 2^0$ which of the following is true?

(A) B is 2^{64} more than A (B) A and B are equal

(C) B is larger than A by 1 (D) A is larger than B by 1

13. The next term of the sequence $\frac{3}{16}, \frac{1}{8}, \frac{1}{12}, \frac{1}{18}, \cdots$ is

(A) $\frac{1}{24}$ (B) $\frac{1}{27}$ (C) $\frac{2}{3}$ (D) $\frac{1}{81}$

14. If the sequence $t_1, t_2, t_3, \ldots$ are in A.P. then the sequence $t_6, t_{12}, t_{18}, \ldots$ is

(A) a Geometric Progression (B) an Arithmetic Progression

(C) neither an Arithmetic Progression nor a Geometric Progression

(D) a constant sequence

15. The value of $(1^3 + 2^3 + 3^3 + \cdots + 15^3) - (1 + 2 + 3 + \cdots + 15)$ is

(A) 14400 (B) 14200 (C) 14280 (D) 14520

Exercise 3.20

6ZM3R

Multiple choice questions

1. A system of three linear equations in three variables is inconsistent if their planes

   (A) intersect only at a point (B) intersect in a line

   (C) coincides with each other (D) do not intersect

2. The solution of the system $x + y - 3z = -6$, $-7y + 7z = 7$, $3z = 9$ is

   (A) $x = 1, y = 2, z = 3$ (B) $x = -1, y = 2, z = 3$

   (C) $x = -1, y = -2, z = 3$ (D) $x = 1, y = -2, z = 3$

3. If $(x - 6)$ is the HCF of $x^2 - 2x - 24$ and $x^2 - kx - 6$ then the value of k is

   (A) 3 (B) 5 (C) 6 (D) 8

4. $\frac{3y-3}{y} \div \frac{7y-7}{3y^2}$ is

   (A) $\frac{9y}{7}$ (B) $\frac{9y^3}{(21y-21)}$ (C) $\frac{21y^2-42y+21}{3y^3}$ (D) $\frac{7(y^2-2y+1)}{y^2}$

5. $y^2 + \frac{1}{y^2}$ is not equal to

   (A) $\frac{y^4+1}{y^2}$ (B) $\left(y+\frac{1}{y}\right)^2$ (C) $\left(y-\frac{1}{y}\right)^2+2$ (D) $\left(y+\frac{1}{y}\right)^2-2$

6. $\frac{x}{x^2-25} - \frac{8}{x^2+6x+5}$ gives

   (A) $\frac{x^2-7x+40}{(x-5)(x+5)}$ (B) $\frac{x^2+7x+40}{(x-5)(x+5)(x+1)}$

   (C) $\frac{x^2-7x+40}{(x^2-25)(x+1)}$ (D) $\frac{x^2+10}{(x^2-25)(x+1)}$

7. The square root of $\frac{256x^8y^4z^{10}}{25x^6y^6z^6}$ is equal to

   (A) $\frac{16}{5}\left|\frac{x^2z^4}{y^2}\right|$ (B) $16\left|\frac{y^2}{x^2z^4}\right|$ (C) $\frac{16}{5}\left|\frac{y}{xz^2}\right|$ (D) $\frac{16}{5}\left|\frac{xz^2}{y}\right|$

8. Which of the following should be added to make $x^4 + 64$ a perfect square

   (A) $4x^2$ (B) $16x^2$ (C) $8x^2$ (D) $-8x^2$

9. The solution of $(2x-1)^2 = 9$ is equal to

(A) -1 (B) 2 (C) $-1, 2$ (D) None of these

10. The values of a and b if $4x^4 - 24x^3 + 76x^2 + ax + b$ is a perfect square are

(A) 100,120 (B) 10,12 (C) $-120, 100$ (D) 12,10

11. If the roots of the equation $q^2x^2 + p^2x + r^2 = 0$ are the squares of the roots of the equation $qx^2 + px + r = 0$, then q, p, r are in _____

