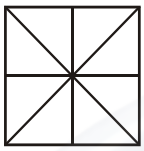
Chapter - 10

FIGURE COUNTING

Answer Key with **Step-by-Step Solutions**
Includes: All MCQs + **Extra PYQs** with Detailed Explanations

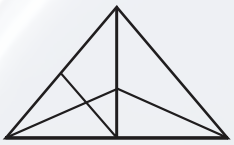
Previous Year Questions

1. How many triangles are there in the following figure?



(a) 16 (b) 14 (c) 8 (d) 12

2. How many triangles are there in the follwing figure?



(a) 32 (b) 13 (c) 24 (d) 48

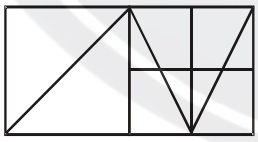
3. How many triangles are there in the following figure?

(a) 10 (b) 11 (c) 12 (d) 13

4. How many triangles are there in the following figures?

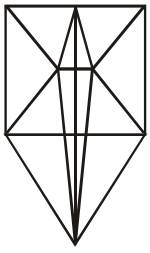
(a) 15 (b) 16 (c) 17 (d) 18

5. How many triangles are there in the following figure?



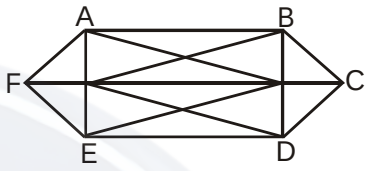
(a) 13 (b) 14 (c) 15 (d) 16

6. How many triangles are there in the following figure?



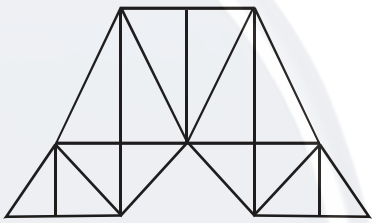
(a) 45 (b) 24 (c) 28 (d) 20

7. In figure A B C D E F how many triangles are there?



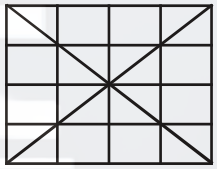
(a) 24 (b) 26 (c) 28 (d) 30

8. How many triangles are there in the following figure?



(a) 27 (b) 23 (c) 29 (d) 36

9. How many triangles are there in ther following figure?



(a) 32 (b) 16 (c) 24 (d) 48

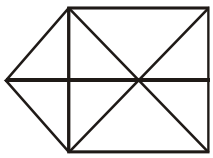
10. How many triangles are there in the following figure?

(a) 13 (b) 15 (c) 17 (d) 20

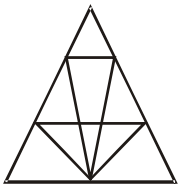
(11 – 15):

11. Find the number of triangles in the given figure.

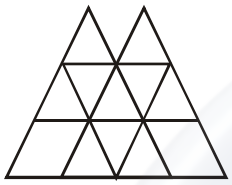
(a) 4 (b) 5 (c) 6 (d) 7

12. 

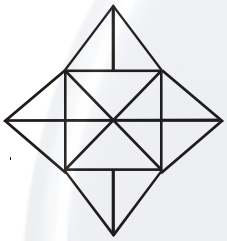
(a) 15 (b) 16 (c) 17 (d) 18

13. 

(a) 12 (b) 18 (c) 22 (d) 26

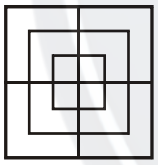
14. 

(a) 16 (b) 18 (c) 14 (d) 15

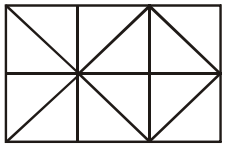
15. 

(a) 18 (b) 20 (c) 28 (d) 34

(16 – 17): In each of the following questions, count the number of squares in the given figure.

16. 

(a) 8 (b) 12 (c) 15 (d) 18

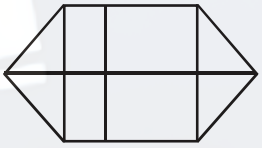
17. 

(a) 6 (b) 7 (c) 9 (d) 10

18. How many triangles and parallelograms are there in the following fugure?

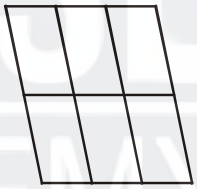
(a) 21, 17 (b) 19, 13 (c) 21, 15 (d) 19, 17

19. How many rectangles are there in the following figure?



(a) 10 (b) 9 (c) 8 (d) 7

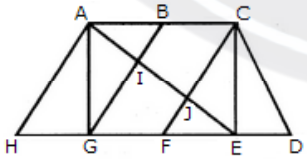
20. Count the number of parallelograms in the given figure.



