Exercise 3:Lines, angles, and triangles

1.

Triangles EFG and JKL are congruent, where E, F, and G correspond to J, K, and L, respectively. The measure of angle E is 45° and the measure of angle F is 20°. What is the measure of angle J?

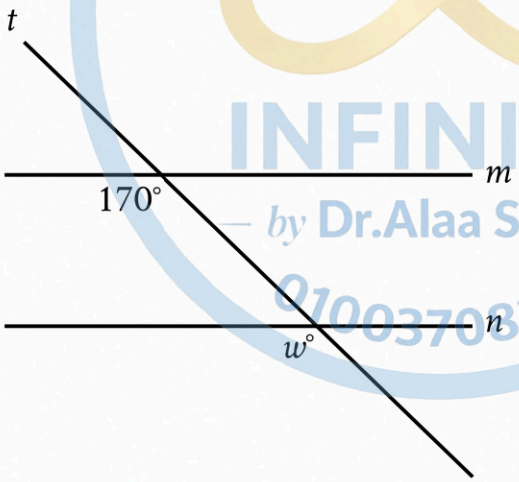
A. 20°

B. 45°

C. 135°

D. 160°

2.



Note: Figure not drawn to scale .

In the figure, line m is parallel to line n. What is the value of w?

A. 17

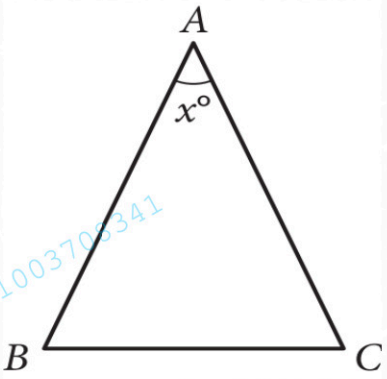
B. 30

C. 70

D. 170

DSAT INFINITY by Dr.Alaa Saber 01003708341
https://math-infinity.tech/

3.



In the given triangle, $AB = AC$ and $\angle ABC$ has a measure of 67°. What is the value of x ?

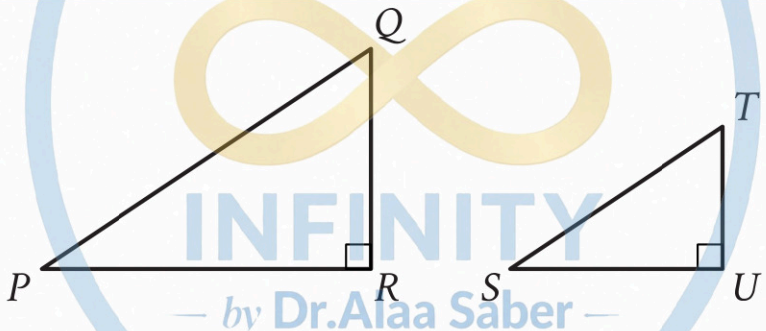
A. 36

B. 46

C. 58

D. 70

4.



Note: Figures not drawn to scale

Right triangles PQR and STU are similar, where P corresponds to S. If the measure of angle Q is 18°, what is the measure of angle S?

A. 18°

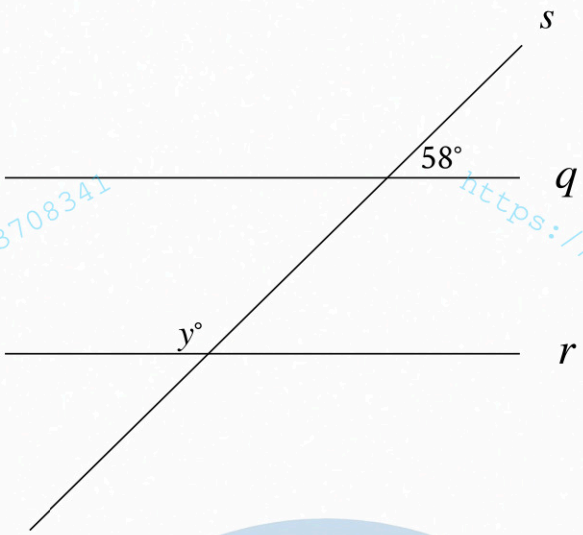
B. 72°

C. 82°

D. 162°

DSAT INFINITY — by Dr.Alaa Saber — 01003708341
Mr:3laa Saber 01003708341
https://math-infinity.tech/

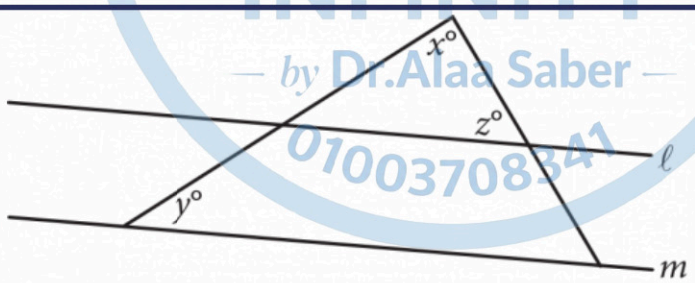
5.



Note: Figure not drawn to scale.

In the figure, line q is parallel to line r, and both lines are intersected by line s. If $y = 2x + 8$, what is the value of x?

6.



Note: Figure not drawn to scale.

In the figure above, lines ℓ and m are parallel, $y = 20$, and $z = 60$. What is the value of x?

A. 120

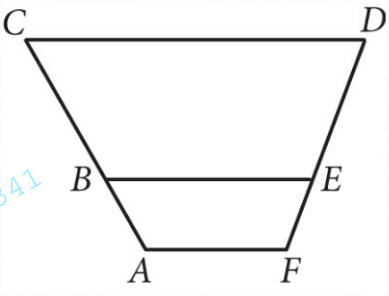
B. 100

C. 90

D. 80

Mr:3laa Saber 01003708341 https://math-infinity.tech/
DSAT INFINITY — by Dr.Alaa Saber — 01003708341

7.



In the figure above, $\overline{AF}$, $\overline{BE}$, and $\overline{CD}$ are parallel. Points B and E lie on $\overline{AC}$ and $\overline{FD}$, respectively. If $AB = 9$, $BC = 18.5$, and $FE = 8.5$, what is the length of $\overline{ED}$, to the nearest tenth?

