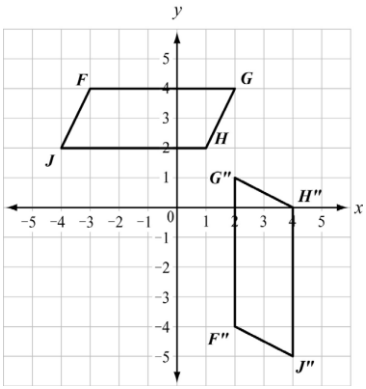
Unit 2 Review SOLUTIONS

1. Parallelogram FGHJ was translated 3 units down to form parallelogram F 'G'H'J '. Parallelogram F 'G'H'J ' was then rotated 90° counterclockwise about point G' to obtain parallelogram F ''G''H''J ''.

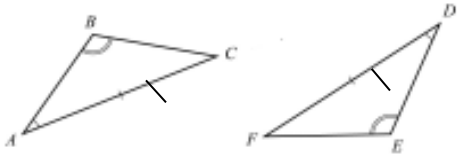


Which statement is true about parallelogram FGHJ and parallelogram F ''G''H''J ''?

a) The figures are both similar and congruent.
b) The figures are neither similar nor congruent.
c) The figures are similar but not congruent.
d) The figures are congruent but not similar.

A

2. Consider the triangles shown.



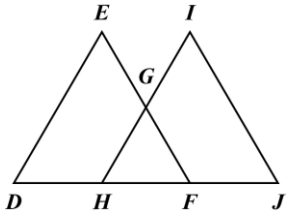
D

Which can be used to prove the triangles congruent?

a) SSS b) ASA c) SAS d) AAS

3. In this diagram, $\overline{DE} \cong \overline{JI}$ and $\angle D \cong \angle J$.

B



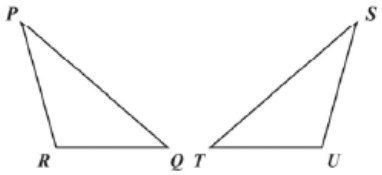
Which additional information is sufficient to prove that ΔDEF is congruent to ΔJIH?

a) $\overline{EF} \cong \overline{IH}$ b) $\overline{DH} \cong \overline{JF}$ c) $\overline{HG} \cong \overline{GI}$ d) $\overline{HF} \cong \overline{JF}$

Unit 1 Triangle Theorems, Congruence & Proofs Review

Solutions

4. Which set of relationships is sufficient to prove that the triangles in this figure are congruent?



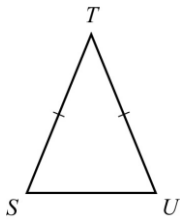
a) $\overline{PR} \cong \overline{SU}$, $\overline{PQ} \cong \overline{ST}$, $\angle Q \cong \angle U$

b) $\overline{PQ} \cong \overline{PR}$, $\overline{ST} \cong \overline{SU}$, $\overline{RQ} \cong \overline{TU}$ C

c) $\overline{RQ} \cong \overline{TU}$, $\angle R \cong \angle U$, $\angle P \cong \angle S$

d) $\angle P \cong \angle S$, $\angle R \cong \angle U$, $\angle Q \cong \angle T$

5. In this diagram, STU is an isosceles triangle where $\overline{ST}$ is congruent to $\overline{UT}$. The paragraph proof shows that $\angle S$ is congruent to $\angle U$.

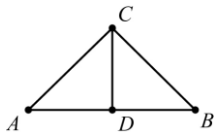


A

It is given that $\overline{ST}$ is congruent to $\overline{UT}$. Draw $\overline{TV}$ that bisects $\angle T$. By the definition of an angle bisector, $\angle STV$ is congruent to $\angle UTV$. By the Reflexive Property, $\overline{TV}$ is congruent to $\overline{TV}$. $\triangle STV$ is congruent to $\triangle UTV$ by SAS. $\angle S$ is congruent to $\angle U$ by ___?____.

a) CPCTC b) Reflexive Property of $\cong$ c) Def. of Right angles d) $\angle$ Congruence Postulate

6. In this diagram, $\overline{CD}$ is the perpendicular bisector of $\overline{AB}$. The two-column proof shows that $\overline{AC}$ is congruent to $\overline{BC}$.



Step	Statement	Justification
1	$\overline{CD}$ is the perpendicular bisector of $\overline{AB}$	Given
2	$\overline{AD} \cong \overline{BD}$	Definition of bisector
3	$\overline{CD} \cong \overline{CD}$	Reflexive Property of Congruence
4	$\angle ADC$ and $\angle BDC$ are right angles	Definition of perpendicular lines
5	$\angle ADC \cong \angle BDC$	All right angles are congruent
6	$\triangle ADC \cong \triangle BDC$	?
7	$\overline{AC} \cong \overline{BC}$	CPCTC

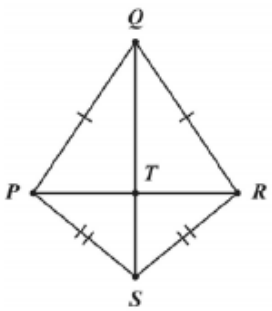
Which theorem would justify step 6? C

a) AAS b) ASA c) SAS d) SSS

Unit 1 Triangle Theorems, Congruence & Proofs Review

Solutions

7. Use this diagram of a kite to answer the question.
Which statement can be proved by using the HL postulate?



a) $\Delta PQR \cong \Delta PSR$

b) $\Delta PTS \cong \Delta TSR$

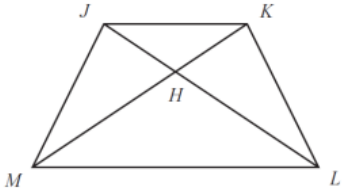
D

c) $\Delta QPS \cong \Delta SRQ$

d) $\Delta QTP \cong \Delta QTR$

8. In this figure, Gabrielle wants to prove that $\triangle JLM \cong \triangle KML$. She knows that $\overline{JM} \cong \overline{KL}$.

