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Analytical Reasoning

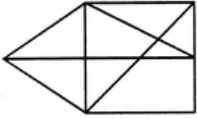


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Q. 1 Find the number of triangles in the given figure.



- [A] 12
- [B] 13
- [C] 14
- [D] 15

Answer Option [D]

Explanation:

The figure may be labelled 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 = $6 + 6 + 3 = 15$.

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Q. 2 Find the number of triangles in the given figure.



- [A] 4
- [B] 5
- [C] 6
- [D] 7

Answer Option [B]

Explanation:

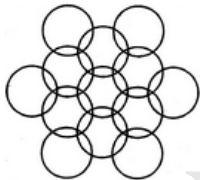
The figure may be labelled as shown.



The simplest triangles are ADE, BDF, DEF and EFC i.e. 4 in number.
There is only one triangle ABC composed of four components.
Thus, there are $4 + 1 = 5$ triangles in the given figure.

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Q. 3 How many circles are there in the adjoining figure.



- [A] 11
- [B] 12
- [C] 13
- [D] 14

Answer Option [C]

Explanation:

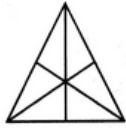
The figure may be labelled as shown.



There are 13 circles in the given figure. This is clear from the adjoining figure in which the centres of all the circles in the given figure have been numbered from 1 to 13.

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Q. 4 Find the number of triangles in the given figure.



- [A] 16
- [B] 13
- [C] 9
- [D] 7

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Answer Option [A]

Explanation:

The figure may be labelled 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.

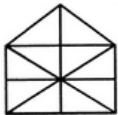
The triangles composed of three components each are AFC, BEC, BDC, ABF, ABE and DAC i.e. 6 in number.

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.

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Q. 5 Find the number of triangles in the given figure.



- [A] 10
- [B] 19
- [C] 21
- [D] 23

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Answer Option [C]

Explanation:

The figure may be labelled as shown.



The simplest triangles are ABI, BIC, AIJ, CIJ, AHJ, CDJ, JHG, JDE, GJF and EJF i.e. 10 in number.

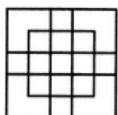
The triangles composed of two components each are ABC, BCJ, ACJ, BAJ, AJG, CJE and GJE i.e. 7 in number.

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 = $10 + 7 + 4 = 21$.

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Q. 6 Count the number of squares in the given figure.



- [A] 18
- [B] 19

[C] 25

[D] 27

Answer Option [D]

Explanation:

The figure may be labelled as shown.



The simplest squares are EFRQ, MQYX, QRZY, RNSZ, LXWK, XYA₁W, YZB₁A₁, ZSTB₁, SGHT, WA₁VP, A₁B₁UV, B₁TOU and VUIJ i.e. 13 in number.

The squares having two components each are AEYL, FBGZ, KA₁JD and B₁HCI i.e. 4 in number.

The squares having four components each are MRB₁W, QNTA₁ XZUP and YSOV i.e. 4 in number.

The squares having seven components each are AFB₁K, EBHA₁ LZID and YGCV i.e. 4 in number.

There is only one square i.e. MNOP composed of nine components.

There is only one square i.e. ABCD composed of seventeen components.

There are $13 + 4 + 4 + 4 + 1 + 1 = 27$ squares in the figure.

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Q. 7 Find the number of triangles in the given figure.



[A] 12

[B] 18

[C] 22

[D] 26

Answer Option [B]

Explanation:

The figure may be labelled 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.

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Q. 8 Find the number of triangles in the given figure.



[A] 11

[B] 13

[C] 15

[D] 17

Answer Option [C]

Explanation:

The figure may be labelled 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.

Q. 9 **Count the number of parallelogram in the given figure.**



- [A] 8
- [B] 11
- [C] 12
- [D] 15

Answer Option [D]

Explanation:

The figure may be labelled as shown.



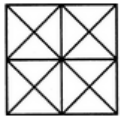
The simplest parallelograms are LMHJ and BDFM i.e. 2 in number. The parallelograms composed of two components each are ABML and MFGH i.e. 2 in number.

The parallelograms composed of three components each are LBHI, LBEF, BDGH, DFLA, BCFH, KLFH, A6HJ and LFGJ i.e. 8 in number.

The parallelograms composed of six components each are LCFI, KBEH and ADGJ i.e. 3 in number.

Total number of parallelograms in the figure = $2 + 2 + 8 + 3 = 15$.

Q. 10 **Count the number of triangles and squares in the given figure.**



- [A] 44 triangles, 10 squares
- [B] 14 triangles, 16 squares
- [C] 27 triangles, 6 squares
- [D] 36 triangles, 9 squares

Answer Option [A]

Explanation:

The figure may be labelled as shown.



Triangles :

The simplest triangles are AEI, EOI, OHI, HAI, EBJ, BFJ, FOJ, OEJ, HOL, OGL, GDL, DHL, OFK, FCK, CGK and GOK i.e. 16 in number.

The triangles composed of two components each are HAE, AEO, EOH, OHA, OEB, EBF, BFO, FOE, DHO, HOG, OGD, GDH, GOF, OFC, FCG and CGO i.e. 16 in number.

The triangles composed of four components each are HEF, EFG, FGH, GHE, ABO, BGO, CDO and DAO i.e. 8 in number.

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

Total number of triangles in the figure = $16 + 16 + 8 + 4 = 44$.

Squares :

The squares composed of two components are HIOL, IEJO, JFKO and KGLO i.e. 4 in number.

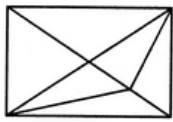
The squares composed of four components are AEOH, EBFO, OFGC and HOGD i.e. 4 in number.

