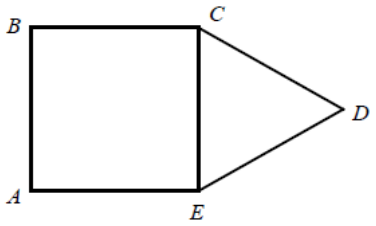
Practice Test

Triangles

1



In the figure above, CDE is an equilateral triangle and $ABCD$ is a square with an area of $4x^2$. What is the area of triangle CDE in terms of x?

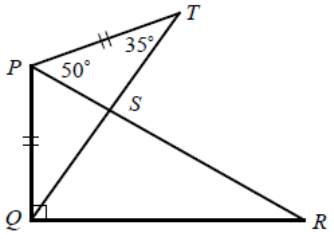
A) $\frac{\sqrt{3}}{2}x^2$

B) $\sqrt{3}x^2$

C) $\frac{3\sqrt{3}}{2}x^2$

D) $2\sqrt{3}x^2$

2



In the figure above, $\overline{PQ} \perp \overline{QR}$ and $\overline{PQ} \cong \overline{PT}$. What is the measure of $\angle R$?

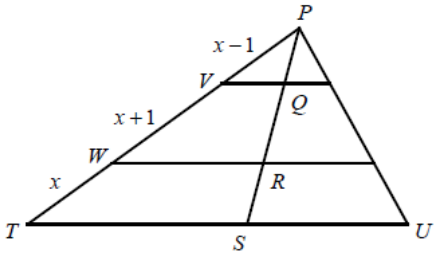
A) 30

B) 35

C) 40

D) 45

3



Note: Figure not drawn to scale.

In the figure above, $\overline{VQ} \parallel \overline{WR} \parallel \overline{TS}$.

If $PS = 15$, what is the length of $\overline{RS}$?

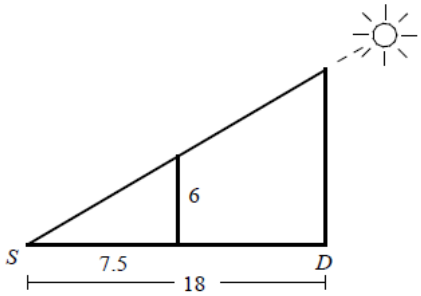
A) 4.5

B) 5

C) 6

D) 6.5

4



Note: Figure not drawn to scale.

A person 6 feet tall stands so that the ends of his shadow and the shadow of the pole coincide. The length of the person's shadow was measured 7.5 feet and the length of the pole's shadow, SD, was measured 18 feet. How tall is the pole?

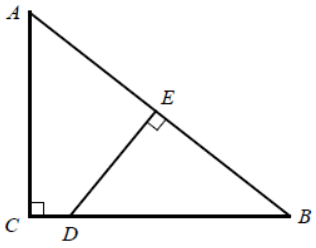
A) 12.8

B) 13.6

C) 14.4

D) 15.2

5



In the figure above, ΔABC and ΔDBE are right triangles. If $AC = 12$, $BC = 15$, and $DE = 8$, what is the length of BE?

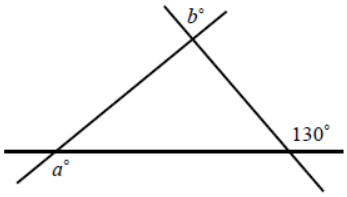
A) 8.5

B) 9

C) 9.5

D) 10

6



In the figure above, what is the value of $a - b$?

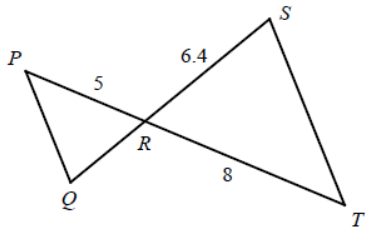
A) 50

B) 55

C) 60

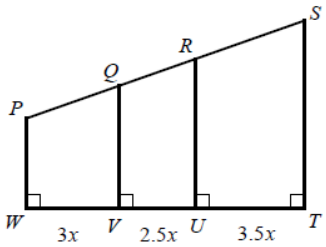
D) 65

7



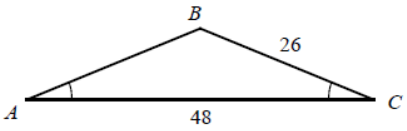
In the figure above, $\overline{PQ} \parallel \overline{ST}$ and segment PT intersects segment QS at R. What is the length of segment QS?