(a) 20 (b) 18 (c) 16 (d) 12

Practice Set Solutions

1. (d); The figure may be labeled as shown.



The simplest triangles are AHG, AIG, AIB, JFE, CJE and CED i.e. 6 in number.

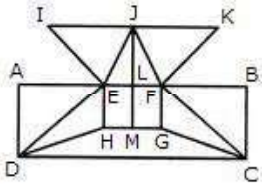
The triangles composed of two components each are ABG, CFE, ACJ and EGI i.e. 4 in number.

The triangles composed of three components each are ACE, AGE and CFD i.e. 3 in number.

There is only one triangle i.e. AHE composed of four components.

Therefore, there are 6 + 4 + 3 + 1 = 14 triangles in the given figure.

2. (b); The figure may be labeled as shown.



The horizontal lines are IK, AB, HG and DC i.e. 4 in number.

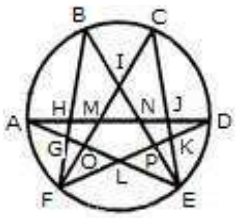
The vertical lines are AD, EH, JM, FG and BC i.e. 5 in number.

The slanting lines are IE, JE, JF, KF, DE, DH, FC

and GC i.e. 8 is number.

Thus, there are 4 + 5 + 8 = 17 straight lines in the figure.

3. (d); The figure may be labeled as shown.



The simplest triangles are AGH, GFO, LFO, DJK, EKP, PEL and IMN i.e. 7 in number.

The triangles having two components each are GFL, KEL, AMO, NDP, BHN, CMJ, NEJ and HFM i.e. 8 in number.

The triangles having three components each are IOE, IFP, BIF and CEI i.e. 4 in number.

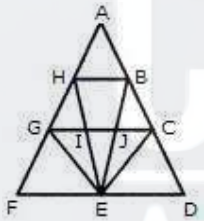
The triangles having four components each are ANE and DMF i.e. 2 in number.

The triangles having five components each are FCK, BGE and ADL i.e. 3 in number.

The triangles having six components each are BPF, COE, DHF and AJE i.e. 4 in number.

Total number of triangles in the figure = 7 + 8 + 4 + 2 + 3 + 4 = 28.

4. (b); The figure may be labeled as shown.



The simplest triangles are AHB, GHI, BJC, GFE, GIE, IJE, CEJ and CDE i.e. 8 in number.

The triangles composed of two components each are HEG, BEC, HBE, JGE and ICE i.e. 5 in number.

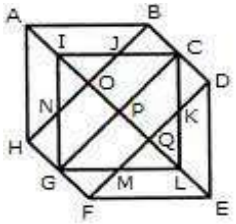
The triangles composed of three components each are FHE, GCE and BED i.e. 3 in number.

There is only one triangle i.e. AGC composed of four components.

There is only one triangle i.e. AFD composed of nine components.

Thus, there are 8 + 5 + 3 + 1 + 1 = 18 triangles in the given figure.

5. (c); The figure may be labeled as shown.



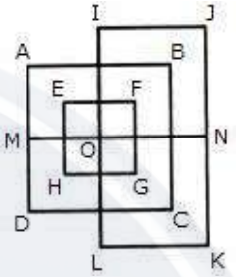
The simplest triangles are IJO, BCJ, CDK, KQL, MLQ, GFM, GHN and NIO i.e. 8 in number.

The triangles composed of two components each are ABO, AHO, NIJ, IGP, ICP, DEQ, FEQ, KLM, LCP and LGP i.e.10 in number.

The triangles composed of four components each are HAB, DEF, LGI, GIC, ICL and GLC i.e. 6 in number.

Total number of triangles in the figure = 8 + 10 + 6 = 24.

6. (a); The figure may be labeled as shown.

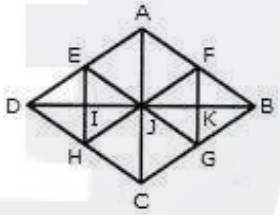


The horizontal lines are IJ, AB, EF, MN, HG, DC and LK i.e. 7 in number.

The vertical lines are AD, EH, IL, FG, BC and JK i.e. 6 in number.