There is only one square EFGH which is composed of eight components.

There is only one square ABCD which is composed of sixteen components.

Total number of squares in the figure = $4 + 4 + 1 + 1 = 10$.

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



- [A] 11
- [B] 13
- [C] 15
- [D] 17

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Answer Option [C]

Explanation:

The figure may be labelled as shown.



The simplest triangles are AFB, FEB, EBC, DEC, DFE and AFD i.e. 6 in number.

The triangles composed of two components each are AEB, FBC, DFC, ADE, DBE and ABD i.e. 6 in number.

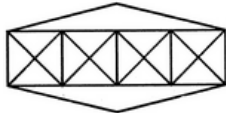
The triangles composed of three components each are ADC and ABC i.e. 2 in number.

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

Thus, there are $6 + 6 + 2 + 1 = 15$ triangles in the figure.

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Q. 12 Count the number of triangles and squares in the given figure.



- [A] 36 triangles, 7 squares
- [B] 38 triangles, 9 squares
- [C] 40 triangles, 7 squares
- [D] 42 triangles, 9 squares

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Answer Option [C]

Explanation:

The figure may be labelled as shown.



Triangles:

The simplest triangles are BGM, GHM, HAM, ABM, GIN, UN, JHN, HGN, IKO, KLO, LJO, JIO, KDP, DEP, ELP, LKP, BCD and AFE i.e. 18 in number.

The triangles composed of two components each are ABG, BGH, GHA, HAB, HGI, GIJ, IJH, JHG, JIK, IKL, KLJ, LJI, LKD, KDE, DEL and ELK i.e. 16 in number.

The triangles composed of four components each are BHI, GJK, ILD, AGJ, HIL and JKE i.e. 6 in number.

Total number of triangles in the figure = $18 + 16 + 6 = 40$.

Squares :

The squares composed of two components each are MGNH, NIOJ and OKPL i.e. 3 in number.

The squares composed of four components each are BGHA, GIJH, IKLJ and KDEL i.e. 4 in number.

Total number of squares in the figure = $3 + 4 = 7$.

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Q. 13 Find the number of triangles in the given figure.



- [A] 21
- [B] 23
- [C] 25
- [D] 27

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Answer Option [D]

Explanation:

The figure may be labelled 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.

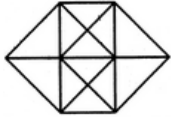
There is only one triangle i.e. AEI composed of ten components.

There is only one triangle i.e. KCG composed of eleven components.

Therefore, Total number of triangles in the given figure = $9 + 9 + 1 + 4 + 2 + 1 + 1 = 27$.

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Q. 14 Find the number of triangles in the given figure.



[A] 20

[B] 24

[C] 28

[D] 32

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Answer Option [C]

Explanation:

The figure may be labelled as shown.



The simplest triangles are ABG, BIG, BIC, CIH, GIH, CDH, HED, GHJ, HJE, FEJ, GFJ and AGF i.e. 12 in number.

The triangles composed of two components each are ABF, CDE, GBC, BCH, GHG, BHG, GHF, GHE, HEF and GEF i.e. 10 in number.

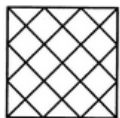
The triangles composed of three components each are ABH, AFH, CDG and GDE i.e. 4 in number.

The triangles composed of four components each are BHF and CGE i.e. 2 in number.

Total number of triangles in the figure = $12 + 10 + 4 + 2 = 28$.

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Q. 15 Find the number of triangles in the given figure.



[A] 28

[B] 32

[C] 36

[D] 40

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Answer Option [C]

Explanation:

The figure may be labelled as shown.



The simplest triangles are AML, LRK, KWD, DWJ, JXI, IYC, CYH, HTG, GOB, BOF, FNE and EMA i.e. 12 in number.

The triangles composed of two components each are AEL, KDJ, HIC and FBG i.e. 4 in number.

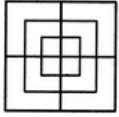
The triangles composed of three components each are APF, EQB, BQH, GVC, CVJ, IUD, DUL and KPA i.e. 8 in number.

The triangles composed of six components each are ASB, BSG, CSD, DSA, AKF, EBH, GGJ and IDL i.e. 8 in number.

The triangles composed of twelve components each are ADB, ABC, BCD and CDA i.e. 4 in number.

Total number of triangles in the figure = $12 + 4 + 8 + 8 + 4 = 36$.

Q. 16 Count the number of squares in the given figure.



- [A] 8
- [B] 12
- [C] 15
- [D] 18

Answer Option [C]

Explanation:

The figure may be labelled as shown.



The simplest squares are QUYX, URVY, YVSW and XYWT i.e. 4 in number.

The squares composed of two components each are IMYP, MJNY, YNKO and PYOL i.e. 4 in number.

The squares composed of three components each are AEYH, EBFY, YFCG and HYG D i.e. 4 in number.

There is only one square i.e. QRST composed of four components.

There is only one square i.e. IJKL composed of eight components.

There is only one square i.e. ABCD composed of twelve components.

Total number of squares in the given figure = $4 + 4 + 4 + 1 + 1 + 1 = 15$.

Q. 17 Find the number of triangles in the given figure.



- [A] 22
- [B] 24
- [C] 26
- [D] 28

Answer Option [D]

Explanation:

The figure may be labelled 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 = $7 + 8 + 4 + 2 + 3 + 4 = 28$.

Q. 18 Find the number of triangles in the given figure.



- [A] 16
- [B] 18
- [C] 14

[D] 15

Answer Option [B]

Explanation:

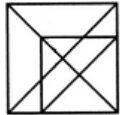
The figure may be labelled as shown.