A. 16.8

B. 17.5

C. 18.4

D. 19.6

8.

In $\triangle XYZ$, the measure of $\angle X$ is 24° and the measure of $\angle Y$ is 98°. What is the measure of $\angle Z$?

A. 58°

B. 74°

C. 122°

D. 212°

DSAT INFINITY — by Dr.Alaa Saber — 01003708341
Mr:3laa Saber 01003708341
https://math-infinity.tech/

9.

Two nearby trees are perpendicular to the ground, which is flat. One of these trees is 10 feet tall and has a shadow that is 5 feet long. At the same time, the shadow of the other tree is 2 feet long. How tall, in feet, is the other tree?

A. 3

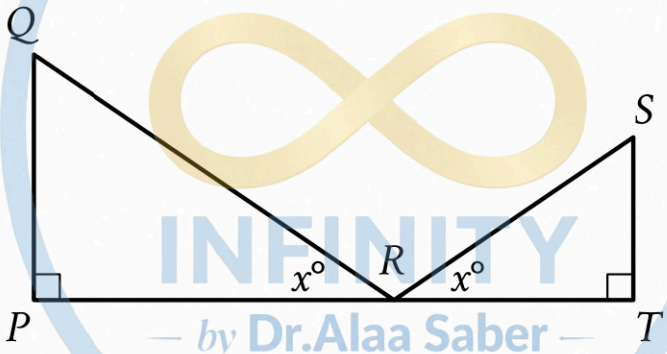
B. 4

C. 8

D. 27

Mr:3laa Saber 01003708341 https://math-infinity.tech/

10.



Note: Figure not drawn to scale.

$\triangle QPR$ is similar to $\triangle STR$. The lengths represented by $\overline{ST}$, $\overline{QP}$, $\overline{PR}$, and $\overline{QR}$ in the figure are 14, 15, 20, and 25, respectively. What is the length of $\overline{SR}$?

A. $\frac{350}{15}$

B. $\frac{350}{20}$

C. $\frac{210}{20}$

D. $\frac{210}{25}$

DSAT INFINITY — by Dr.Alaa Saber — 01003708341
Mr:3laa Saber 01003708341 https://math-infinity.tech/

11.

Triangle ABC is similar to triangle XYZ, where A, B, and C correspond to X, Y, and Z, respectively. In triangle ABC, the length of $\overline{AB}$ is 170 and the length of $\overline{BC}$ is 850. In triangle XYZ, the length of $\overline{YZ}$ is 60. What is the length of $\overline{XY}$?

A. 204

B. 182

C. 60

D. 12

12.

Each side of equilateral triangle S is multiplied by a scale factor of k to create equilateral triangle T. The length of each side of triangle T is greater than the length of each side of triangle S. Which of the following could be the value of k?

A. $\frac{29}{28}$

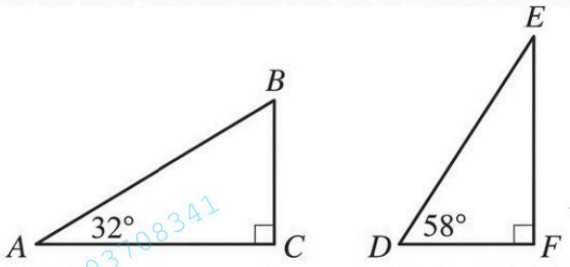
B. 1

C. $\frac{28}{29}$

D. 0

Mr:3laa Saber 01003708341 https://math-infinity.tech/
DSAT INFINITY — by Dr.Alaa Saber — 01003708341
Mr:3laa Saber 01003708341 https://math-infinity.tech/

13.



Triangles ABC and DEF are shown above. Which of the following is equal to the ratio $\frac{BC}{AB}$?

A. $\frac{DE}{DF}$

B. $\frac{DF}{DE}$

C. $\frac{DF}{EF}$

D. $\frac{EF}{DE}$

14.



Note: Figure not drawn to scale.

In the figure shown, triangle CAE is similar to triangle CBD. The measure of angle CBD is 57°, and $AE = 26(BD)$. What is the measure of angle CAE?

A. $(26 \cdot 57)^\circ$

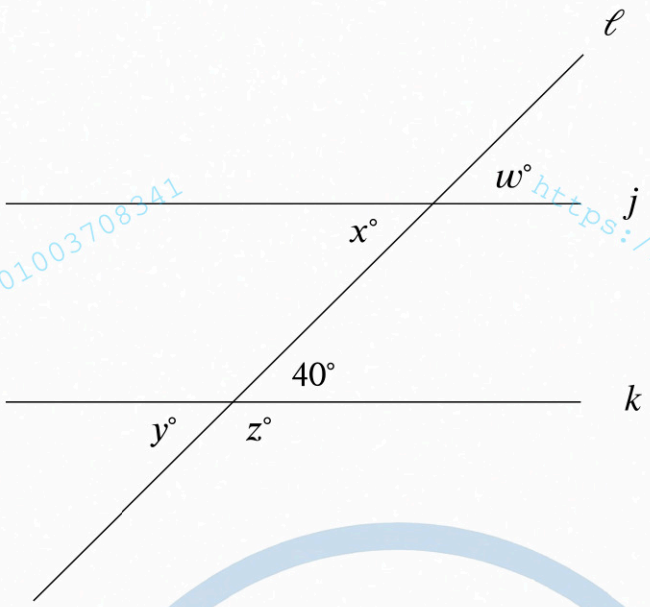
B. $(26 + 57)^\circ$

C. 57°

D. 26°

DSAT INFINITY by Dr.Alaa Saber 01003708341
https://math-infinity.tech/

15.



Note: Figure not drawn to scale.

In the figure shown, line ℓ intersects lines j and k. Which additional piece of information is sufficient to prove that lines j and k are parallel?

A. $w = 40$

B. $x = 140$

C. $y = 40$

D. $z = 140$

16.

In $\triangle XYZ$, the measure of $\angle X$ is 23° and the measure of $\angle Y$ is 66°. What is the measure of $\angle Z$?