Thus, there are 7 + 6 = 13 straight lines in the figure.

7. (c); The figure may be labeled as shown.



The simplest triangles are AFJ, FJK, FKB, BKG, JKG, JGC, HJC, HIJ, DIH, DEI, EIJ and AEJ i.e. 12 in number.

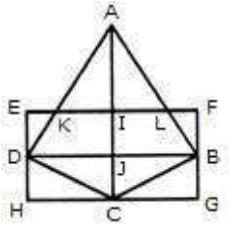
The triangles composed of two components each are JFB, FBG, BJG, JFG, DEJ, EJH, DJH and DEH i.e. 8 in number.

The triangles composed of three components each are AJB, JBC, DJC and ADJ i.e. 4 in number.

The triangles composed of six components each are DAB, ABC, BCD and ADC i.e. 4 in number.

Thus, there are 12 + 8 + 4 + 4 = 28 triangles in the figure.

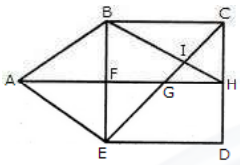
8. (c); The figure may be labeled as shown.



The simplest triangles are AKI, AIL, EKD, LFB, DJC, BJC, DHC and BCG i.e. 8 in number.

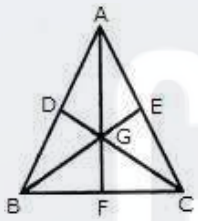
The triangles composed of two components each are AKL, ADJ, AJB and DBC i.e. 4 in number.
The triangles composed of the three components each are ADC and ABC i.e. 2 in number.
There is only one triangle i.e. ADB composed of four components.
Thus, there are 8+ 4 + 2 + 1= 15 triangles in the figure.

9. (d); The figure may be labeled as shown.



The simplest triangles are ABF, BIC, CIH, GIH, FGE and AFE i.e. 6 in number.
The triangles composed of two components each are ABE, AGE, BHF, BCH, CGH and BIE i.e. 6 in number.
The triangles composed of three components each are ABH, BCE and CDE i.e. 3 in number.
Hence, the total number of triangles in the figure = 6 + 6 + 3 = 15.

10. (a); The figure may be labeled as shown.

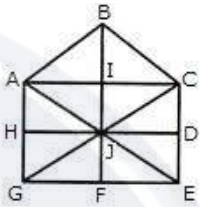


The simplest triangles are AGE, EGC, GFC, BGF, DGB and ADG i.e. 6 in number.
The triangles composed of two components each are AGC, BGC and ABG i.e. 3 in number.
The triangles composed of three components each are AFC, BEC, BDC, ABF, ABE and DAC i.e. 6 in number.
There is only one triangle i.e. ABC composed of six components.
Thus, there are 6 + 3 + 6 + 1 = 16 triangles in the given figure.

11. (d); The figure may be labeled as shown.

The simplest triangles are ABL, BCD, DEF, FGP, PGH, QHI, JQI, KRJ and LRK i.e. 9 in number.
The triangles composed of two components each are OSG, SGQ, SPI, SRI, KSQ, KMS, FGH, JHI and JKL i.e. 9 in number.
There is only one triangle i.e. KSG which is composed of four components.
The triangles composed of five components each are NEI, ANI, MCG and KCO i.e. 4 in number.
The triangles composed of six components each are GMK and KOG i.e. 2 in number.
There is only one triangle i.e. AEI composed of ten components.
There is only one triangle i.e. KCG composed of eleven components.
Therefore, Total number of triangles in the given figure = 9 + 9+1 + 4 + 2+1 + 1 = 27.

12. (c); The figure may be labeled as shown.

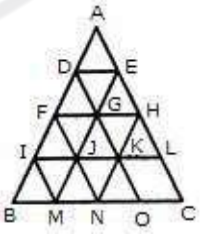


The simplest triangles are ABI, BIC, AIJ, CIJ, AHJ, CDJ, JHG, JDE, GJF and EJF i.e. 10 in number.
The triangles composed of two components each are ABC, BCJ, ACJ, BAJ, AJG, CJE and GJE i.e. 7 in number.
The triangles composed of four components each are ACG, ACE, CGE and AGE i.e. 4 in number.
Total number of triangles in the figure =10+ 7 + 4 = 21.

13. (d); The figure may be labeled as shown.