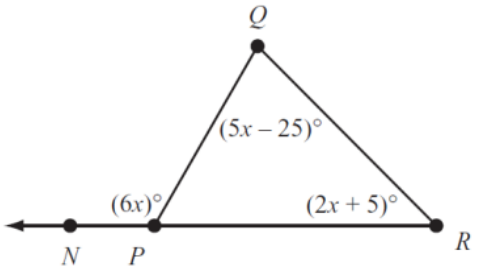
A



What additional information will allow Gabrielle to complete the proof?

a) $\overline{JL} \cong \overline{KM}$ b) $\overline{ML} \cong \overline{KM}$ c) $\overline{JH} \cong \overline{HK}$ d) $\overline{MH} \cong \overline{LH}$

9. Use this diagram to answer the question.



C

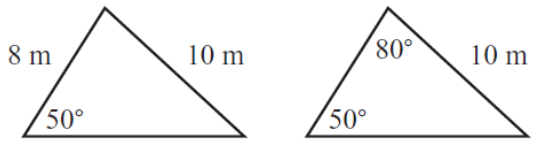
What is the measure of $\angle QPR$?

a) 15° b) 60° c) 120° d) 175°

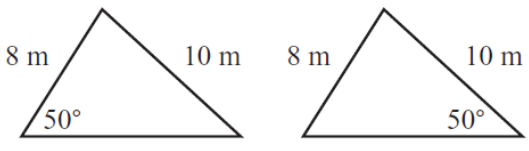
10. Which pair of triangles could be proved congruent?

C

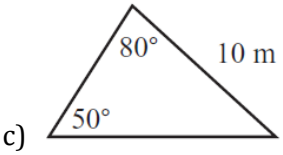
a)

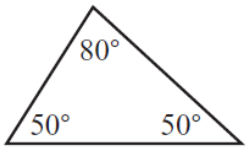


b)

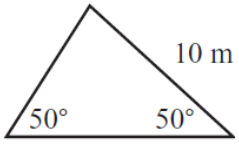


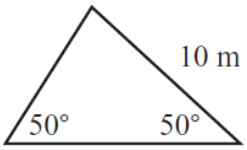
c)



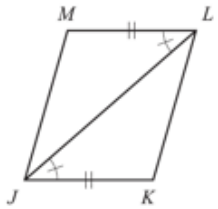


d)





11. This figure shows quadrilateral JKLM.



What information will NOT be used to prove that JKLM is a parallelogram?

a) Show that <JLM ≅ <LJK
b) Show that $\overline{JK} \cong \overline{LM}$
c) Show that △JKL ≅ △LMJ
d) Show that △JKL ≅ △JLM

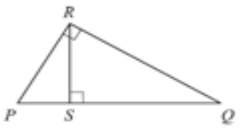
D

12. Which transformation of △HIJ does NOT result in a congruent triangle

D

a) A reflection across the x-axis, followed by a rotation of 180° about the origin
b) A rotation by 180° about the origin, followed by a translation of 2 units left and 3 units down
c) A translation of 1 unit right and 2 units up, followed by a dilation by a factor of 3
d) A dilation by a factor of 2, followed by a dilation by a factor of 0.5

13. Use this triangle to answer the question



This is a proof of the Pythagorean Theorem

	Step	Justification
1	$\triangle PQR \sim \triangle RPS \sim \triangle QSR$	AA postulate
2	$\frac{PQ}{QR} = \frac{QR}{SQ}$ and $\frac{PQ}{PR} = \frac{PR}{PS}$	Corresponding sides of similar triangles are congruent
3	$QR^2 = PQ \cdot SQ$ and $PR^2 = PQ \cdot PS$	Multiplication property of equality
4	$QR^2 + PR^2 = PQ \cdot SQ + PQ \cdot PS$	Addition property
5	$QR^2 + PR^2 = PQ(SQ + PS)$	Distributive property
6	$QR^2 + PR^2 = PQ(PQ)$	Segment addition postulate
7	$QR^2 + PR^2 = PQ^2$	Simplify

In which step is there a mistake in the proof?

a) Step 1
b) Step 2
c) Step 4
d) Step 6

B

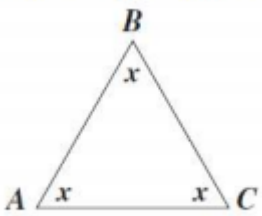
Unit 1 Triangle Theorems, Congruence & Proofs Review

Solutions

14. Given triangle ABC, which expression BEST represents the sum ot the interior angles?

a) 3x
b) $2x^2$
c) x^3

A



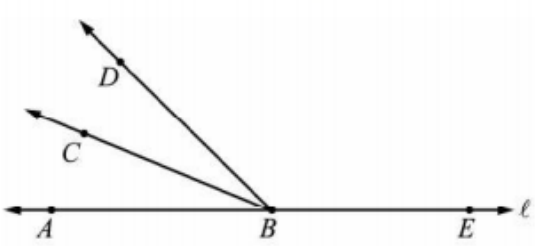
d) $2x^2 * x$

15. In the figure below, BC bisects <ABD, and A, B, and E are all points on line l.

Which angles must be congruent?

a) <ABC and <CBD
b) <ABC and <CBE
c) <ABD and <DBE
d) <CBD and <ABD

A

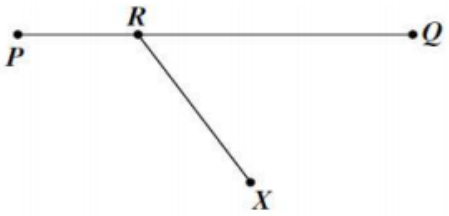


16. On PQ, R is between P and Q. Point X does not lie on PQ and XR is not perpendicular to PQ.

Which of the following describes <XRQ and <XRP?

a) Complementary angles
b) Congruent angles
c) Supplementary angles
d) Vertical angles

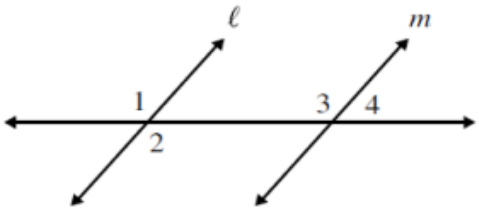
C



17. In the figure below, l is parallel to m. Which of the following are corresponding angles?

a) <1 and <2
b) <1 and <3
c) <2 and <3
d) <3 and <4

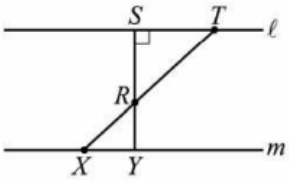
B



18. In the figure below, l is parallel to m. If RS = ST, what is the measure of <RXY?

a) 30°
b) 45°

B



c) 60^o
d) 90^o

Unit 1 Triangle Theorems, Congruence & Proofs Review

Solutions

19. Which statement about a parallelogram must be true?

a) All of its sides are the same length.
b) Its diagonals are the same length.
c) Its opposite angles have the same measure.
d) At least one angle is a right angle.