(A) $A.P$ (B) $G.P$ (C) Both $A.P$ and $G.P$ (D) none of these

12. Graph of a linear equation is a _____

(A) straight line (B) circle (C) parabola (D) hyperbola

13. The number of points of intersection of the quadratic polynomial $x^2 + 4x + 4$ with the X axis is

(A) 0 (B) 1 (C) 0 or 1 (D) 2

14. For the given matrix $A = \begin{pmatrix} 1 & 3 & 5 & 7 \\ 2 & 4 & 6 & 8 \\ 9 & 11 & 13 & 15 \end{pmatrix}$ the order of the matrix A^T is

(A) 2×3 (B) 3×2 (C) 3×4 (D) 4×3

15. If A is a 2×3 matrix and B is a 3×4 matrix, how many columns does AB have

(A) 3 (B) 4 (C) 2 (D) 5

16. If number of columns and rows are not equal in a matrix then it is said to be a

(A) diagonal matrix (B) rectangular matrix

(C) square matrix (D) identity matrix

17. Transpose of a column matrix is

(A) unit matrix (B) diagonal matrix

(C) column matrix (D) row matrix

18. Find the matrix X if $2X + \begin{pmatrix} 1 & 3 \\ 5 & 7 \end{pmatrix} = \begin{pmatrix} 5 & 7 \\ 9 & 5 \end{pmatrix}$

(A) $\begin{pmatrix} -2 & -2 \\ 2 & -1 \end{pmatrix}$ (B) $\begin{pmatrix} 2 & 2 \\ 2 & -1 \end{pmatrix}$ (C) $\begin{pmatrix} 1 & 2 \\ 2 & 2 \end{pmatrix}$ (D) $\begin{pmatrix} 2 & 1 \\ 2 & 2 \end{pmatrix}$

19. Which of the following can be calculated from the given matrices

$$A=\begin{pmatrix}1 & 2\\ 3 & 4\\ 5 & 6\end{pmatrix}, B=\begin{pmatrix}1 & 2 & 3\\ 4 & 5 & 6\\ 7 & 8 & 9\end{pmatrix},$$ (i) A^2 (ii) B^2 (iii) AB (iv) BA

(A) (i) and (ii) only
(B) (ii) and (iii) only
(C) (ii) and (iv) only
(D) all of these

20. If $A=\begin{pmatrix}1 & 2 & 3\\ 3 & 2 & 1\end{pmatrix}$, $B=\begin{pmatrix}1 & 0\\ 2 & -1\\ 0 & 2\end{pmatrix}$ and $C=\begin{pmatrix}0 & 1\\ -2 & 5\end{pmatrix}$. Which of the following statements are correct? (i) $AB+C=\begin{pmatrix}5 & 5\\ 5 & 5\end{pmatrix}$ (ii) $BC=\begin{pmatrix}0 & 1\\ 2 & -3\\ -4 & 10\end{pmatrix}$

(iii) $BA+C=\begin{pmatrix}2 & 5\\ 3 & 0\end{pmatrix}$ (iv) $(AB)C=\begin{pmatrix}-8 & 20\\ -8 & 13\end{pmatrix}$

(A) (i) and (ii) only
(B) (ii) and (iii) only
(C) (iii) and (iv) only
(D) all of these

Exercise 4.5

Multiple choice questions

1. If in triangles ABC and EDF, $\frac{AB}{DE} = \frac{BC}{FD}$ then they will be similar, when

   (A) $\angle B = \angle E$ (B) $\angle A = \angle D$ (C) $\angle B = \angle D$ (D) $\angle A = \angle F$

2. In ΔLMN, $\angle L = 60°$, $\angle M = 50°$. If $\Delta LMN \sim \Delta PQR$ then the value of $\angle R$ is

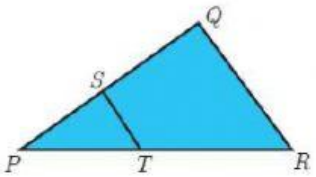
   (A) $40°$ (B) $70°$ (C) $30°$ (D) $110°$