A. 43°

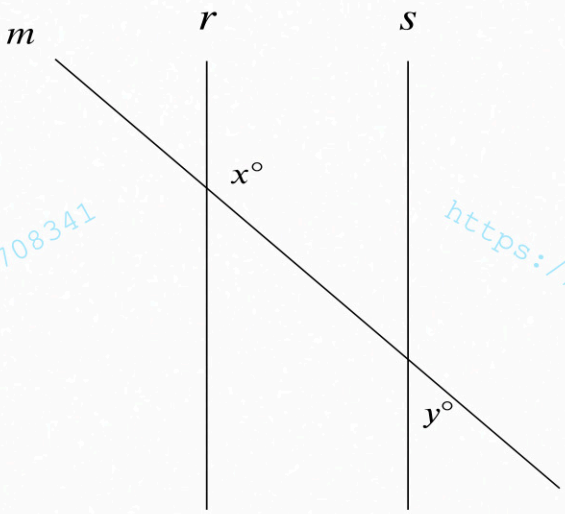
B. 89°

C. 91°

D. 179°

Mr:3laa Saber 01003708341 https://math-infinity.tech/
DSAT INFINITY — by Dr.Alaa Saber — 01003708341

17.



Note: Figure not drawn to scale.

In the figure shown, lines r and s are parallel, and line m intersects both lines. If $y < 65$, which of the following must be true?

A. $x < 115$

B. $x > 115$

C. $x + y < 180$

D. $x + y > 180$

18.

Triangle ABC is similar to triangle XYZ, such that A, B, and C correspond to X, Y, and Z respectively. The length of each side of triangle XYZ is 2 times the length of its corresponding side in triangle ABC. The measure of side AB is 16. What is the measure of side XY?

A. 14

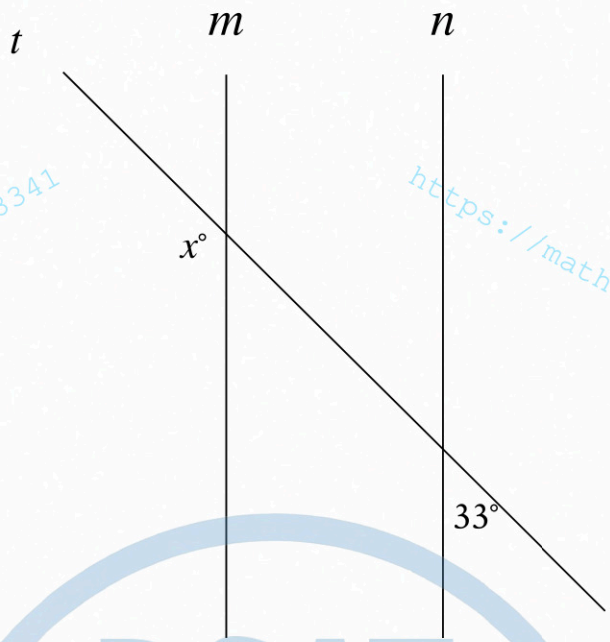
B. 16

C. 18

D. 32

Mr:3laa Saber 01003708341 https://math-infinity.tech/
DSAT INFINITY — by Dr.Alaa Saber — 01003708341

19.



Note: Figure not drawn to scale.

In the figure, line m is parallel to line n, and line t intersects both lines. What is the value of x?

A. 33

B. 57

C. 123

D. 147

20.

In triangle JKL, the measures of $\angle K$ and $\angle L$ are each 48°. What is the measure of $\angle J$, in degrees? (Disregard the degree symbol when entering your answer.)

Mr:3laa Saber 01003708341
https://math-infinity.tech/
DSAT INFINITY — by Dr.Alaa Saber — 01003708341

21.

In triangle DEF, the measure of angle D is 47° and the measure of angle E is 97°. In triangle RST, the measure of angle R is 47° and the measure of angle S is 97°. Which of the following additional pieces of information is needed to determine whether triangle DEF is similar to triangle RST?

A. The measure of angle F

B. The measure of angle T

C. The measure of angle F and the measure of angle T

D. No additional information is needed.

22.

Quadrilateral $P'Q'R'S'$ is similar to quadrilateral $PQRS$, where P, Q, R, and S correspond to P', Q', R', and S', respectively. The measure of angle P is 30°, the measure of angle Q is 50°, and the measure of angle R is 70°. The length of each side of $P'Q'R'S'$ is 3 times the length of each corresponding side of $PQRS$. What is the measure of angle P'?

A. 10°

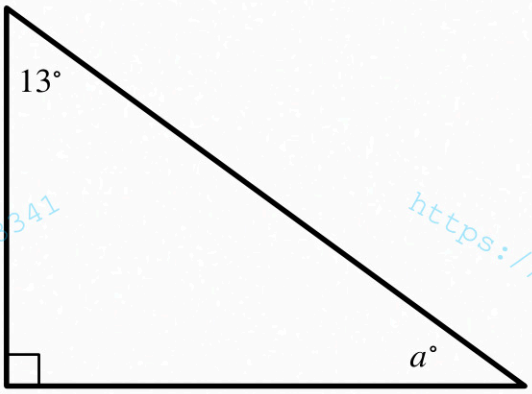
B. 30°

C. 40°

D. 90°

DSAT INFINITY — by Dr.Alaa Saber — 01003708341
Mr:3laa Saber 01003708341
https://math-infinity.tech/

23.



Note: Figure not drawn to scale.

In the right triangle shown, what is the value of a?

A. 13

B. 77

C. 90

D. 103

24.

At a certain time and day, the Washington Monument in Washington, DC, casts a shadow that is 300 feet long. At the same time, a nearby cherry tree casts a shadow that is 16 feet long. Given that the Washington Monument is approximately 555 feet tall, which of the following is closest to the height, in feet, of the cherry tree?