C

20. An open area at a local high school is in the shape of a quadrilateral. Two sidewalks crisscross this open area as diagonals of the quadrilateral. If the walkways cross at their midpoints and the walkways are equal in length, what is the shape of the open area?

a) A parallelogram
b) A rhombus
c) A rectangle
d) A trapezoid

C

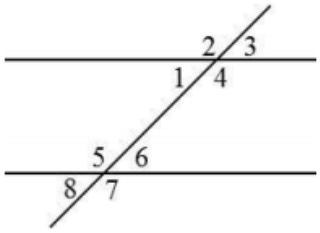
21. Which set of information is NOT enough to prove that △ABC is congruent to △DEF?

a) <A ≅<D, <C ≅ <F, and $\overline{BC} \cong \overline{EF}$
b) $\overline{AB} \cong \overline{DE}$, $\overline{BC} \cong \overline{EF}$, and <B ≅ <E
c) <A ≅<D, <C ≅ <F, and $\overline{AC} \cong \overline{DF}$
d) <A ≅<D, $\overline{AC} \cong \overline{DF}$, and $\overline{BC} \cong \overline{EF}$

D

22. A transversal crosses two parallel lines. Which statement should be used to prove that the measures of angles 1 and 5 sum to 180°?

A

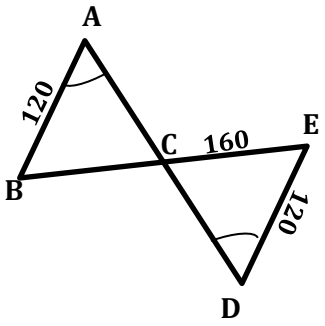


a) Angles 1 and 8 are congruent as corresponding angles; angles 5 and 8 form a linear pair.
b) Angles 1 and 2 form a linear pair; angles 3 and 4 form a linear pair.
c) Angles 5 and 7 are congruent as vertical angles; angles 6 and 8 are congruent as vertical angles.
d) Angles 1 and 3 are congruent as vertical angles; angles 7 and 8 form a linear pair.

23. Which postulate or theorem can be used to determine the two triangles are congruent?

a) ASA Congruence Postulate
b) SSS Congruence Postulate
c) AAS Congruence Theorem
d) SAS Congruence Postulate

C



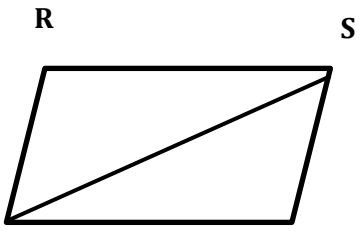
Solutions

24. Which statement would be used to help find the missing value?

D

a) Opposite sides of a parallelogram are supplementary.
b) Opposite sides of a parallelogram are congruent.
c) Opposite angles of a parallelogram are supplementary.
d) Opposite angles of a parallelogram are congruent.

25. In the diagram of quadrilateral RSTU, RS || UT, <RSU ≅ <TUS, and diagonal $\overline{SU}$ is drawn

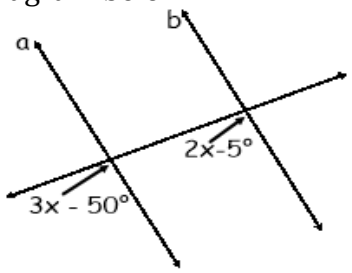


Which method can be used to prove △RSU is congruent to △TUS?

a) AAS
b) SSA
c) ASA
d) SAS

C

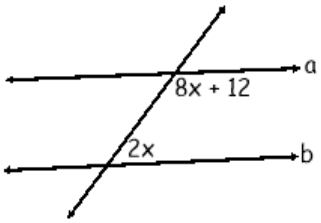
26. Find the value of x in the diagram below



a) x =57
b) x = 45
c) x = 50
d) x = 8

B

27. Find the value of x.



a) x = 12.2
b) x = 32
c) x = 10
d) x = 16.8

D

Unit 1 Triangle Theorems, Congruence & Proofs Review

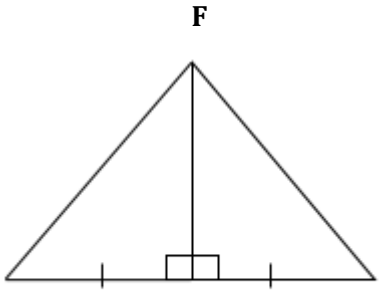
Solutions

28. What are the different ways you can use to prove a shape is a parallelogram?

Quadrilateral with both pairs of opposite sides parallel.
Opposite sides congruent.

Opposite angles congruent.
Consecutive angles supplementary.
Diagonals bisect each other.

29. If $\overline{FH}$ is a perpendicular bisector of $\overline{IG}$, what can we use to prove that $\overline{FI}$ is congruent to $\overline{FG}$



a) SAS Postulate
b) Triangle Sum Theorem
c) SSS Postulate
d) Vertical angles theorem

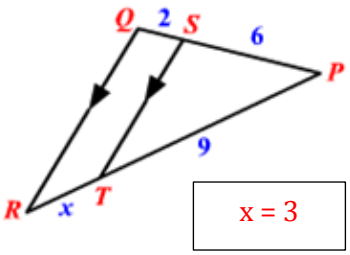
A

30. Given the statement △QRS ≅ △WXY, which statement must be true

a) < S ≅ <X
b) <Q ≅ < W
c) QS ≅ WX
d) SR ≅ XY

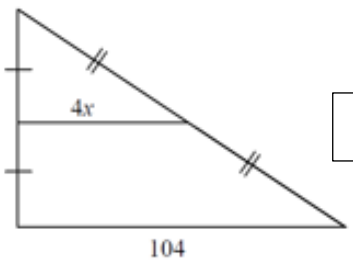
B

31. Find the value of x.



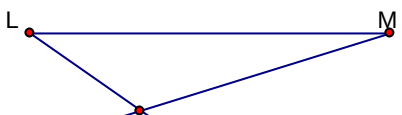
x = 3

32. Find x.



x = 13

1. In the diagram of ΔLMN *and* ΔNOP *below,* $\overline{LP}$ *and* $\overline{MO}$ *intersect at* N*, and* $\angle NLM \cong \angle NPO$.