The simplest triangles are BFG, CGH, EFM, FMG, GMN, GHN, HNI, LMK, MNK and KNJ i.e. 10 in number.
The triangles composed of three components each are FAK and HKD i.e. 2 in number.
The triangles composed of four components each are BEN, CMI, GLJ and FHK i.e. 4 in number.
The triangles composed of eight components each are BAJ and OLD i.e. 2 in number.
Thus, there are $10 + 2 + 4 + 2 = 18$ triangles in the given figure.

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Q. 19 Find the number of triangles in the given figure.



- [A] 16
- [B] 18
- [C] 19
- [D] 21

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Answer Option [D]

Explanation:

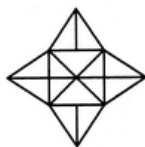
The figure may be labelled as shown.



The simplest triangles are EFH, BIC, GHJ, GIJ, EKD and CKD i.e. 6 in number.
The triangles composed of two components each are ABJ, AFJ, GCK, GEK, CED and GHI i.e. 6 in number.
The triangles composed of three components each are GCD, GED, DJB and DJF i.e. 4 in number.
The triangles composed of four components each are ABF and GCE i.e. 2 in number.
The triangles composed of five components each are ABD and AFD i.e. 2 in number.
There is only one triangle i.e. FBD composed of six components.
Total number of triangles in the figure = $6 + 6 + 4 + 2 + 2 + 1 = 21$.

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Q. 20 Find the number of triangles in the given figure.



- [A] 18
- [B] 20
- [C] 28
- [D] 34

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Answer Option [C]

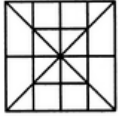
Explanation:

The figure may be labelled as shown.



The simplest triangles are AEI, AIH, BEJ, BJF, CFK, CKG, DGL, DLH, EOJ, FOJ, FOG, LOG, HOL and HOE i.e. 14 in number.
The triangles composed of two components each are EAH, FBE, BEO, EOF, BFO, FCG, GDH, HOD, HOG and GOD i.e. 10 in number.
The triangles composed of three components each are EFH, EHG, FGH and EFG i.e. 4 in number.
Thus, there are $14 + 10 + 4 = 28$ triangles in the given figure.

Q. 21 Count the number of squares in the given figure.



- [A] 13
- [B] 16
- [C] 19
- [D] 20

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Answer Option [B]

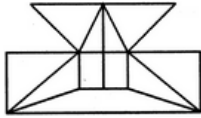
Explanation:

The figure may be labelled as shown.



The simplest squares are BCNM, CDON, PQIJ and QRHI i.e. 4 in number.
 The squares composed of two components each are MNTS, NOU, STQP and TURQ i.e. 4 in number.
 The squares composed of five components each are ACTL, CEFT, TFGI and LTIK i.e. 4 in number.
 The squares composed of six components each are BDUS and SUHJ i.e. 2 in number.
 There is only one square i.e. MORP composed of eight components.
 There is only one square i.e. AEGK composed of twenty components.
 Total number of squares in the figure = 4 + 4 + 4 + 2 + 1 + 1 = 16.

Q. 22 Find the minimum number of straight lines required to make the given figure.



- [A] 16
- [B] 17
- [C] 18
- [D] 19

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Answer Option [B]

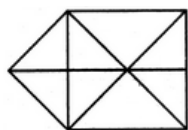
Explanation:

The figure may be labelled 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 in number.
 Thus, there are 4 + 5 + 8 = 17 straight lines in the figure.

Q. 23 Find the number of triangles in the given figure.



- [A] 15
- [B] 16
- [C] 17
- [D] 18

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Answer Option [C]

Explanation:

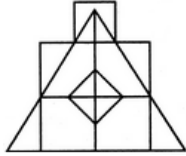
The figure may be labelled as shown.



The simplest triangles are ABF, BFG, BCG, CGH, GHD, GED, EFG and AFE i.e. 8 in number.
The triangles composed of two components each are ABG, BGE, AGE, ABE and GCD i.e. 5 in number.
The triangles composed of three components each are BCD, CDE, BED and BCE i.e. 4 in number.
Thus, there are $8 + 5 + 4 = 17$ triangles in the figure.

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Q. 24 Count the number of triangles and squares in the given figure.



- [A] 21 triangles, 7 squares
- [B] 18 triangles, 8 squares
- [C] 20 triangles, 8 squares
- [D] 22 triangles, 7 squares

Answer Option [A]

Explanation:

The figure may be labelled as shown.



Triangles :

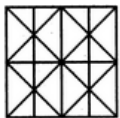
The simplest triangles are BPN, PNE, ABM, EFG, MLK, GHI, QRO, RSO, STO and QTO i.e. 10 in number.
The triangles composed of two components each are BPE, TQR, QRS, RST and STQ i.e. 5 in number.
The triangles composed of three components each are MPO and GPO i.e. 2 in number.
The triangles composed of six components each are LPJ, HPJ and MPG i.e. 3 in number.
There is only one triangle LPH composed of twelve components.
Total number of triangles in the figure = $10 + 5 + 2 + 3 + 1 = 21$.

Squares :

The squares composed of two components each are KJOM and JIGQ i.e. 2 in number.
The squares composed of three components each are ANOM, NFGO and CDEB i.e. 3 in number.
There is only one square i.e. QRST composed of four components.
There is only one square i.e. AFIK composed of ten components.
Total number of squares in the figure = $2 + 3 + 1 + 1 = 7$.

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Q. 25 Find the minimum number of straight lines required to make the given figure.



- [A] 11
- [B] 14
- [C] 16
- [D] 17

Answer Option [B]

Explanation:

The figure may be labelled as shown.