A. 10

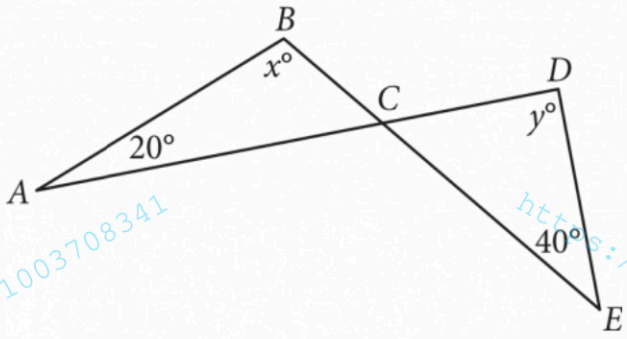
B. 20

C. 30

D. 35

Mr:3laa Saber 01003708341 https://math-infinity.tech/
DSAT INFINITY by Dr. Alaa Saber 01003708341

25.



Note: Figure not drawn to scale.

In the figure above, $\overline{AD}$ intersects $\overline{BE}$ at C. If $x = 100$, what is the value of y ?

A. 100

B. 90

C. 80

D. 60

26.

In triangle ABC, the measure of angle A is $50°$. If triangle ABC is isosceles, which of the following is NOT a possible measure of angle B ?

A. $50°$

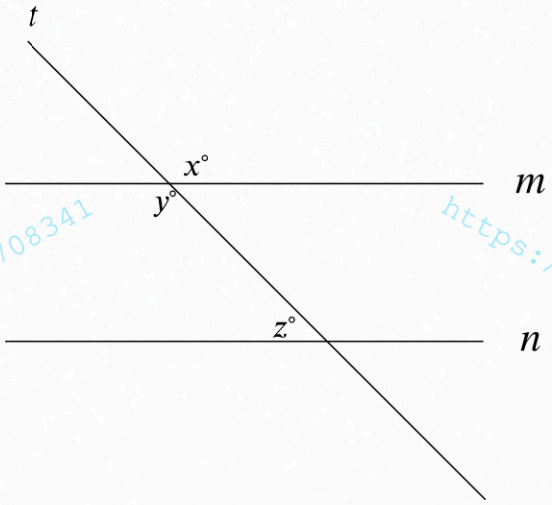
B. $65°$

C. $80°$

D. $100°$

Mr:3laa Saber 01003708341 https://math-infinity.tech/
DSAT INFINITY — by Dr.Alaa Saber — 01003708341

27.



Note: Figure not drawn to scale.

In the figure, lines m and n are parallel. If $x = 6k + 13$ and $y = 8k - 29$, what is the value of z?

A. 3

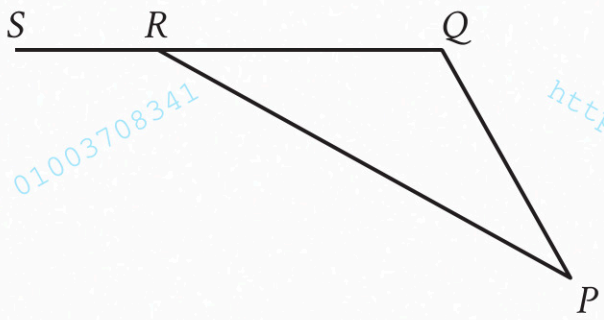
B. 21

C. 41

D. 139

Mr:3laa Saber 01003708341 https://math-infinity.tech/
DSAT INFINITY — by Dr.Alaa Saber — 01003708341
Mr:3laa Saber 01003708341 https://math-infinity.tech/

28.



Note: Figure not drawn to scale

In triangle PQR, $\overline{QR}$ is extended to point S. The measure of $\angle PQR$ is 132°, and the measure of $\angle PRS$ is 163°. What is the measure of $\angle QPR$?

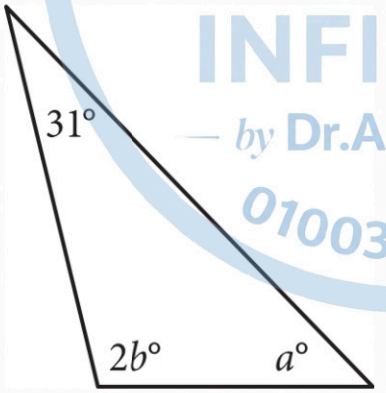
A. 48°

B. 31°

C. 24°

D. 17°

29.



In the triangle above, $a = 45$. What is the value of b ?

A. 52

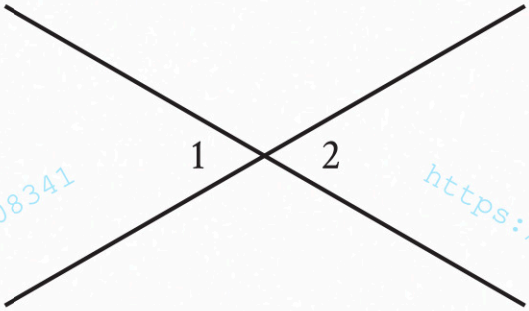
B. 59

C. 76

D. 104

Mr:3laa Saber 01003708341 https://math-infinity.tech/
DSAT INFINITY — by Dr.Alaa Saber — 01003708341

30.



Note: Figure not drawn to scale

In the figure, two lines intersect at a point. Angle 1 and angle 2 are vertical angles. The measure of angle 1 is 72°. What is the measure of angle 2?

A. 72°

B. 108°

C. 144°

D. 288°

31.



Note: Figure not drawn to scale.

In the figure, three lines intersect at point P. If $x = 65$ and $y = 75$, what is the value of z?

A. 140

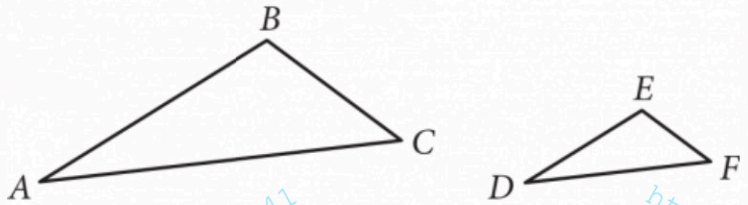
B. 80

C. 40

D. 20

Mr:3laa Saber 01003708341 https://math-infinity.tech/
DSAT INFINITY by Dr.Alaa Saber 01003708341

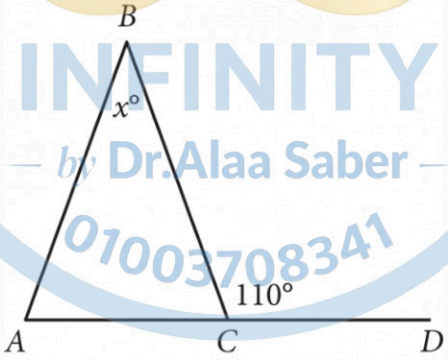
32.