<NLM ≅ <NPO (Given)
< LNM ≅ < PNO
< LMN ≅ < PON

Which angles are congruent?

2. Given $\Delta ABC \sim \Delta DEF$ *such that* $\frac{AB}{DE} = \frac{5}{3}$, which statement is *not* true?

a. $\frac{BC}{EF} = \frac{5}{3}$

b. $\frac{AC}{DF} = \frac{5}{3}$

c. $\angle B \cong \angle E$

d. $\frac{m\angle A}{m\angle D} = \frac{5}{3}$

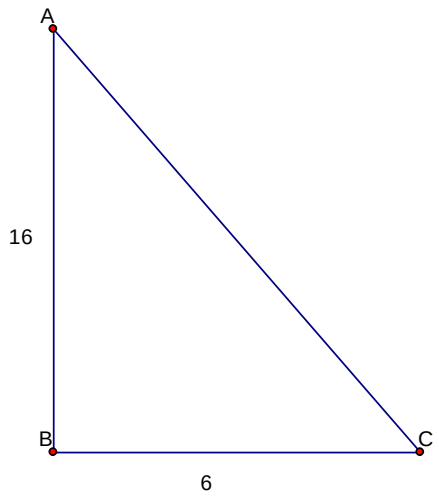
D

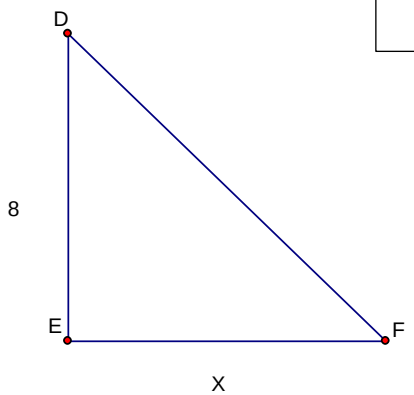
3. If $\Delta ABC \sim \Delta ZXY, m\angle B = 65, and\ m\angle C = 35, what\ is\ m\angle Z?$

80°

4. As shown in the diagram below, $\Delta ABC \sim \Delta DEF, AB = 16, BC = 6, DE = 8, and\ EF = x.$

What is the length of $\overline{EF}$?

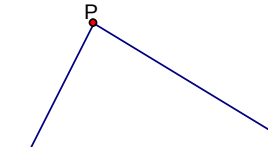




x = 3

Unit 1 Similarity Review ***Solutions***

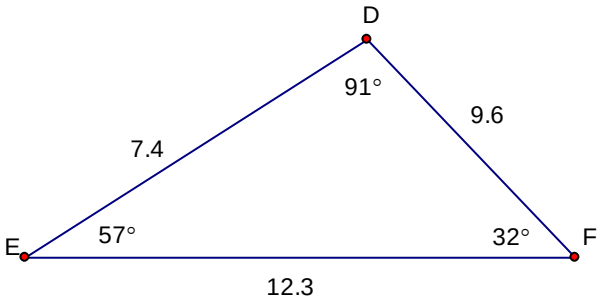
5. In the diagram below of ΔPRT, Q is a point on $\overline{PR}$, S is a point on $\overline{TR}$, $\overline{QS}$ is drawn, and $\angle RTP \cong \angle RQS$.

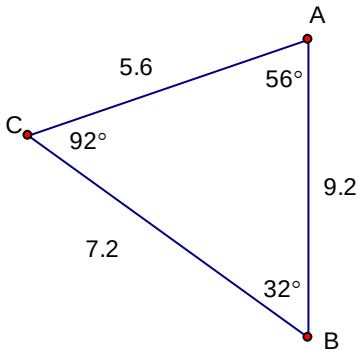


What theorem proves that $\Delta PRT \sim \Delta SRQ$?

AA

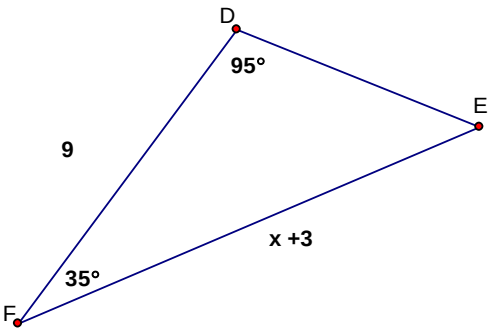
6. Are these two triangles similar and if so, why?

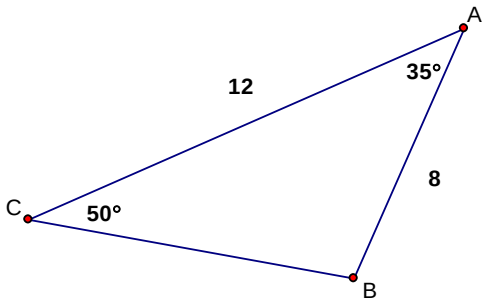




The triangles are not similar as the angles are not congruent

7. The triangles below are similar. Write the similarity statement and determine the value of x.

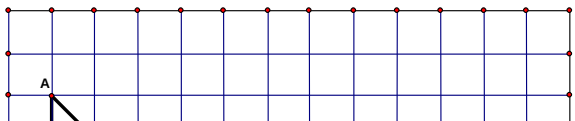




$\Delta DEF \sim \Delta BCA$

x = 10.5

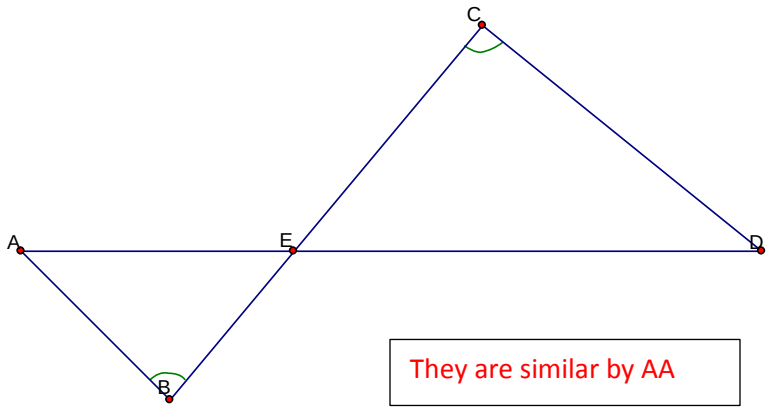
8. Determine the scale factor for the dilation below. Determine whether the dilation is an enlargement or reduction.