8



In the figure above, if $PS = 162$, what is the length of segment QR?

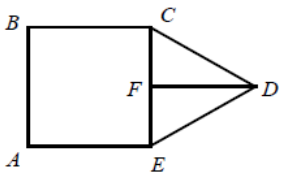
9



In the figure above, what is the area of the isosceles triangle ABC?

Answers
Triangles

1. B



If the area of square $ABCD$ is $4x^2$, the length of the side of square $ABCD$ is $2x$.

Drawing $\overline{DF}$, a perpendicular bisector of $\overline{CE}$, makes two $30°$-$60°$-$90°$ triangles, ΔCDF and ΔEDF.

$CE = 2x$

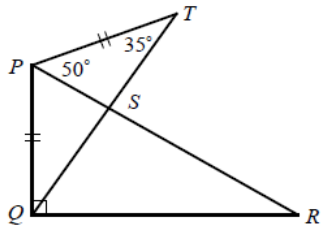
$CF = \frac{1}{2}CE = \frac{1}{2}(2x) = x$

$DF = \sqrt{3}CF = \sqrt{3}x$

Area of $\Delta CDE = \frac{1}{2}CE \cdot DF = \frac{1}{2}(2x)(\sqrt{3}x)$

$= \sqrt{3}x^2$

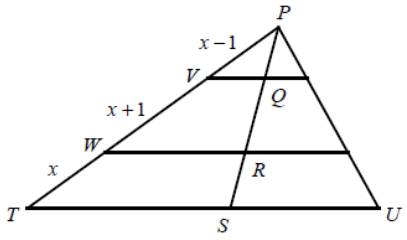
2. A



$\overline{PQ} \cong \overline{PT}$	Given
$m\angle PQT = m\angle T = 35$	Isosceles Δ Theorem
$m\angle PQT + m\angle T + m\angle QPT = 180$	Angle Sum Theorem
$35 + 35 + m\angle QPT = 180$	Substitution
$m\angle QPT = 110$	
$m\angle QPT = m\angle QPR + m\angle RPT$	Angle Addition Postulate
$110 = m\angle QPR + 50$	Substitution
$60 = m\angle QPR$	
$\overline{PQ} \perp \overline{QR}$	Given
$m\angle PQR = 90$	Definition of Right $\angle$
$m\angle PQR + m\angle QPR + m\angle R = 180$	Angle Sum Theorem
$90 + 60 + m\angle R = 180$	Substitution
$m\angle R = 30$	

Answers
Triangles

3. B



Note: Figure not drawn to scale.

Since $\overline{VQ} \parallel \overline{WR} \parallel \overline{TS}$, $\frac{PT}{PS} = \frac{x}{RS}$.

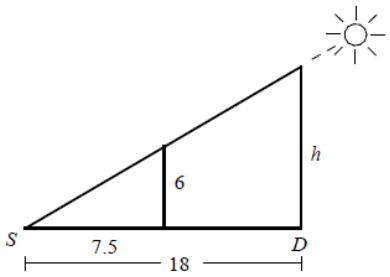
$\frac{(x-1)+(x+1)+x}{15} = \frac{x}{RS}$ Substitution

$\frac{3x}{15} = \frac{x}{RS}$ Simplify.

$3x(RS) = 15x$ Cross Products

$RS = 5$

4. C



Note: Figure not drawn to scale.

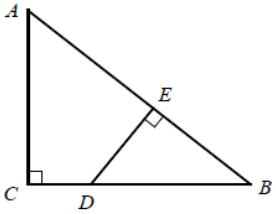
Let h = the length of the pole.