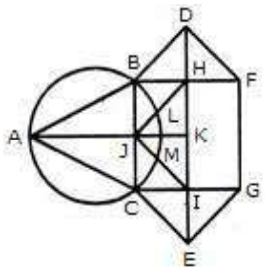
The simplest triangles are AJF, FBG, GCH, HDI and IEJ i.e. 5 in number.
The triangles composed of three components each EBH, AIC, EFC, ADG and BJD i.e. 5 in number.
Thus, there are 5 + 5 = 10 triangles in the figure.

14. (b); The figure may be labeled as shown.



The horizontal lines are DE, FH, IL and BC i.e. 4 in number.
The slanting lines are AC, DO, FN, IM, AB, EM and HN i.e. 7 in number.
Thus, there are 4 + 7 = 11 straight lines in the figure.

15. (c); The figure may be labeled as shown.



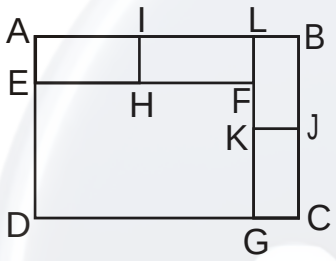
The simplest triangles are ABJ, ACJ, BDH, DHF, CIE and GIE i.e. 6 in number.

The triangles composed of two components each are ABC, BDF, CEG, BHJ, JHK, JKI and CJI i.e. 7 in number.

There is only one triangle JHI which is composed of four components.

Thus, there are 6 + 7 + 1 = 14 triangles in the given figure.

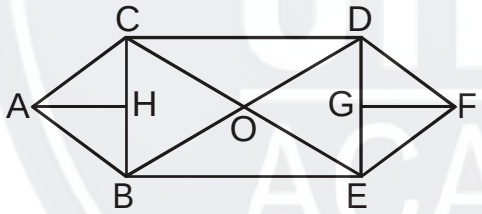
16. (c);



Required rectangles :-

AIHE, ILFH, ALFE, LBJK, JCGK, LBCG, EFGD, ABCD

17. (c); $\rightarrow 14$



Δ's ABC, ACH, ABH, DEF, DGF, GEF

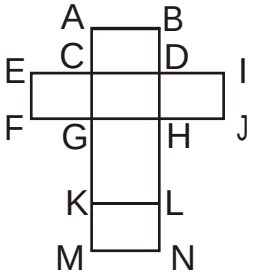
BDE, CDE, BEC, BOE, EOD, DOC

BOC, BDC

18. (d); $\rightarrow 30$

$4^2 + 3^2 + 2^2 + 1^2 = 16 + 9 + 4 + 1 = 30$

19. (b); $\rightarrow 15$



ABCD, ECFG, GCDH, HDIJ, GKLH, KMNL, EFJI, EFHD, GCIJ, ABNM, ABLK, MNDC, ABGH, GHNM, CDLK

20. (c); $\rightarrow 16$

Straight lines : - AC , CE, EG , AG, IK, IO, OM, MK, QS, ST, TV, VQ, BF, HD, GC, AE

Distinct Solutions

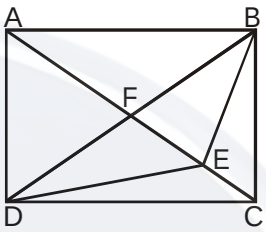
21. (c); AFB, FEB, EBC, DEC, DFE, AFD $\rightarrow 6\ \Delta$'s

AEB, FBC, DFC, ADE, DBE, ABD $\rightarrow 6\ \Delta$'s

ADC and ABC $\rightarrow 2\ \Delta$'s

DBC $\rightarrow 1\ \Delta$

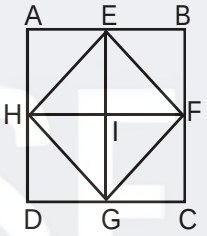
Total = 6 + 6 + 2 + 1 = 15 Δ's



22. (c); AEH, EBF, EFI, FGC, EHI, IFG, DGH, HIG $\rightarrow 8\ \Delta$'s

HEF, EFG, HFG, EHG $\rightarrow 4\ \Delta$'s

Total = 8 + 4 = 12 triangles in the figure.