The horizontal lines are AK, BJ, CI, DH and EG i.e. 5 in number.
The vertical lines are AE, LF and KG i.e. 3 in number.
The slanting lines are LC, CF, FI, LI, EK and AG i.e. 6 in number.
Thus, there are $5 + 3 + 6 = 14$ straight lines in the figure.

Q. 26 Count the number of triangles and squares in the given figure.



- [A] 28 triangles, 3 squares
- [B] 24 triangles, 5 squares
- [C] 28 triangles, 5 squares
- [D] 24 triangles, 3 squares

Answer Option [C]

Explanation:

The figure may be labelled as shown.



Triangles :

The simplest triangles are ABI, BGI, GHI, HAI, BCJ, CFJ, FGJ, GBJ, CDK, DEK, EFK and FCK i.e. 12 in number.

The triangles composed of two components each are ABG, BGH, GHA, HAB, BCF, CFG, FGB, GBC, CDE, DEF, EFC and FGD i.e. 12 in number.

The triangles composed of four components each are AGC, BFD, HBF and GCE i.e. 4 in number.

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

Squares :

The squares composed of two components each are BJGI and CKFJ i.e. 2 in number.

The squares composed of four components each are ABGH, BCFG and CDEF i.e. 3 in number.

Total number of squares in the figure = $2 + 3 = 5$.

Q. 27 Find the number of triangles in the given figure.



- [A] 27
- [B] 25
- [C] 23
- [D] 21

Answer Option [A]

Explanation:

The figure may be labelled as shown.



The simplest triangles are GLK, DLJ, DJM, HMN, QRE, IRA, IPA and FPO i.e. 8 in number.

The triangles having two components each are BDO, CDQ, DLM, PRA, KFI, NEI, HJI, GJI, DKI and DNI i.e. 10 in number.

The triangles having four components each are DIE, DFI, DOA, DQA and GHI i.e. 5 in number.

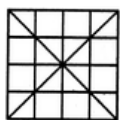
The triangles having six components each are DCA and DBA i.e. 2 in number.

DEF is the only triangle having eight components.

ABC is the only triangle having twelve components.

Thus, there are $8+10+ 5 + 2+1 + 1 = 27$ triangles in the figure.

Q. 28 Find the number of triangles in the given figure.



- [A] 36

[B] 40

[C] 44

[D] 48

Answer Option [D]

Explanation:

The figure may be labelled as shown.



The simplest triangles are APQ, AEQ, QTU, QRU, BGS, BHS, RSU, SUV, TUW, UWX, NWD, WDM, UVY, UXY, JCY and YKC i.e. 16 in number.

The triangles composed of two components each are QUW, QSU, SYU and UWY i.e. 4 in number.

The triangles composed of three components each are AOU, AFU, FBU, BIU, UIC, ULC, ULD and OUD i.e. 8 in number.

The triangles composed of four components each are QYW, QSW, QSY and SYW i.e. 4 in number.

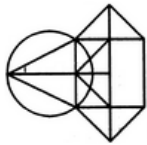
The triangles composed of six components each are AUD, ABU, BUC and DUC i.e. 4 in number.

The triangles composed of seven components each are QMC, ANY, EBW, PSD, CQH, AGY, DSK and BJW i.e. 8 in number.

The triangles composed of twelve components each are ABD, ABC, BCD and ACD i.e. 4 in number.

Thus, there are $16 + 4 + 8 + 4 + 4 + 4 + 8 + 4 = 48$ triangles in the figure.

Q. 29 Find the number of triangles in the given figure.



[A] 10

[B] 12

[C] 14

[D] 16

Answer Option [C]

Explanation:

The figure may be labelled as shown.



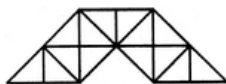
The simplest triangles are ABJ, ACJ, BDH, DHF, CIE and GIE i.e. 6 in number.

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.

Q. 30 Find the number of triangles in the given figure.



[A] 23

[B] 27

[C] 29

[D] 31

Answer Option [C]

Explanation:

The figure may be labelled as shown.



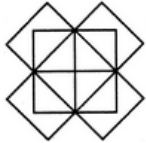
The simplest triangles are AHL, LHG, GHM, HMB, GMF, BMF, BIF, CIF, FNC, CNJ, FNE, NEJ, EKJ and JKD i.e. 14 in number.

The triangles composed of two components each are AGH, BHG, HBF, BFG, HFG, BCF, CJF, CJE, JEF, CFE and JED i.e. 11 in number.

The triangles composed of four components each are ABG, CBG, BCE and CED i.e. 4 in number.
Total number of triangles in the given figure = $14 + 11 + 4 = 29$.

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Q. 31 **Count the number of rectangles in the given figure.**



- [A] 20
- [B] 18
- [C] 16
- [D] 15

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Answer Option [A]

Explanation:

The figure may be labelled as shown.



The rectangles composed of two components each are HIJE, EKJ,F, FMNG, GPQH, AEOH, EBFO, OFCG and HOGD i.e. 8 in number.

The rectangles composed of four components each are ABFH, BCGE, CDHF, DAEG and EFGH i.e. 5 in number.

The rectangles composed of six components each are IJFG, KLGH, MNHE and PQEF i.e. 4 in number.

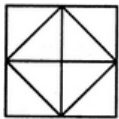
The rectangles composed of eight components each are IJMN, KLPQ and ABCD i.e. 3 in number.

Thus, there are $8 + 5 + 4 + 3 = 20$ rectangles in the given figure.

(Here note that the squares are also counted amongst rectangles)

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Q. 32 **Find the number of triangles in the given figure.**



- [A] 8
- [B] 10
- [C] 12
- [D] 14

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Answer Option [C]

Explanation:

The figure may be labelled as shown.