Note: Figures not drawn to scale.

Triangle *ABC* and triangle *DEF* are shown.The relationship between the side lengths of the two triangles is such that $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF} = 3$. If the measure of angle *BAC* is 20°, what is the measure, in degrees, of angle *EDF* ?(Disregard the degree symbol when gridding your answer.)

33.



In the given figure, $\overline{AC}$ extends to point *D*. If the measure of $\angle BAC$ is equal to the measure of $\angle BCA$, what is the value of *x* ?

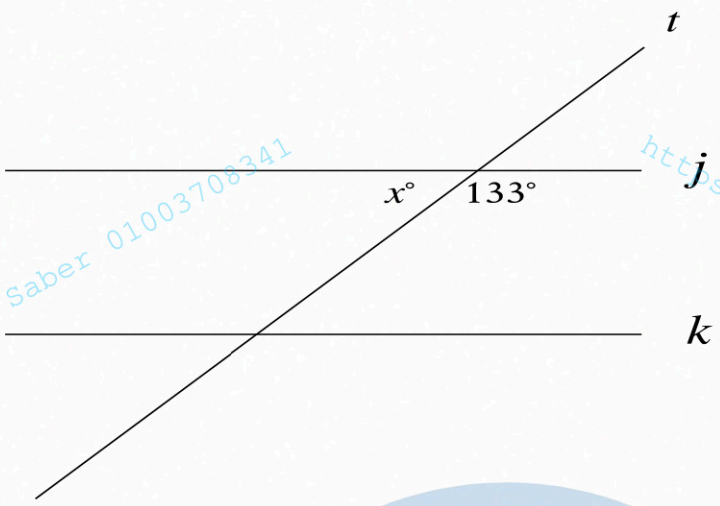
A. 110

B. 70

C. 55

D. 40

34.



Note: Figure not drawn to scale.

In the figure, line j is parallel to line k. What is the value of x?

35.

Triangles ABC and DEF are congruent, where A corresponds to D, and B and E are right angles. The measure of angle A is 69°. What is the measure, in degrees, of angle F?

36.

Triangles ABC and DEF are congruent, where A corresponds to D, and B and E are right angles. The measure of angle A is 18°. What is the measure of angle F?

A. 18°

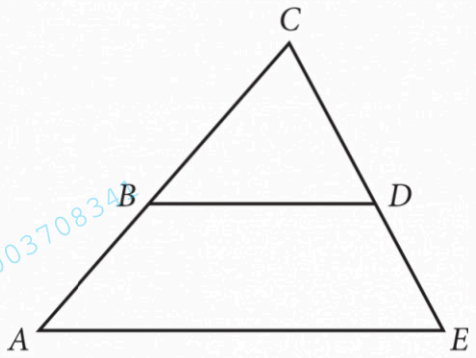
B. 72°

C. 90°

D. 162°

Mr:3laa Saber 01003708341
https://math-infinity.tech/
DSAT INFINITY — by Dr.Alaa Saber — 01003708341

37.



Note: Figure not drawn to scale.

In the figure above, segments *AE* and *BD* are parallel. If angle *BDC* measures 58° and angle *ACE* measures 62°, what is the measure of angle *CAE* ?

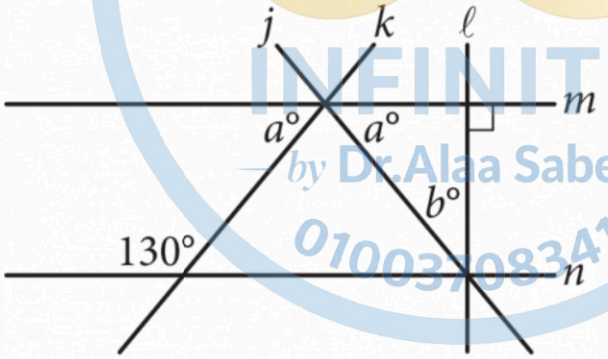
A. 58°

B. 60°

C. 62°

D. 120°

38.



Note: Figure not drawn to scale.

In the figure above, lines *m* and *n* are parallel. What is the value of *b* ?

A. 40

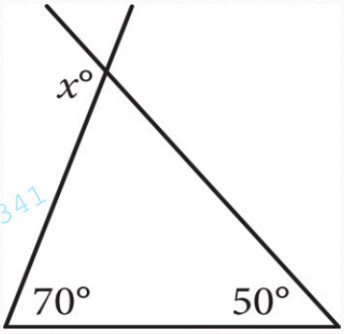
B. 50

C. 65

D. 80

Mr:3laa Saber 01003708341 https://math-infinity.tech/
DSAT INFINITY by Dr.Alaa Saber 01003708341

39.



In the figure above, two sides of a triangle are extended. What is the value of x ?

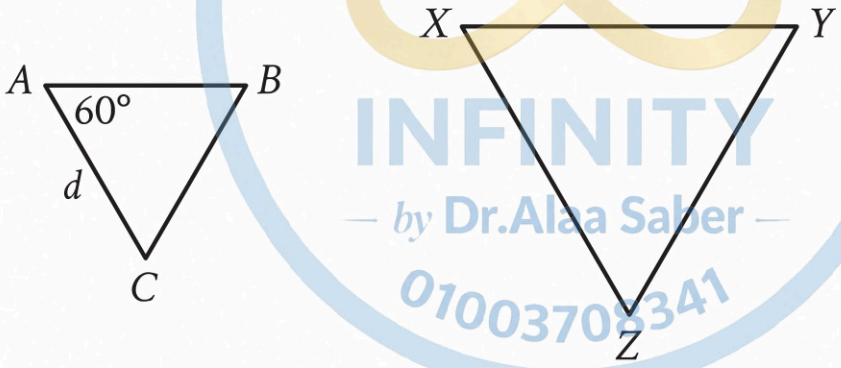
A. 110

B. 120

C. 130

D. 140

40.