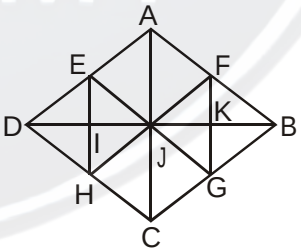
23. (c); AFJ, FJK, FKB, BKG, JKG, JGC, HJC, HIJ, DIH, DEI, EIJ, AEJ $\rightarrow 12\ \Delta$'s

JFB, FBG, BJG, JFG, DEJ, EJH, DJH, DEH $\rightarrow 8\ \Delta$'s

AJB, JBC, DJC, ADJ $\rightarrow 4\ \Delta$'s

DAB, ABC, BCD, ADC $\rightarrow 4\ \Delta$'s

Total = 12 + 8 + 4 + 4 = 28 Δ's



24. (a); GLK, DLJ, DJM, HMN, QRE, IRA, IPA, FPO $\rightarrow 8\ \Delta$'s

BDO, CDQ, DLM, PRA, KFI, NEI, HJI, GJI, DKI and DNI $\rightarrow 10\ \Delta$'s

DIE, DFI, DOA, DQA and GHI $\rightarrow 5\ \Delta$'s

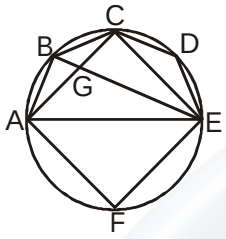
DCA and DBA $\rightarrow 2\ \Delta$'s

DEF $\rightarrow 1\ \Delta$'s

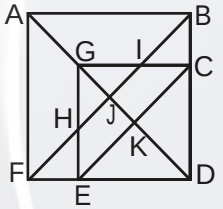
ABC $\rightarrow 1\ \Delta$'s

Total = 8 + 10 + 5 + 2 + 1 + 1 = 27 Δ's

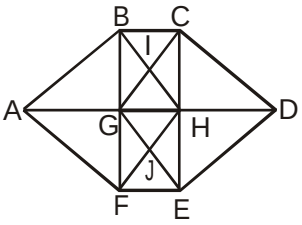
25. (b); ABG, BCG, CGE, CDE, AGE and AEF $\rightarrow$ 6 Δ's
ABE, ABC, BCE and ACE $\rightarrow$ 4 Δ's
$\therefore$ Total = 6 + 4 = 10 Δ's



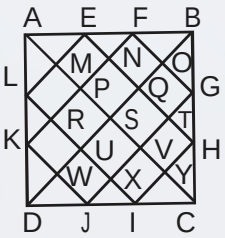
26. (d); EFH, BIC, GHJ, GIJ, EKD and CKD $\rightarrow$ 6 Δ's
ABJ, AFJ, GCK, GEK, CED, GIH $\rightarrow$ 6 Δ's
GCD, GED, DJB, DJF $\rightarrow$ 4 Δ's
ABF and GCE $\rightarrow$ 2 Δ's
ABD and AFD $\rightarrow$ 2 Δ's
FBD $\rightarrow$ 1 Δ
$\therefore$ Total = 6 + 6+ 4 + 2 + 2 + = 21 Δ's



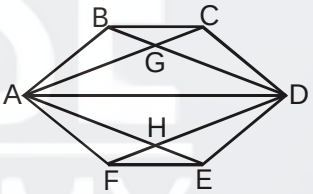
27. (c); ABG, BIG, BIC, CIH, GIH, CDH, HED, GHJ, HJE, FEJ, GFJ and AGF $\rightarrow$ 12 Δ's
ABF, CDE, GBC, BCH, CHG, BHG, GHF, GHE, HEF and GEF. $\rightarrow$ 10 Δ's
ABH, AFH, CDG and GDE. $\rightarrow$ 4 Δ's
BHF, CGE $\rightarrow$ 2 Δ's
Total = 12 + 10 + 4 + 2 = 28 Δ's



28. (c); AML, LRK, KWD, DWJ, JXI, IYC, CYH, HTG, GOB, BOF, FNE and EMA. $\rightarrow$ 12 Δ's
AEL, KDJ, HIC and FBG. $\rightarrow$ 4 Δ's
APF, EQB, BQH, GVC, CVJ, IUD, DUL and KPA $\rightarrow$ 8 Δ's
ASB, BSC, CSD, DSA, AKF, EBH, GCJ, IDL $\rightarrow$ 8 Δ's
ADB, ABC, BCD and CDA $\rightarrow$ 4 Δ's
$\therefore$ Total = 12 +4 + 8 + 8 + 4 = 36 Δ's



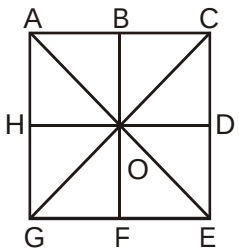
29. (d); ABCD, ABDE, ABDF, ABDH, CDHA, CDEA, CDFA, DEAG, DEFA, FAGD and AGDH.
$\therefore$ The number of quadriaterals in the figure is 11.