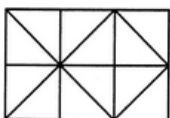
The simplest triangles are AEH, EHI, EBF, EFI, FGC, IFG, DGH and HIG i.e. 8 in number.

The triangles composed of two components each are HEF, EFG, HFG and EFG i.e. 4 in number.

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

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Q. 33 **Count the number of squares in the given figure.**



- [A] 6
- [B] 7

[C] 9

[D] 10

Answer Option [C]

Explanation:

The figure may be labelled as shown.



The squares composed of two components each are ABKJ, BCLK, CDEL, LEFG, KLGH and JKHI i.e. 6 in number.

There is only one square i.e. CEGK composed of four components.

The squares composed of eight components each are ACGI and BDFH i.e. 2 in number.

There are $6 + 1 + 2 = 9$ squares in the figure.

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Q. 34 Find the number of triangles in the given figure.



[A] 8

[B] 10

[C] 11

[D] 12

Answer Option [B]

Explanation:

The figure may be labelled as shown.



The simplest triangles are ABG, BCG, CGE, CDE, AGE and AEF i.e. 6 in number.

The triangles composed of two components each are ABE, ABC, BCE and ACE i.e. 4 in number.

There are $6 + 4 = 10$ triangles in the figure.

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Q. 35 How many triangles and parallelograms are there in the following figure?



[A] 21, 17

[B] 19, 13

[C] 21, 15

[D] 19, 17

Answer Option [A]

Explanation:

The figure may be labelled as shown.



Triangles:

The simplest triangles are KJN, KJO, CNB, OEF, JIL, JIM, BLA and MFG i.e. 8 in number.

The triangles composed of two components each are CDJ, EDJ, NKO, JLM, JAH and JGH i.e. 6 in number.

The triangles composed of three components each are BKI, FKI, CJA and EJG i.e. 4 in number.

The triangles composed of four components each are CDE and AJG i.e. 2 in number.

The only triangle composed of six components is BKF.

Thus, there are $8 + 6 + 4 + 2 + 1 = 21$ triangles in the given figure.

Parallelograms :

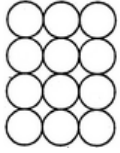
The simplest parallelograms are NJLB and JOFM i.e. 2 in number.

The parallelograms composed of two components each are CDKB, DEFK, BIHA and IFGH i.e. 4 in number.

The parallelograms composed of three components each are BKJA, KFGJ, CJIB and JEFI i.e.4 in number.
 There is only one parallelogram i.e. BFGA composed of four components.
 The parallelograms composed of five components each are CDJA, DEGJ, CJHA and JEGH i.e.4 in number.
 The only parallelogram composed of six components is CEFB.
 The only parallelogram composed of ten components is CEGA.
 Thus, there are $2 + 4 + 4 + 1 + 4 + 1 + 1 = 17$ parallelograms in the given figure.
 (Here note that the squares and rectangles are also counted amongst the parallelograms).

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Q. 36 In the adjoining figure, if the centres of all the circles are joined by horizontal and vertical lines, then find the number of squares that can be formed.



- [A] 6
- [B] 7
- [C] 8
- [D] 1

Answer Option [C]

Explanation:

The figure may be labelled as shown.



We shall join the centres of all the circles by horizontal and vertical lines and then label the resulting figure as shown. The simplest squares are ABED, BCFE, DEHG, EFIH, GHKJ and HILK i.e. 6 in number. The squares composed of four simple squares are ACIG and DFLJ i.e. 2 in number. Thus, $6 + 2 = 8$ squares will be formed.

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Q. 37 What is the number of triangles that can be formed whose vertices are the vertices of an octagon but have only one side common with that of octagon?

- [A] 64
- [B] 32
- [C] 24
- [D] 16

Answer Option [B]

Explanation:



When the triangles are drawn in an octagon with vertices same as those of the octagon and having one side common to that of the octagon, the figure will appear as shown in (Fig. 1).



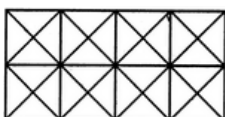
Now, we shall first consider the triangles having only one side AB common with octagon ABCDEFGH and having vertices common with the octagon (See Fig. 2). Such triangles are ABD, ABE, ABF and ABG i.e. 4 in number.



Similarly, the triangles having only one side BC common with the octagon and also having vertices common with the octagon are BCE, BCF, BCG and BCH (as shown in Fig. 3). i.e. There are 4 such triangles. This way, we have 4 triangles for each side of the octagon. Thus, there are $8 \times 4 = 32$ such triangles.

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Q. 38 Count the number of squares in the given figure.



- [A] 11
- [B] 21
- [C] 24
- [D] 26

Answer Option [C]

Explanation:

The figure may be labelled as shown.



The squares composed of two components each are BNQM, CORN, DPSO, MQTL, NRUQ, OSVR, PFWS, QUJT, RVIU and SWHV i.e. 10 in number.

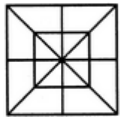
The squares composed of four components each are ABQL, BCRQ, CDSR, DEFS, LQJK, QRIJ, RSHI and SFGH i.e. 8 in number.

The squares composed of eight components each are BRJL, CSIQ and DFHR i.e. 3 in number.

The squares composed of sixteen components each are ACIK, BDHJ and CEGI i.e. 3 in number.

Thus, there are $10 + 8 + 3 + 3 = 24$ squares in the figure.

Q. 39 **Count the number of triangles and squares in the given figure.**



- [A] 28 triangles, 10 squares
- [B] 28 triangles, 8 squares
- [C] 32 triangles, 10 squares
- [D] 32 triangles, 8 squares

Answer Option [C]

Explanation:

The figure may be labelled as shown.