Note: Figures not drawn to scale.

For the triangles shown, triangle ABC is dilated by a scale factor of 3 to obtain triangle XYZ, where $d = 16$. What is the measure, in degrees, of angle X?

A. 20

B. 57

C. 60

D. 63

Mr:3laa Saber 01003708341 https://math-infinity.tech/

41.

In triangle ABC, the measure of angle A is 54°, the measure of angle B is 90°, and the measure of angle C is $\left(\frac{k}{2}\right)^\circ$. What is the value of k?

A. 36

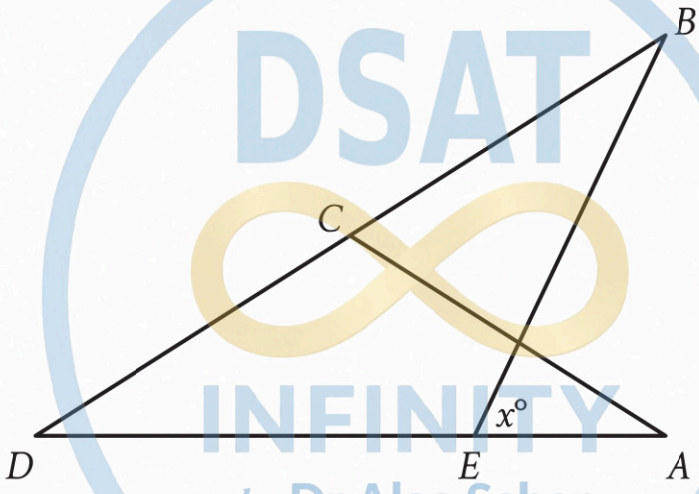
B. 45

C. 72

D. 108

Mr:3laa Saber 01003708341 https://math-infinity.tech/

42.



Note: Figure not drawn to scale

In the figure, $AC = CD$. The measure of angle EBC is 45°, and the measure of angle ACD is 104°. What is the value of x?

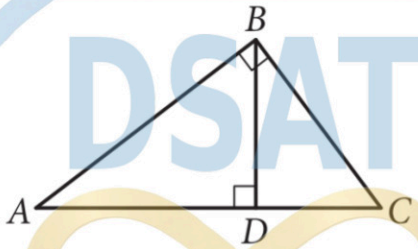
DSAT INFINITY — by Dr.Alaa Saber — 01003708341
Mr:3laa Saber 01003708341 https://math-infinity.tech/

43.

A line intersects two parallel lines, forming four acute angles and four obtuse angles. The measure of one of the acute angles is $(9x - 560)^\circ$. The sum of the measures of one of the acute angles and three of the obtuse angles is $(-18x + w)^\circ$. What is the value of w?

Mr:3laa Saber 01003708341 https://math-infinity.tech/

44.



Note: Figure not drawn to scale.

In the figure above, $BD = 6$ and $AD = 8$. What is the length of $\overline{DC}$?

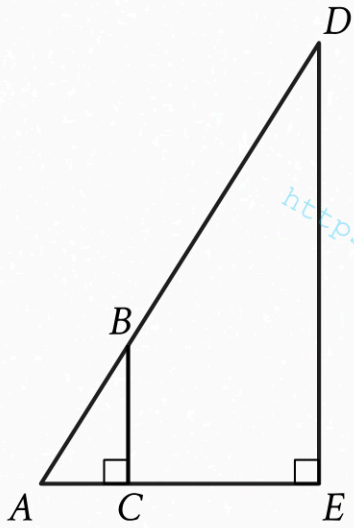
DSAT INFINITY — by Dr.Alaa Saber — 01003708341

45.

In convex pentagon $ABCDE$, segment AB is parallel to segment DE. The measure of angle B is 139 degrees, and the measure of angle D is 174 degrees. What is the measure, in degrees, of angle C?

Mr:3laa Saber 01003708341 https://math-infinity.tech/

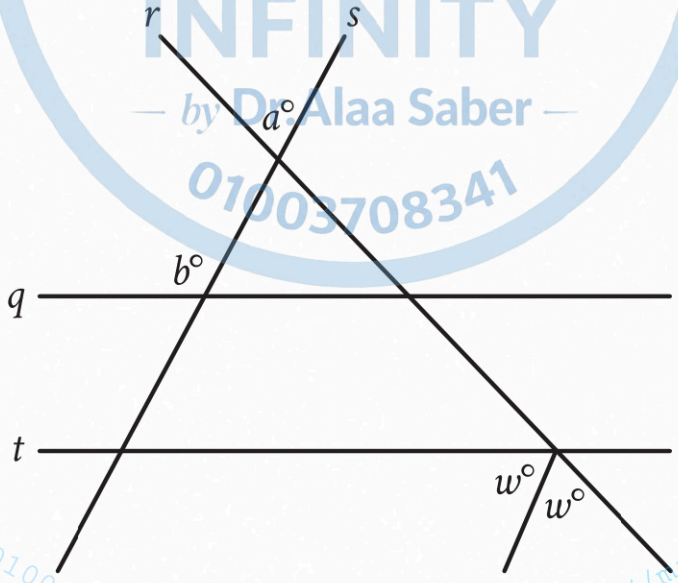
46.



Note: Figure not drawn to scale

In the figure shown, $AB = \sqrt{34}$ units, $AC = 3$ units, and $CE = 21$ units. What is the area, in square units, of triangle ADE?

47.

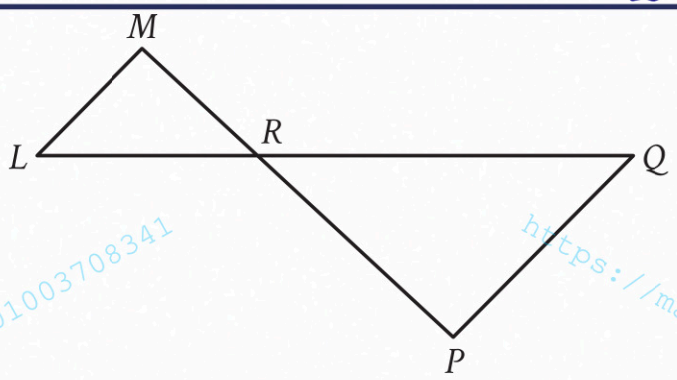


Note: Figure not drawn to scale

In the figure, parallel lines q and t are intersected by lines r and s. If $a = 43$ and $b = 122$, what is the value of w?