30. (d); The pentagons in the figure are ABCDE, ABCDF, ABCDH, ABDEF, CDEFA and DEFAG.
Clearly, there are six pentagons in the figure.

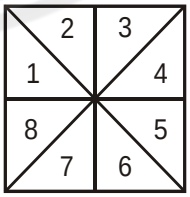
Previous Year Solutions

1. (a);



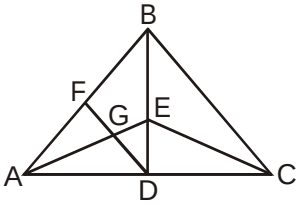
ΔGEC ΔGAC ΔECA ΔEGA ΔGOE
ΔCOE ΔAOC ΔAOG ΔGOF ΔFOE
ΔEOD ΔDOC ΔBOC ΔAOB ΔAOH
ΔHOG

or



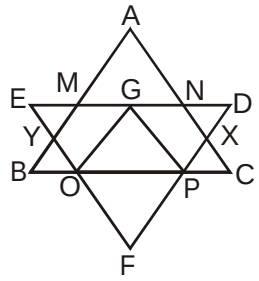
No. of triangles = 8 × 2 = 16

2. (b);



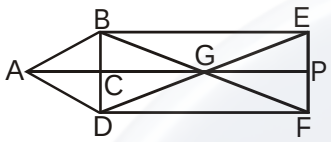
ΔABC ΔABD ΔBDC ΔACE ΔAGD ΔAGF
ΔDEG ΔABE ΔBEC ΔDEC ΔDFB ΔAFD
ΔAED

3. (b);



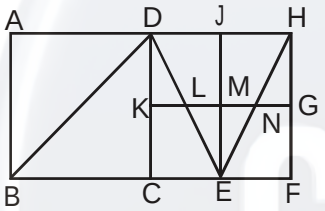
ΔABC ΔEFD ΔGOP ΔMAN ΔEMY ΔBOY
ΔFOP ΔPXC ΔNXD ΔOGE ΔGDP

4. (c);



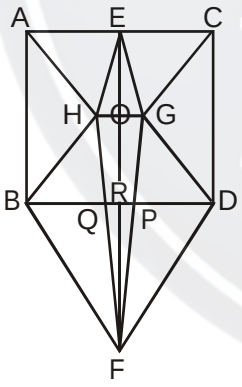
ΔABD ΔABC ΔACD ΔBEF ΔBDF ΔDEF
ΔDEB ΔDGF ΔGFE ΔBEG ΔBGD ΔBCG
ΔDCG ΔEGP ΔPGF ΔABG ΔADG

5. (a);



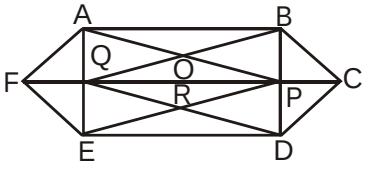
ΔADB ΔBDC ΔBDE ΔDEH ΔDCE ΔDEJ
ΔEJH ΔEHF ΔHNG ΔKDL ΔELN ΔLEM
ΔMNE

6. (c);



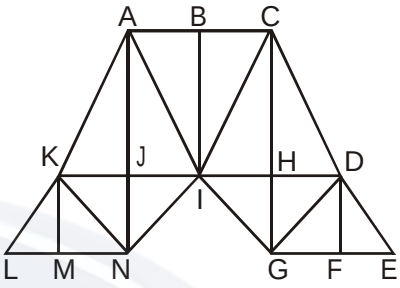
ΔABH ΔDGC ΔHGE ΔHOE ΔOGE ΔHFG
ΔHOF ΔGOF ΔAHE ΔEGC ΔBQH ΔPGD
ΔBFD ΔBRF ΔDRF ΔDPF ΔPFB ΔFQB
ΔFQD ΔFGD ΔBHF ΔBED ΔBER ΔDRE
ΔAEB ΔDEC ΔEFH ΔEFG

7. (c);