$\frac{6}{7.5} = \frac{h}{18}$

$7.5h = 6 \times 18$ Cross Products

$h = 14.4$

5. D



$m\angle C = m\angle BED$ All right $\angle s$ are equal.

$m\angle B = m\angle B$ Reflexive Property

$\Delta ABC \sim \Delta DBE$ AA Similarity Postulate

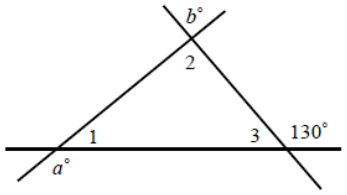
$\frac{AC}{BC} = \frac{DE}{BE}$ AA Similarity Postulate

$\frac{12}{15} = \frac{8}{BE}$ Substitution

$12BE = 15 \times 8$ Cross Products

$BE = 10$

6. A



$m\angle 1 + m\angle 2 + m\angle 3 = 180$ Angle Sum Theorem

$a + m\angle 1 = 180$ Straight $\angle$ measures 180.

$m\angle 1 = 180 - a$

$m\angle 2 = b$ Vertical $\angle s$ are $\cong$.

$130 + m\angle 3 = 180$ Straight $\angle$ measures 180.

$m\angle 3 = 50$

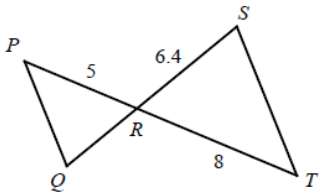
$180 - a + b + 50 = 180$ Substitution

$230 - a + b = 180$

$-a + b = -50$

$a - b = 50$

7. 10.4



$\overline{PQ} \parallel \overline{ST}$ Given

$m\angle P = m\angle T$ If $\overline{PQ} \parallel \overline{ST}$, alternate interior $\angle s$ are $\cong$.

$m\angle PRQ = m\angle TRS$ Vertical $\angle s$ are $\cong$.

$\Delta PRQ \sim \Delta TRS$ AA Similarity Postulate

$\frac{PR}{TR} = \frac{RQ}{RS}$ AA Similarity Postulate

$\frac{5}{8} = \frac{RQ}{6.4}$ Substitution

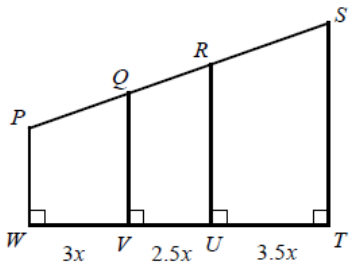
$8RQ = 5 \times 6.4$ Cross Products

$RQ = 4$

$QS = SR + RQ = 6.4 + 4 = 10.4$

Answers
Triangles

8. 45



In the figure above, $\overline{PW} \parallel \overline{QV} \parallel \overline{RU} \parallel \overline{ST}$, because they are all perpendicular to $\overline{TW}$.

Therefore, $\frac{PS}{WT} = \frac{QR}{VU}$.

$\frac{162}{3x + 2.5x + 3.5x} = \frac{QR}{2.5x}$ Substitution

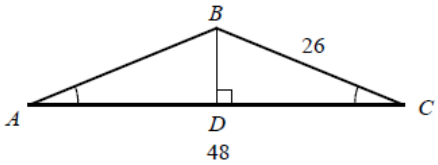
$\frac{162}{9x} = \frac{QR}{2.5x}$ Simplify.

$9x(QR) = 162(2.5x)$ Cross Products

$9x(QR) = 405x$ Simplify.

$QR = 45$

9. 240



Draw $\overline{BD}$ perpendicular to $\overline{AC}$. Since ΔABC is an isosceles triangle, $\overline{BD}$ bisects $\overline{AC}$.

Therefore, $AD = CD = \frac{1}{2}AC = \frac{1}{2}(48) = 24$.

$CD^2 + BD^2 = BC^2$ Pythagorean Theorem

$24^2 + BD^2 = 26^2$

$576 + BD^2 = 676$

$BD^2 = 100$

$BD = 10$

Area of $\Delta ABC = \frac{1}{2}(AC)(BD)$.

$= \frac{1}{2}(48)(10)$

$= 240$