Triangles :

The simplest triangles are IJQ, JKQ, KLQ, LMQ, MNQ, NOQ, OPQ and PIQ i.e. 8 in number. The triangles composed of two components each are ABQ, BCQ, CDQ, DEQ, EFQ, FGQ, GHQ, HAQ, IKQ, KMQ, MOQ and OIQ i.e. 12 in number.

The triangles composed of four components each are ACQ, CEQ, EGQ, GAQ, IKM, KMO, MOI and OIK i.e. 8 in number.

The triangles composed of eight components each are ACE, CEG, EGA and GAC i.e. 4 in number.

Total number of triangles in the figure = $8 + 12 + 8 + 4 = 32$.

Squares :

The squares composed of two components each are IJQP, JKLQ, QLMN and PQNO i.e. 4 in number.

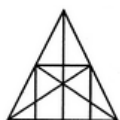
The squares composed of four components each are ABQH, BCDQ, QDEF and HQFG i.e. 4 in number.

There is only one square i.e. IKMO composed of eight components.

There is only one square i.e. ACEG composed of sixteen components.

Thus, there are $4 + 4 + 1 + 1 = 10$ squares in the given figure.

Q. 40 **What is the number of straight lines and the number of triangles in the given figure.**



- [A] 10 straight lines and 34 triangles
- [B] 9 straight lines and 34 triangles
- [C] 9 straight lines and 36 triangles
- [D] 10 straight lines and 36 triangles

Answer Option [C]

Explanation:

The figure may be labelled as shown.



The Horizontal lines are DF and BC i.e. 2 in number.

The Vertical lines are DG, AH and FI i.e. 3 in number.

The Slanting lines are AB, AC, BF and DC i.e. 4 in number.

Thus, there are $2 + 3 + 4 = 9$ straight lines in the figure.

Now, we shall count the number of triangles in the figure.

The simplest triangles are ADE, AEF, DEK, EFK, DJK, FLK, DJB, FLC, BJB and LIC i.e. 10 in number.

The triangles composed of two components each are ADF, AFK, DFK, ADK, DKB, FCK, BKH, KHC, DGB and FIC i.e. 10 in number.

The triangles composed of three components each are DFJ and DFL i.e. 2 in number.

The triangles composed of four components each are ABK, ACK, BFI, CDG, DFB, DFC and BKC i.e. 7 in number.

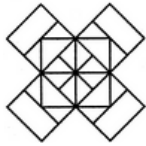
The triangles composed of six components each are ABH, ACH, ABF, ACD, BFC and CDB i.e. 6 in number.

There is only one triangle i.e. ABC composed of twelve components.

There are $10 + 10 + 2 + 7 + 6 + 1 = 36$ triangles in the figure.

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Q. 41 **Count the number of squares in the given figure.**



[A] 22

[B] 20

[C] 18

[D] 14

Answer Option [C]

Explanation:

The figure may be labelled as shown.



The squares composed of two components each are BJMI, CKMJ, DLMK and AIML i.e. 4 in number.

The squares composed of three components each are EBMA, BFCM, MCGD and AMDH i.e. 4 in number.

The squares composed of four components each are VWBA, XYCB, ZA₁DC and B₁C₁AD i.e. 4 in number.

The squares composed of seven components each are NOJL, PQKI, RSLJ and TUIK i.e. 4 in number.

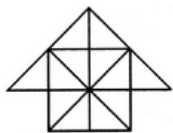
There is only one square i.e. ABCD composed of eight components.

There is only one square i.e. EFGH composed of twelve components.

Total number of squares in the figure = $4 + 4 + 4 + 4 + 1 + 1 = 18$.

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Q. 42 **Count the number of triangles and squares in the given figure.**



[A] 26 triangles, 5 squares

[B] 28 triangles, 5 squares

[C] 26 triangles, 6 squares

[D] 28 triangles, 6 squares

Answer Option [D]

Explanation:

The figure may be labelled as shown.

**Triangles:**

The simplest triangles are JBO, BKO, KDO, DFO, FGO, GHO, HIO, IJO, ABJ, BCK, CKD and DEF i.e. 12 in number.

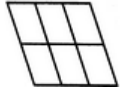
The triangles composed of two components each are IBO, BDO, DGO, GIO, ABO, CDO, CBO, CBD and DEO i.e. 9 in number.

The triangles composed of four components each are IBD, BDG, DGI, GIB, ACO and COE i.e. 6 in number.
 There is only one triangle i.e. ACE composed of eight components.
 Thus, there are $12 + 9 + 6 + 1 = 28$ triangles in the given figure.

Squares:

The squares composed of two components each are BKOJ, KDFO, OFGH and JOHI i.e. 4 in number.
 There is only one square i.e. CDOB composed of four components.
 There is only one square i.e. BDGI composed of eight components.
 Thus, there are $4 + 1 + 1 = 6$ squares in the given figure.

Q. 43 **Count the number of parallelogram in the given figure.**



- [A] 20
- [B] 18
- [C] 16
- [D] 12

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Answer Option [B]

Explanation:

The figure may be labelled as shown.



The simplest ||gms are ABFE, BCGF, CDHG, EFJI, FGKJ and GHLK. These are 6 in number.
 The parallelograms composed of two components each are ACGE, BDHF, EGKI, FHLJ, ABJI, BCKJ and CDLK. Thus, there are 7 such parallelograms.
 The parallelograms composed of three components each are ADHE and EHLI i.e. 2 in number.
 The parallelograms composed of four components each are ACKI and BDLJ i.e. 2 in number
 There is only one parallelogram composed of six components, namely ADLI.
 Thus, there are $6 + 7 + 2 + 2 + 1 = 18$ parallelograms in the figure.