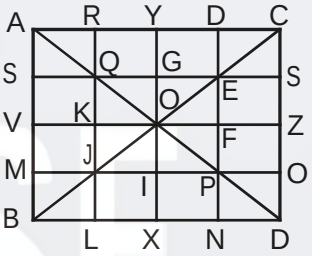
ΔAFE ΔAQF ΔFQE ΔBDC ΔBPC ΔPDC
ΔAQB ΔPQB ΔABP ΔAPQ ΔAOB ΔBOP
ΔPOQ ΔAOQ ΔDPQ ΔDQE ΔEPD ΔDQP
ΔERD ΔDRP ΔPRQ ΔQRE ΔAFP ΔFPE
ΔBQC ΔDQC ΔAEP ΔBDQ

8. (c);



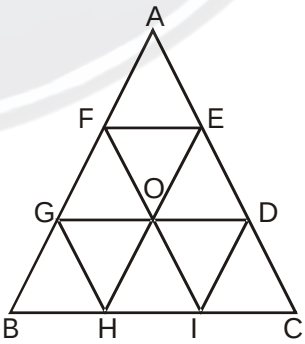
ΔAKI ΔAKJ ΔAJI ΔAIC ΔABI ΔBCI
ΔCID ΔCIH ΔCHD ΔKLN ΔKLM ΔKMN
ΔKNI ΔKJN ΔJNI ΔIGD ΔIHG ΔGHD
ΔGDE ΔGFD ΔFDE ΔANK ΔANI ΔCGI
ΔCGD ΔACN ΔACG ΔALN ΔCGE

9. (d);



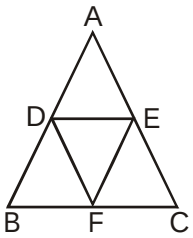
ΔABC ΔBCD ΔACD ΔADB ΔAOB ΔBOD
ΔDOC ΔAOC ΔCSE ΔECD ΔOEF ΔOEG
ΔJIO ΔKOJ ΔJBL ΔJBM ΔAQR ΔASQ
ΔQGO ΔQOK ΔOIP ΔOPF ΔNPD ΔPOD
ΔOJP ΔOEP ΔOEQ ΔOQJ ΔOBX ΔODX
ΔOZC ΔODZ ΔOYC ΔOYA ΔOVA ΔOBV
ΔAMP ΔADP ΔCOJ ΔCRJ ΔBNE ΔBSE
ΔDSQ ΔDLQ ΔEPJ ΔEJQ ΔQPE ΔPQJ

10. (a);



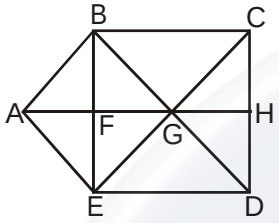
ΔABC ΔAFE ΔGFO ΔGBH ΔGOH ΔHOI
ΔIOD ΔIDC ΔEOD ΔFEO ΔAGD ΔHEC
ΔBFI

11. (b);



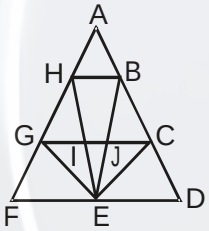
ADE, BDF, DEF and EFC $\rightarrow$ 4 Δ's
ABC $\rightarrow$ 1 Δ
Total = 4 + 1 = 5 Δ's

12. (c);



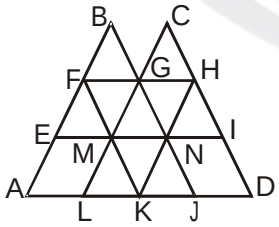
ABF, BFG, BCG, CGH, GHD, GED, EFG and AFE $\rightarrow$ 8 Δ's
ABG, BGE, AGE, ABE and GCD $\rightarrow$ 5 Δ's
BCD, CDE, BED and BCE $\rightarrow$ 4 Δ's
Total = 8 + 5 + 4 = 17 Δ's

13. (b);



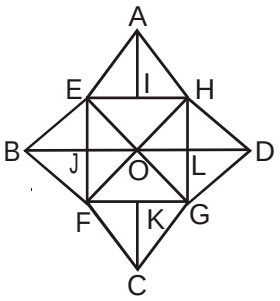
AHB, GHI, BJC, GFE, GIE, IJE, CEJ and CDE $\rightarrow$ 8 Δ's
HEG, BEC, HBE, JGE and ICE $\rightarrow$ 5 Δ's
FHE, GCE and BED $\rightarrow$ 3 Δ's
AGC $\rightarrow$ 1 Δ
AFD $\rightarrow$ 1 Δ
Total = 8 + 5 + 3 + 1 + 1 = 18 Δ's

14. (b);