Reduction

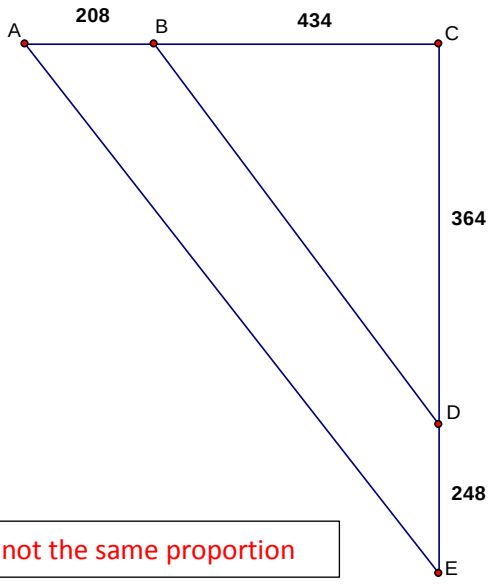
Scale Factor = ½

9. Determine if the triangles in the figure are similar. If they are, what theorem proves their similarity?



They are similar by AA

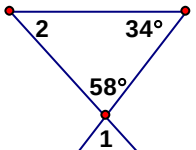
10. Determine if the triangles shown in the figure are similar. If they are similar, describe their similarity (which theorem proves).



The triangles are not similar as the sides are not the same proportion

Unit 1 Similarity Review ***Solutions***

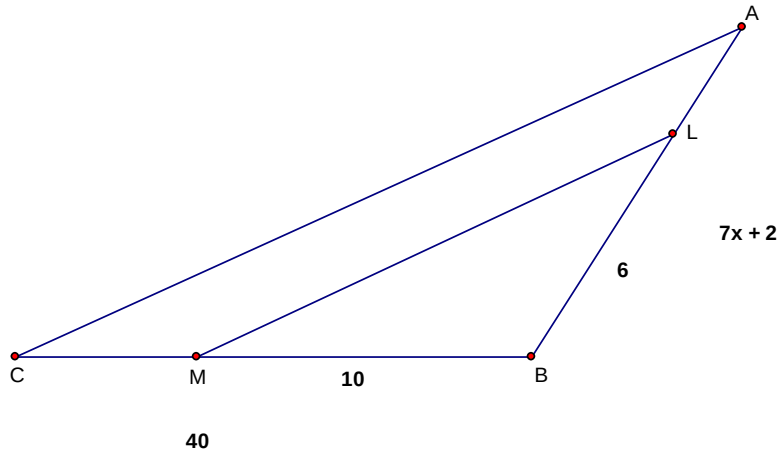
11. Determine $m\angle 1, m\angle 2, m\angle 3$.



m <1 = 58°

m <2 = 88°

12. In the following figure, $\Delta ABC \sim \Delta LBM$. Find the value of x.



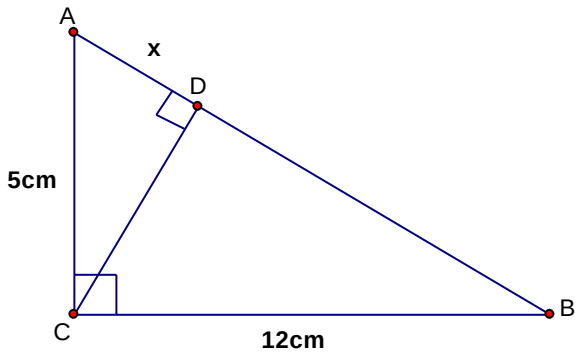
x = 3.1

13. What two things have to be true for two triangles to be similar?

All corresponding angles are congruent
All corresponding sides are proportional (same ratios)

14. In the diagram below, the length of the legs $\overline{AC}$ *and* $\overline{BC}$ of right triangle ABC are 5cm and 12cm, respectively. Altitude $\overline{CD}$ is drawn to the hypotenuse of ΔABC.

What is the length of $\overline{AD}$ to the nearest tenth of a centimeter?

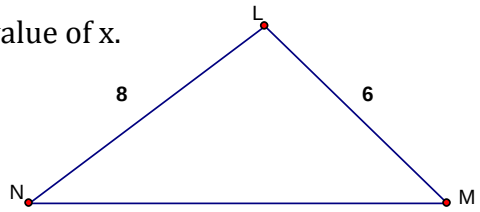


x = 1.9 ?

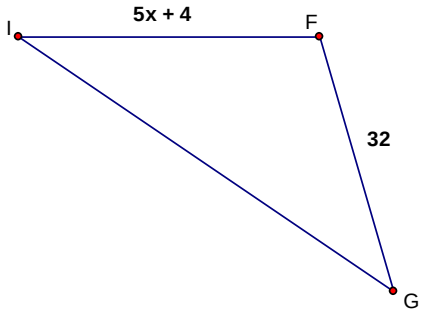
15. The side lengths of ΔABC are 5, 6, and 9 and the sides of ΔXYZ are 15, 18, and 27 respectively. Are the two triangles similar and if so, which postulate or theorem can be used to prove the triangles similar?

The triangles are not similar as the sides are not the same proportion

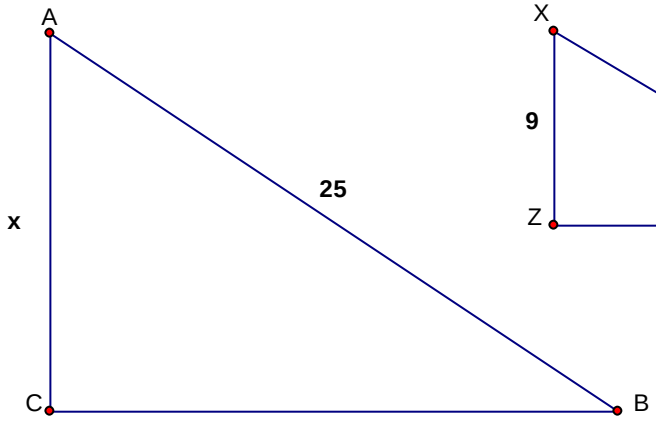
16. If $\Delta LMN \sim \Delta FIG$, find the value of x.