Mr:3laa Saber 01003708341 https://math-infinity.tech/
DSAT INFINITY — by Dr Alaa Saber — 01003708341

48.



Note: Figure not drawn to scale

In the figure, $\overline{LQ}$ intersects $\overline{MP}$ at point R, and $\overline{LM}$ is parallel to $\overline{PQ}$. The lengths of $\overline{MR}$, $\overline{LR}$, and $\overline{RP}$ are 6, 7, and 11, respectively. What is the length of $\overline{LQ}$?

A. $\frac{119}{11}$

B. $\frac{77}{6}$

C. $\frac{113}{6}$

D. $\frac{119}{6}$

49.

In triangle RST, angle T is a right angle, point L lies on $\overline{RS}$, point K lies on $\overline{ST}$, and $\overline{LK}$ is parallel to $\overline{RT}$. If the length of $\overline{RT}$ is 72 units, the length of $\overline{LK}$ is 24 units, and the area of triangle RST is 792 square units, what is the length of $\overline{KT}$, in units?

Mr:3laa Saber 01003708341 https://math-infinity.tech/
DSAT INFINITY by Dr.Alaa Saber 01003708341
Mr:3laa Saber 01003708341 https://math-infinity.tech/

50.

Triangles PQR and LMN are graphed in the *xy*-plane. Triangle PQR has vertices P, Q, and R at $(4, 5)$, $(4, 7)$, and $(6, 5)$, respectively. Triangle LMN has vertices L, M, and N at $(4, 5)$, $(4, 7 + k)$, and $(6 + k, 5)$, respectively, where k is a positive constant. If the measure of $\angle Q$ is t°, what is the measure of $\angle N$?

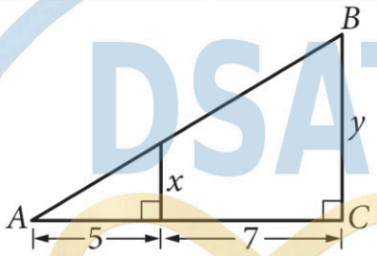
A. $(90 - (t - k))^\circ$

B. $(90 - (t + k))^\circ$

C. $(90 - t)^\circ$

D. $(90 + k)^\circ$

51.



Note: Figure not drawn to scale.

The area of triangle *ABC* above is at least 48 but no more than 60. If *y* is an integer, what is one possible value of *x* ?

52.

Quadrilaterals $PQRS$ and $WXYZ$ are similar, where P, Q, and R correspond to W, X, and Y, respectively. The measure of $\angle S$ is 135°, $PS = 45$, and $WZ = 9$. What is the measure of $\angle Z$?

A. 5°

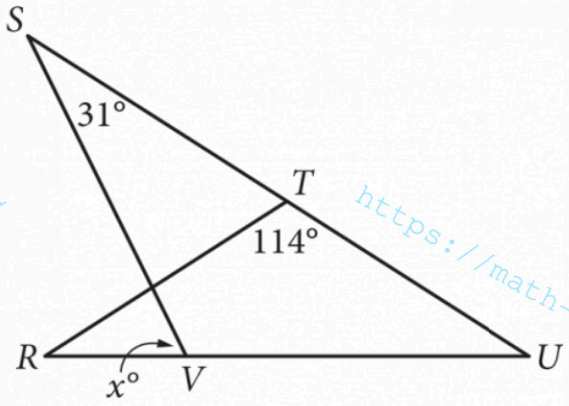
B. 27°

C. 45°

D. 135°

DSAT INFINITY — by Dr.Alaa Saber — 01003708341
Mr. Alaa Saber 01003708341 https://math-infinity.tech/

53.



In the figure above, $RT = TU$. What is the value of x?

A. 72

B. 66

C. 64

D. 58

54.

A line intersects two parallel lines, forming four acute angles and four obtuse angles. The measure of one of these eight angles is $(7x - 250)^\circ$. The sum of the measures of four of the eight angles is k°. Which of the following could NOT be equivalent to k, for all values of x?

A. $-14x + 1{,}540$

B. $14x - 320$

C. $-28x + 1{,}720$

D. 360

Mr:3laa Saber 01003708341 https://math-infinity.tech/
DSAT INFINITY — by Dr.Alaa Saber — 01003708341

55.

Triangle XYZ is similar to triangle RST such that X, Y, and Z correspond to R, S, and T, respectively. The measure of $\angle Z$ is 20° and $2XY = RS$. What is the measure of $\angle T$?

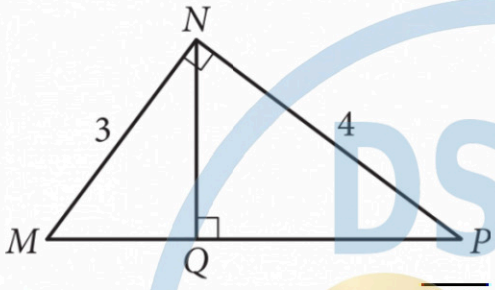
A. 2°

B. 10°

C. 20°

D. 40°

56.



In the figure above, what is the length of $\overline{NQ}$?

A. 2.2

B. 2.3

C. 2.4

D. 2.5

57.

In triangles LMN and RST, angles L and R each have measure 60°, $LN = 10$, and $RT = 30$. Which additional piece of information is sufficient to prove that triangle LMN is similar to triangle RST?