3. If ΔABC is an isosceles triangle with $\angle C = 90°$ and $AC = 5$ cm, then AB is

   (A) 2.5 cm (B) 5 cm (C) 10 cm (D) $5\sqrt{2}$ cm

4. In a given figure $ST \parallel QR$, $PS = 2$ cm and $SQ = 3$ cm. Then the ratio of the area of ΔPQR to the area of ΔPST is

   (A) 25 : 4 (B) 25 : 7
   (C) 25 : 11 (D) 25 : 13



5. The perimeters of two similar triangles ΔABC and ΔPQR are 36 cm and 24 cm respectively. If $PQ = 10$ cm, then the length of AB is

   (A) $6\frac{2}{3}$ cm (B) $\frac{10\sqrt{6}}{3}$ cm (C) $66\frac{2}{3}$ cm (D) 15 cm

6. If in ΔABC, $DE \parallel BC$. $AB = 3.6$ cm, $AC = 2.4$ cm and $AD = 2.1$ cm then the length of AE is

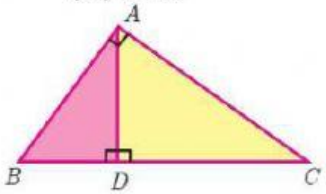
   (A) 1.4 cm (B) 1.8 cm (C) 1.2 cm (D) 1.05 cm

7. In a ΔABC, AD is the bisector of $\angle BAC$. If $AB = 8$ cm, $BD = 6$ cm and $DC = 3$ cm. The length of the side AC is

   (A) 6 cm (B) 4 cm (C) 3 cm (D) 8 cm

8. In the adjacent figure $\angle BAC = 90°$ and $AD \perp BC$ then

   (A) $BD \cdot CD = BC^2$ (B) $AB.AC = BC^2$
   (C) $BD \cdot CD = AD^2$ (D) $AB \cdot AC = AD^2$

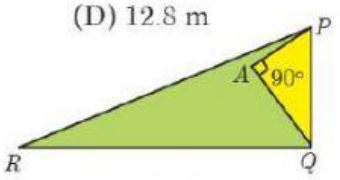


9. Two poles of heights 6 m and 11 m stand vertically on a plane ground. If the distance between their feet is 12 m, what is the distance between their tops?

   (A) 13 m (B) 14 m (C) 15 m (D) 12.8 m

10. In the given figure, $PR = 26$ cm, $QR = 24$ cm, $\angle PAQ = 90°$, $PA = 6$ cm and $QA = 8$ cm. Find $\angle PQR$

    (A) $80°$ (B) $85°$ (C) $75°$ (D) $90°$



11. A tangent is perpendicular to the radius at the

(A) centre (B) point of contact (C) infinity (D) chord

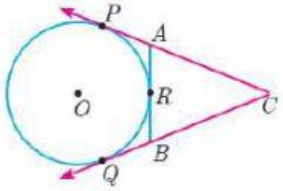
12. How many tangents can be drawn to the circle from an exterior point?

(A) one (B) two (C) infinite (D) zero

13. The two tangents from an external points P to a circle with centre at O are PA and PB. If $\angle APB = 70°$ then the value of $\angle AOB$ is

(A) 100° (B) 110° (C) 120° (D) 130°

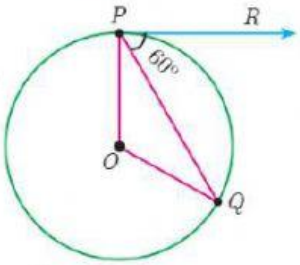
14. In figure CP and CQ are tangents to a circle with centre at O. ARB is another tangent touching the circle at R. If $CP = 11$ cm and $BC = 7$ cm, then the length of BR is



(A) 6 cm (B) 5 cm

(C) 8 cm (D) 4 cm

15. In figure if PR is tangent to the circle at P and O is the centre of the circle, then $\angle POQ$ is



(A) 120° (B) 100°

(C) 110° (D) 90°

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