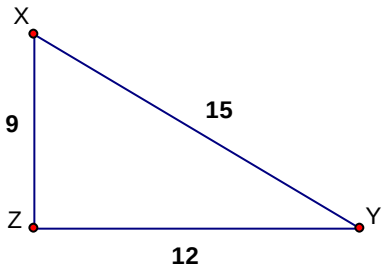


x = 4



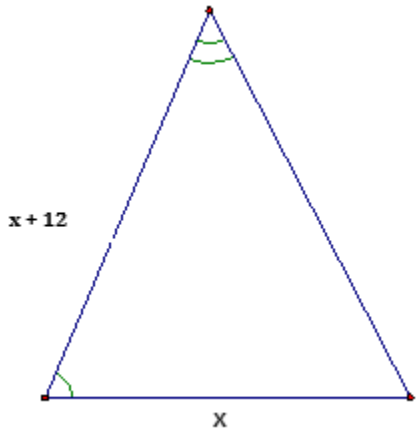
17. Solve for x: $\Delta ABC \sim \Delta XYZ$

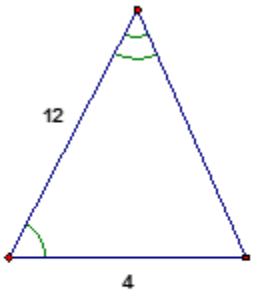




x = 15

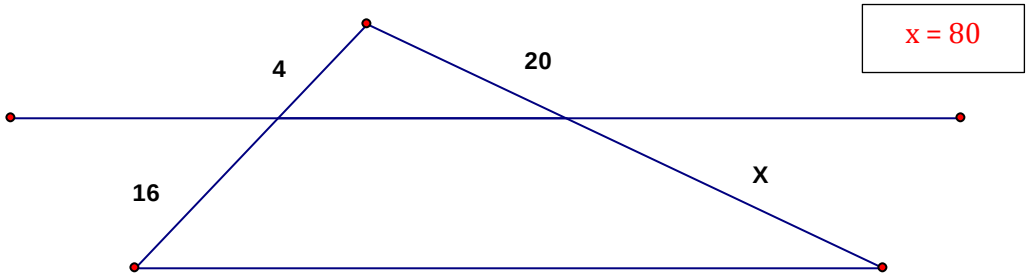
18. The following two triangles are similar. Solve for x.





x = 6

19. A line parallel to a triangle's side splits into lengths of 16 and 4. The other side is split into lengths of 20 and x. What is the value of x that would prove that the parallel line divides the sides proportionally?



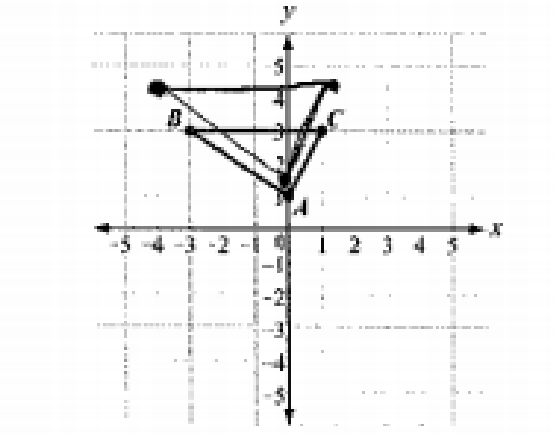
x = 80

20. Dilate the triangle using a scale factor of 1.5 and a center of (0, 0). Name the dilated triangle A'B'C'.

A' (0, 1.5)

B' (-4.5, 4.5)

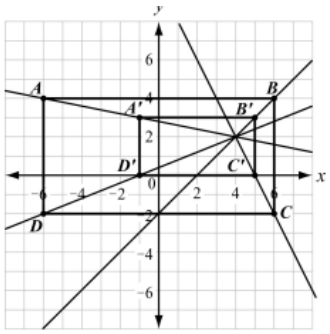
C' (1.5, 4.5)



21. Line segment CD is 5 inches long. If line segment CD is dilated to form line segment C 'D' with a scale factor of 0.6, what is the length of line segment C 'D'?

C'D' = 3

22. Figure A'B'C'D' is a dilation of figure ABCD.

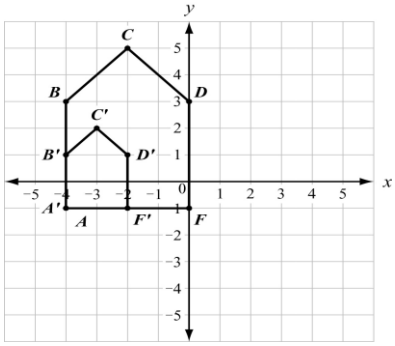


a) Determine the center of dilation. (4, 2)

b) Determine the scale factor of the dilation. ½

23. Figure *A'B'C'D'F'* is a dilation of figure *ABCDF* by a scale factor of ½.

The dilation is centered at (–4, –1).



B

Which statement is true?

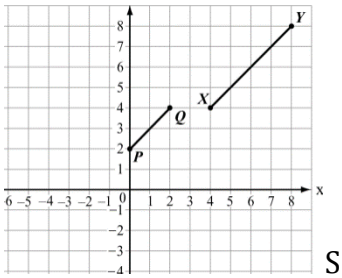
a) $\frac{AB}{A'B'} = \frac{B'C'}{BC}$ b) $\frac{AB}{A'B'} = \frac{BC}{B'C'}$ c) $\frac{AB}{A'B'} = \frac{BC}{D'F'}$ d) $\frac{AB}{A'B'} = \frac{DF}{B'C'}$

24. Which transformation results in a figure that is similar to the original figure but has a greater area?

a) a dilation of ΔQRS by a scale factor of 0.25
b) a dilation of ΔQRS by a scale factor of 0.5
c) a dilation of ΔQRS by a scale factor of 1
d) a dilation of ΔQRS by a scale factor of 2

D

25. In the coordinate plane, segment PQ is the result of a dilation of segment XY by a scale factor of 1/2.



A

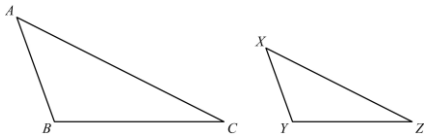
S

Which point is the center of dilation?

a) (-4, 0) b) (0,-4) c) (0, 4) d) (4, 0)

26. In the triangles shown, ΔABC is dilated by a factor of 2/3 to form ΔXYZ.

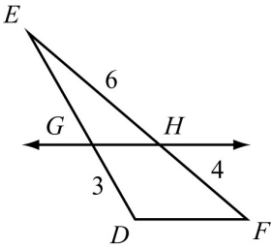
Given that $m\angle A = 50^o$ and $m\angle B = 100^o$, what is the $m\angle Z$?