A. $MN = 7$ and $ST = 7$

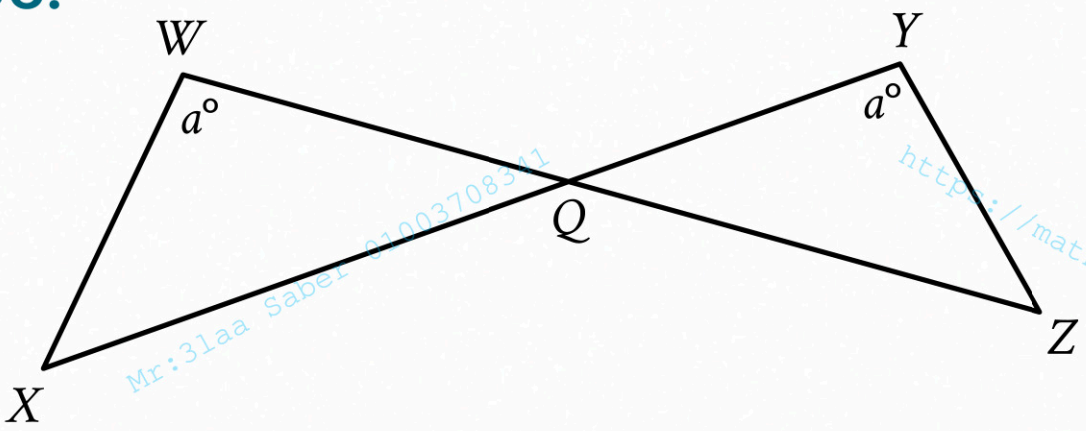
B. $MN = 7$ and $ST = 21$

C. The measures of angles M and S are 70° and 60°, respectively.

D. The measures of angles M and T are 70° and 50°, respectively.

Mr:3laa Saber 01003708341 https://math-infinity.tech/
DSAT INFINITY — by Dr.Alaa Saber — 01003708341

58.



Note: Figure not drawn to scale.

In the figure shown, $\overline{WZ}$ and $\overline{XY}$ intersect at point Q. $YQ = 63$, $WQ = 70$, $WX = 60$, and $XQ = 120$. What is the length of $\overline{YZ}$?

59.

In triangle ABC, the measure of angle B is 90° and $\overline{BD}$ is an altitude of the triangle. The length of $\overline{AB}$ is 15 and the length of $\overline{AC}$ is 23 greater than the length of $\overline{AB}$. What is the value of $\frac{BC}{BD}$?

A. $\frac{15}{38}$

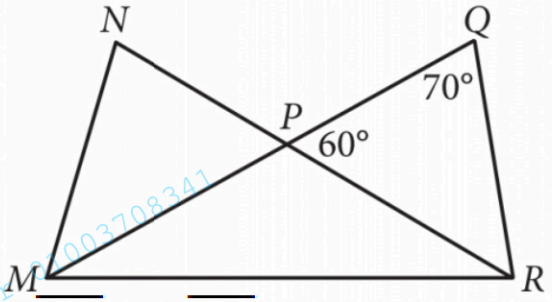
B. $\frac{15}{23}$

C. $\frac{15}{\frac{23}{15}}$

D. $\frac{38}{}$

DSAT INFINITY by Dr Alaa Saber 01003708341
Mr:3laa Saber 01003708341 https://math-infinity.tech/

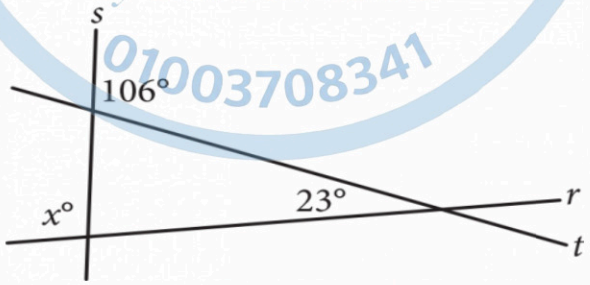
60.



In the figure above, $\overline{MQ}$ and $\overline{NR}$ intersect at point P, $NP = QP$, and $MP = PR$. What is the measure, in degrees, of $\angle QMR$?

61.

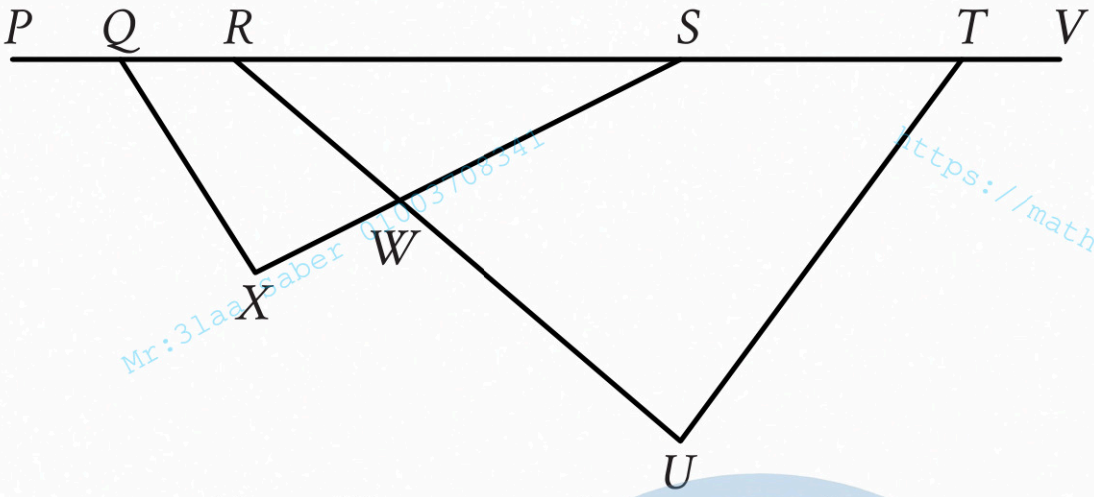
Intersecting lines r, s, and t are shown below.



What is the value of x ?

DSAT INFINITY by Dr.Alaa Saber 01003708341 https://math-infinity.tech/

62.



Note: Figure not drawn to scale.

In the figure shown, points Q, R, S, and T lie on line segment PV, and line segment RU intersects line segment SX at point W. The measure of $\angle SQX$ is 48°, the measure of $\angle SXQ$ is 86°, the measure of $\angle SWU$ is 85°, and the measure of $\angle VTU$ is 162°. What is the measure, in degrees, of $\angle TUR$?

DSAT INFINITY — by Dr.Alaa Saber — 01003708341
Mr:3laa Saber 01003708341 https://math-infinity.tech/