Q. 44 **Count the number of parallelogram in the given figure.**



- [A] 47
- [B] 45
- [C] 41
- [D] 39

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Answer Option [B]

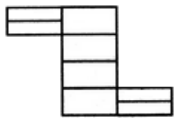
Explanation:

The figure may be labelled as shown.



The parallelograms composed of two components each are ADME, DFNM, EMOG, FHJN, MNKO, GOLI, HBJN, NJKO, OKLI, FHNM, MNOG, DFME, HJKN, NKLO, OLCI, FNOM, MOIG and DMGE. i.e. 18 in number.
 The parallelograms composed of four components each are HOKB, NILJ, FGOH, HOLJ, NICK, FGIN, FMJB, DENH, MGKJ, MGCL, DEIO, FMLK, AENF, AGOD, DMJH, DOKF, EILM and EGKN i.e. 18 in number.
 The parallelograms composed of six components each are AEJH, DAIL, DECL, DEJB, HILB and HICJ i.e. 6 in number.
 The parallelograms composed of eight components each are FGKB, FGCK and AGKF i.e. 3 in number.
 Total number of parallelograms in the figure = $18 + 18 + 6 + 3 = 45$.

Q. 45 **Count the number of rectangles in the given figure.**



- [A] 8
- [B] 17
- [C] 18
- [D] 20

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Answer Option [C]

Explanation:

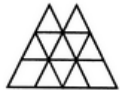
The figure may be labelled as shown.



The simplest rectangles are ABQP, PQNO, BCDN, NDEM, MEFL, LFJK, FGHR and RHIJ i.e. 8 in number.
 The rectangles composed of two components each are ABNO, BCEM, NDFL, MEJK and FGIJ i.e. 5 in number.
 The rectangles composed of three components each are ACDO, BCFL, NDJK and LGIK i.e. 4 in number.
 There is only one rectangle i.e. BCJK composed of four components.
 Total number of rectangles in the figure = $8 + 5 + 4 + 1 = 18$.

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Q. 46 Count the number of parallelogram in the given figure.



- [A] 23
- [B] 22
- [C] 21
- [D] 18

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Answer Option [A]

Explanation:

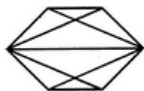
The figure may be labelled as shown.



The simplest parallelograms are EMLA and NIDJ i.e. 2 in number.
 The parallelograms composed of two components each are BFMG, CGNH, GMKN, FGME, GHNM, MNKL, FGNM, GHIN and MNJK i.e. 9 in number.
 The parallelograms composed of three components each are FGLA, ENKA, GHDJ and MIDK i.e. 4 in number.
 The parallelograms composed of four components each are FGJK, GHKL, FBNK, CHKM, EFHN and MFHI i.e. 6 in number.
 The parallelograms composed of seven components each are FHKA and FHDK i.e. 2 in number.
 Total number of parallelograms in the figure = $2 + 9 + 4 + 6 + 2 = 23$.

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Q. 47 Find the number of quadrilaterals in the given figure.



- [A] 6
- [B] 7
- [C] 9
- [D] 11

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Answer Option [D]

Explanation:

The figure may be labelled as shown.



The quadrilaterals in the figure are ABCD, ABDE, ABDF, ABDH, CDHA, CDEA, CDFA, DEAG, DEFA, FAGD and AGDH.
The number of quadrilaterals in the figure is 11.

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Q. 48 **Count the number of convex pentagons in the adjoining figure.**



- [A] 16
- [B] 12
- [C] 8
- [D] 4

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Answer Option [B]

Explanation:

A convex pentagon has no angles pointing inwards. More precisely, no internal angles can be more than 180° .
The figure may be labelled as shown.



The pentagons in the figure, are ABDFH, CDFHB, EFHBD, GHBDF, ACDFG, CEFHA, EGHBC, GABDE, BDEGH, DFGAB, FHACD and HBCEF. Clearly, these are 12 in number.

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Q. 49 **What is the minimum number of colours required to fill the spaces in the given diagram without any two adjacent spaces having the same colour?**



- [A] 6
- [B] 5
- [C] 4
- [D] 3

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Answer Option [D]

Explanation:

The figure may be labelled as shown.



The spaces P, Q and R have to be shaded by three different colours definitely (since each of these three spaces lies adjacent to the other two).

Now, in order that no two adjacent spaces be shaded by the same colour, the spaces T, U and S must be shaded with the colours of the spaces P, Q and R respectively.

Also the spaces X, V and W must be shaded with the colours of the spaces S, T and U respectively i.e. with the colours of the spaces R, P and Q respectively. Thus, minimum three colours are required.

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Q. 50 **Find the number of triangles in the given figure.**



- [A] 5
- [B] 6
- [C] 8

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[D] 10

Answer Option [D]

Explanation:

The figure may be labelled as shown.



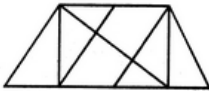
The simplest triangles are AJF, FBG, GCH, HDI and IEJ i.e. 5 in number.

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.

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Q. 51 Find the number of triangles in the given figure.



[A] 8

[B] 10

[C] 12

[D] 14

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Answer Option [D]

Explanation:

The figure may be labelled 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.

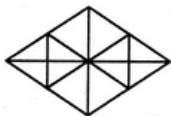
The triangles composed of three components each are ACE, AGE and CFD i.e. 3 in number.

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.

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Q. 52 Find the number of triangles in the given figure.



[A] 16

[B] 22

[C] 28

[D] 32

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Answer Option [C]

Explanation:

The figure may be labelled 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.