C

a) 15º b) 25° c) 30º d) 50°

27. In the triangle shown $\overline{GH} \parallel \overline{DF}$.



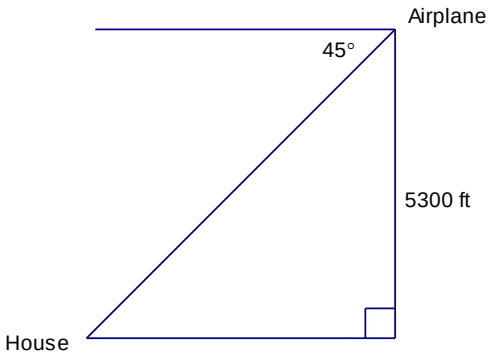
B

What is the length of $\overline{GE}$

a) 2.0 b) 4.5 c) 7.5 d) 8.0

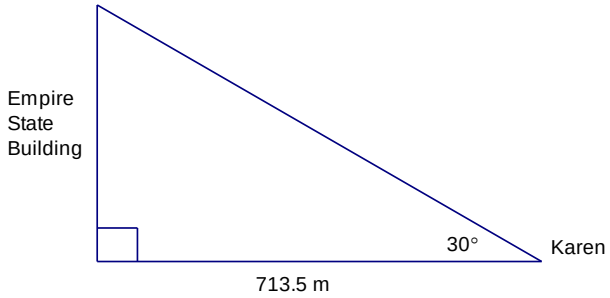
Unit 2 Review ***Solutions***

1. Alan is flying an airplane at an altitude of 5300 feet. He sees his house on the ground at a 45° angle of depression.



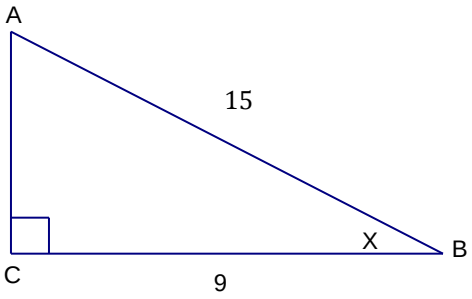
What is Alan's ***horizontal*** distance from his house at this point? 5300 ft.

2. Karen is standing on a street in New York City looking at the top of the Empire State Building with a 30° angle of elevation. She is 713.5 meters from the Empire State Building.



How tall is the Empire State Building? (round to the tenths place) 411.9 m

3. A right triangle (shown below) has a hypotenuse with a length of 15 inches and a leg with a length of 9 inches. Find the measure of angle B (round to the tenths place).



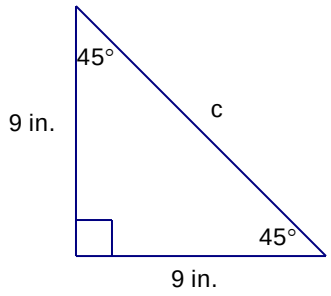
x = 53.1°

4. What is the cos B? $\frac{9}{17}$

5. What is the sin B? $\frac{12}{17}$

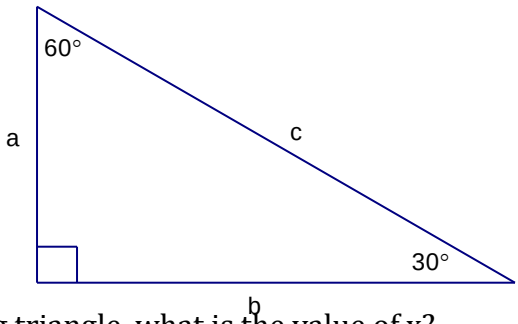
6. What is the tan A? $\frac{3}{4}$

7. The legs of the isosceles triangle each measure 9 inches. Find the length of the hypotenuse.



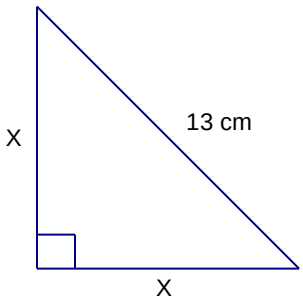
$9\sqrt{2}$ or ≈ 12.7 in.

8. In the following triangle, $a = 5\sqrt{3}$ what is the value of b?



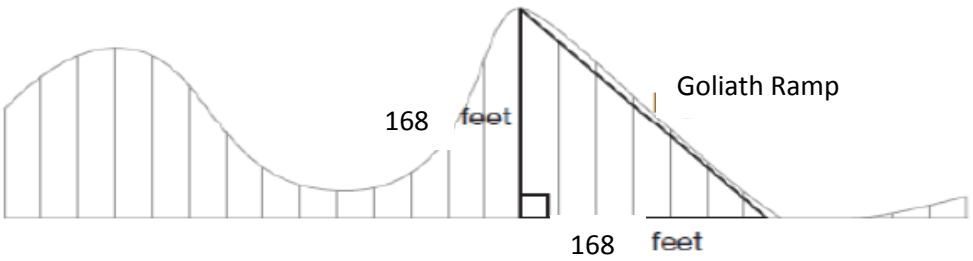
b = 15

9. In the following triangle, what is the value of x?



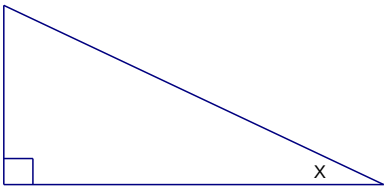
$\frac{13\sqrt{2}}{2}$ or 9.2 cm.

10. The following drawing shows the plan for big hill on a new roller coaster at an amusement park.



Find the estimated measure of the Goliath Ramp. Round to the tenths place. 237.6 ft.

11. In the following figure, if $\tan x = \frac{6}{8}$, what are sin x and cos x

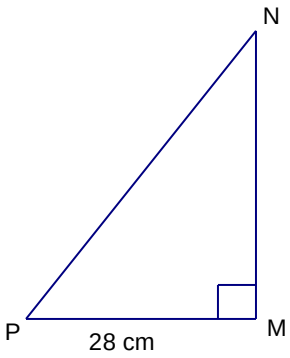


$\sin x = \frac{3}{5}$

$\cos x = \frac{4}{5}$

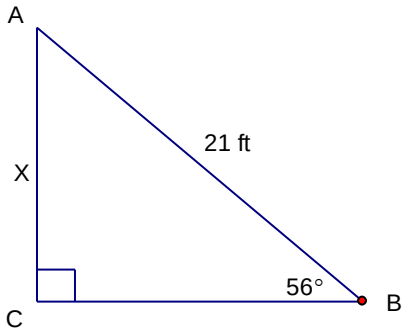
12. In the following figure cos P = 0.5, what is the length of $\overline{PN}$?