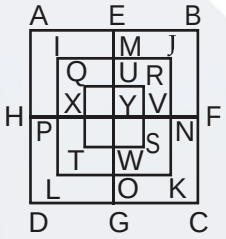
BFG, CGH, EFM, FMG, GMN, GHN, HNI, LMK, MNK and KNJ $\rightarrow$ 10 Δ's
FAK and KHD $\rightarrow$ 2 Δ's
BEN, CMI, GLJ and FHK $\rightarrow$ 4 Δ's
BAJ and CLD $\rightarrow$ 2 Δ's
Total = 10 + 2 + 4 + 2 = 18 Δ's

15. (c);



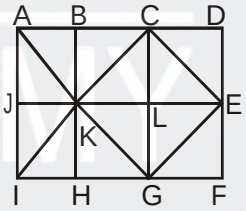
AEI, AIH, BEJ, BJF, CFK, CKG, DGL, DLH, EOJ, FOJ, FOG, LOG, HOL and HOE $\rightarrow$ 14 Δ's
EAH , FBE, BEO, EOF, BFO, FCG, GDH, HOD, HOG, GOD $\rightarrow$ 10 Δ's
EFH, EHG, FGH, EFG $\rightarrow$ 4 Δ's
Total = 14 + 10 + 4 = 28 Δ's

16. (c);



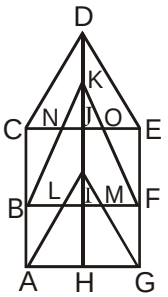
QUYX, URVY, YVSW and XYWT $\rightarrow$ 4 square's
IMYP, MJNY, YNKO and PYOL $\rightarrow$ 4 square's
AEYH, EBFY, YFCG, HYGD $\rightarrow$ 4 square's
IJKL $\rightarrow$ 1 square
QRST $\rightarrow$ 1 square
ABCD $\rightarrow$ 1 square
$\therefore$ Total number of square in the given figure = 4 + + 4 + 4 + 1 + 1 + 1 = 15 square

17. (c);



ABKJ, BCLK, CDEL, LEFG, KLGH and JKHI $\rightarrow$ 6 squares
CEGK $\rightarrow$ 1 square
ACGI and BDFH $\rightarrow$ 2 squares
$\therefore$ Total = 6 + 1 + 2 = 9 squares

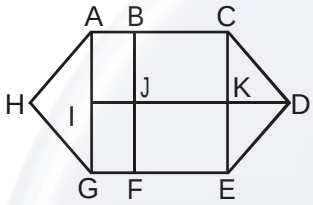
18 (a);



KJN, KJO, CNB, OEF, JIL, JIM, BLA and MFG $\rightarrow$

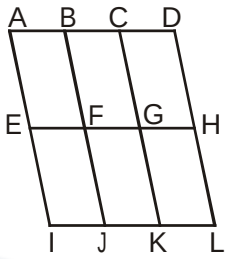
8 Δ's
CDJ, EDJ, NKO, JLM, JAH and JGH → 6 Δ's
BKI, FKI, CJA and EJG → 4 Δ's
CDE and AJG → 2 Δ's
BKF → 1 Δ
Total = 8 + 6 + 4 + 2 + 1 = 21 Δ's
Parallelograms :
NJLB and JOFM → 2 ||gms
CDKB, DEFK, BIHA and IFGH → 4 ||gms
BKJA, KFGJ, CJIB, JEFI → 4 ||gms
BFGA → 1 ||gm
CDJA, DEGJ, CJHA, JEGH → 4 ||gms
CEFB → 1 ||gm
CEGA → 1 ||gm
Total = 2 + 4 + 4 + 1 + 4 + 1 + 1 = 17 ||gms
(Here not that the squares and rectangles are also counted among the parallelograms).

19. (b);



ABJI, BCKJ, IJFG and JKEF → 4
ACKI, BCEF, IKEG and ABFG → 4
ACEG → 1
Total = 4 + 4 + 1 = 9 rectangles in the given figure.

20. (b);



ABFE, BCGF, CDHG, EFJI, FGKJ and GHLK. → 6 ||gms
ACGE, BDHF, EGKI, FHLJ, ABJI, BCKJ and CDLK → 7 ||gms
ADHE and EHLI → 2 ||gms
ACKI, BDLJ → 2 ||gms
ADLI → 1 ||gm
Total = 6 + 7 + 2 + 2 + 1 = 18 parallelograms in the figure.