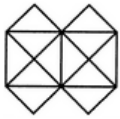
The triangles composed of three components each are AJB, JBC, DJC and ADJ i.e. 4 in number.

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.

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Q. 53 What is the minimum number of straight lines that is needed to construct the figure?



- [A] 11
- [B] 13
- [C] 15
- [D] 21

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Answer Option [B]

Explanation:

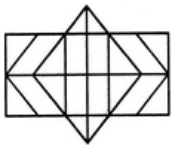
The figure may be labelled as shown.



The horizontal lines are AE and JF i.e. 2 in number. The vertical lines are AJ, CH and EF i.e. 3 in number. The slanting lines are AG, BF, JD, IE, AB, DE, JI and FG i.e. 8 in number. Total number of straight lines needed to construct the figure = $2 + 3 + 8 = 13$.

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Q. 54 Determine the number of rectangles and hexagons in the given figure.



- [A] 30, 5
- [B] 32, 3
- [C] 28, 5
- [D] 30, 3

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Answer Option [A]

Explanation:

The figure may be labelled as shown.



Rectangles:

The simplest rectangles are CVSR, VETS, RSWM and STKW i.e. 4 in number.
 The rectangles composed of two components each are CETR, VEKW, RTKM and CVWM i.e. 4 in number.
 The rectangles composed of three components each are ACRP, PRMO, EGHT and THIK i.e. 4 in number.
 The rectangles composed of four components each are CEKM, AVSP,PSWO, VGHS and SHIW i.e. 5 in number.
 The rectangles composed of five components each are AETP, PTKO, CGHR and RHIM i.e. 4 in number.
 The rectangles composed of six components each are ACMO and EGIK i.e. 2 in number.
 The rectangles composed of eight components each are AGHP, PHIO, AVWO and VGIW i.e. 4 in number.
 The rectangles composed of ten components each are AEKO and CGIM i.e. 2 in number.

AGIO is the only rectangle having sixteen components.

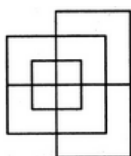
Total number of rectangles in the given figure
 $= 4 + 4 + 4 + 5 + 4 + 2 + 4 + 2 + 1 = 30$.

Hexagons:

The hexagons in the given figure are CDEKLM, CEUKMQ, CFHJMQ, BEUKNP and BFHJNP.
 So, there are 5 hexagons in the given figure.

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Q. 55 Find the minimum number of straight lines required to make the given figure.



- [A] 13
- [B] 15

[C] 17

[D] 19

Answer Option [A]

Explanation:

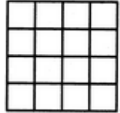
The figure may be labelled as shown.



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.

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Q. 56 Count the number of squares in the given figure.



[A] 32

[B] 30

[C] 29

[D] 28

Answer Option [B]

Explanation:

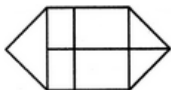
The figure may be labelled as shown.



The simplest squares are ABGF, BCHG, CDIH, DEJI, FGLK, GHML, HINM, IJON, KLQP, LMRQ, MNSR, NOTS, PQVU, QRWV, RSXW and STYX i.e. 16 in number.
The squares composed of four components each are ACMK, BDNL, CEOM, FHRP, GISQ, HJTR, KMWU, LNXV and MOYW i.e. 9 in number.
The squares composed of nine components each are ADSP, BETQ, FIXU and GJYV i.e. 4 in number.
There is one square AEYU composed of sixteen components.
There are $16 + 9 + 4 + 1 = 30$ squares in the given figure.

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Q. 57 How many rectangles are there in the given figure.



[A] 10

[B] 9

[C] 8

[D] 7

Answer Option [B]

Explanation:

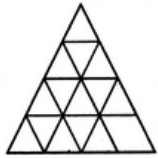
The figure may be labelled as shown.



The simplest rectangles are ABJI, BCKJ, IJFG and JKEF i.e. 4 in number.
The rectangles composed of two components each are ACKI, BCEF, IKEG and ABFG i.e. 4 in number.
The only rectangle composed of four components is ACEG.
Thus, there are $4 + 4 + 1 = 9$ rectangles in the given figure.

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Q. 58 Find the minimum number of straight lines required to make the given figure.



- [A] 9
- [B] 11
- [C] 15
- [D] 16

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Answer Option [B]

Explanation:

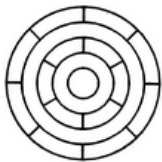
The figure may be labelled as shown.



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.

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Q. 59 What is the minimum number of different colours required to paint the given figure such that no two adjacent regions have the same colour?



- [A] 3
- [B] 4
- [C] 5
- [D] 6

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Answer Option [A]

Explanation:

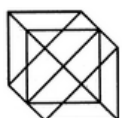
The figure may be labelled as shown.



The regions A, C, E and G can have the same colour say colour 1.
The regions B, D, F and H can have the same colour (but different from colour 1) say colour 2.
The region P lies adjacent to each one of the regions A, B, C, D, E, F, G and H and therefore it should have a different colour say colour 3.
The regions J, L and N can have the same colour (different from colour 3) say colour 1.
The regions K, M and O can have the same colour (different from the colours 1 and 3). Thus, these regions will have colour 2.
The region Q cannot have any of the colours 1 and 2 as it lies adjacent to each one of the regions J, K, L, M, N and O and so it will have colour 3.
The region Q can have any of the colours 1 or 2.
Minimum number of colours required is 3.

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Q. 60 Find the number of triangles in the given figure.



- [A] 18
- [B] 20

[C] 24

[D] 27

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Answer Option [C]

Explanation:

The figure may be labelled 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 = $8 + 10 + 6 = 24$.