$\overline{PN} = 56$

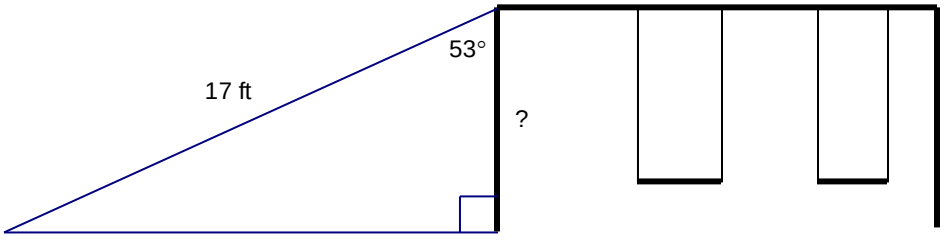


13. In the following diagram, $m\angle B = 56°$ and AB = 21 feet. Write an equation that can be used to find the value of x?

x = 21 (Sin 56)



14. A 17-foot slide is attached to a swing set. The slide makes a 53° angle with the swing set.



Which answer most closely represents the height of the top of the slide?

$10.2\ ft.$

Solutions

5

15. $\angle J$ *and* $\angle K$ are complementary angles in a right triangle. The value of tan J is 12/5. What is the value of sin K?

16. $\angle X$ *and* $\angle Y$ are complementary angles in a right triangle. The value of cos X = 6/10. Find sin X, cos Y, and tan Y.

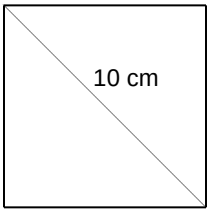
$\sin X = \frac{4}{5}$

$\cos Y = \frac{4}{5}$

$\tan Y = \frac{3}{4}$

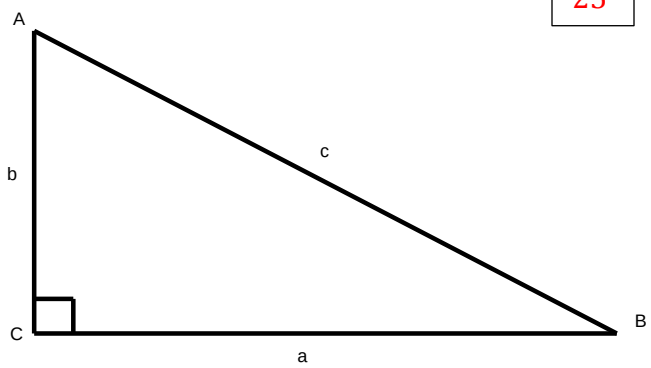
17. The ***diagonal*** of the square is 10 centimeters. Find the length of the sides of the square.

$5\sqrt{2}$ or ≈ 7.1 in.



18. If the value of cos 65° = 0.42, then the sin _____ = 0.42?

25



19. What measure is equivalent to cos A?

20. A broadcast antenna is situated on top of a tower. The signal travels from the antenna to your house so you can watch TV. The angle of elevation from your house to the tower measures 30^o and the distance from your house to the tower is 350 feet. Find the height of the tower. (Round to the nearest 10^{th}).

202.1 ft.

21. An 8 foot ladder is leaning against a wall so that the base is 5 feet from the base of the wall. What angle does the ladder make with the ground? Round to the nearest tenth.

51.3^o

22. A surveyor is standing 25 feet from a building and is looking at the top with an angle of elevation of 65°. How tall is the building? Round to the nearest tenth.

53.6 ft.

23. Bob is looking at a helicopter that is flying 1,000 feet above the ground. Bob is 1,500 feet from the helicopter. At what angle of elevation is Bob looking at the helicopter? Round to the nearest tenth.

33.7 ft.

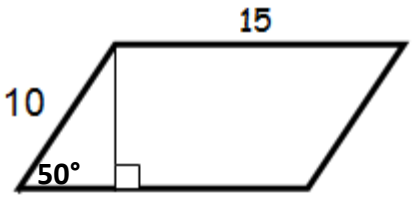
24. A kite is being flown using 150 yards of string. The kite has an angle of elevation with the ground of 65 degrees. How high above the ground is the kite?

135.9 yd.

25. A 5.5 foot person standing 20 feet from a street light casts a 12 foot shadow. What is the height of the streetlight?

14.7 ft.

26. Find the area.



115.5.

27. $\triangle ABC$ is a right triangle. One of the acute angles has a cosine of 1/2. What is the sine of that same angle? What is the sine of its complement?

Sin of the angle ≈ 0.015

Sin of the complement $= \frac{1}{2}$

28. Lenny is planning to cut down a pine tree, and he wants to make sure that the tree will not hit his truck when it falls. The tree casts a shadow that is 150 feet long, and the angle of elevation from the base of the shadow to the top of the tree is 50°

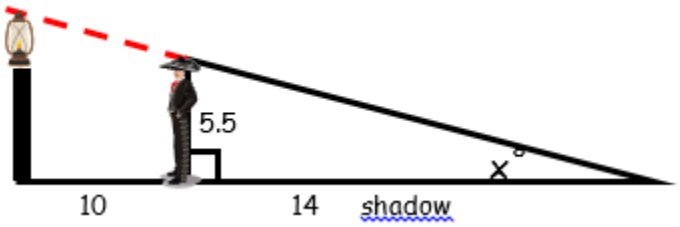
a) How tall is the tree?

178.8 ft.

b) If Lenny parked his truck 90 feet away from the base of the tree, should he move his truck?

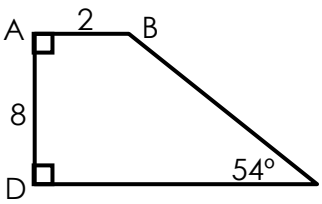
Yes, as when it falls it will hit his truck

29. A 5.5 foot person standing 10 feet from a street light casts a 14 foot shadow. What is the height of the streetlight?



9.4 ft.

30. Find the perimeter of trapezoid ABCD



27.7 units