

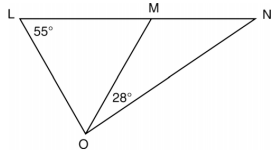
1. If the angles of a triangle are represented by x , $3x + 20$, and $6x$, the triangle must be
- (1) obtuse (2) right (3) acute (4) isosceles

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2. If the three angles of a triangle are represented by $(x + 30)^\circ$, $(4x + 30)^\circ$, and $(10x - 30)^\circ$, the triangle must be
- (1) obtuse (2) isosceles (3) right (4) scalene

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3. In the diagram below, $\triangle LMO$ is isosceles with $LO = MO$.

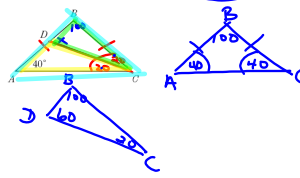


If $m\angle L = 55$ and $m\angle NOM = 28$, what is $m\angle N$?

- (1) 27 (2) 28 (3) 42 (4) 70

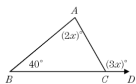
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4. In the accompanying figure, $\overline{AB} \cong \overline{BC}$, $m\angle A = 40$, and \overline{CD} bisects $\angle ACB$. Find $m\angle CDB$.



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5. In the accompanying diagram, $\angle ACD$ is an exterior angle of $\triangle ABC$. If $m\angle B = 40$, $m\angle A = 2x$, and $m\angle ACD = 3x$. What is the value of x ?



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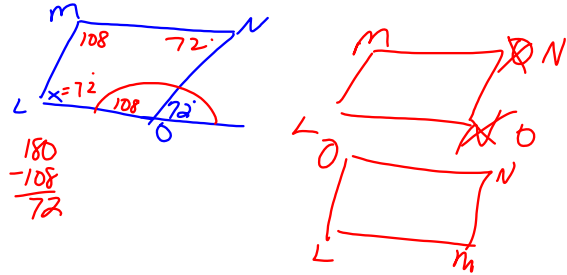
6. In the accompanying diagram of $\triangle ABC$, side \overline{AB} is extended to D . If $m\angle ACB = x + 30$, $m\angle CAB = 2x + 10$, and $m\angle CBD = 4x + 30$, what is the value of x ?



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7. In $\triangle ABC$, the measure of $\angle A$ is 50 and the measure of an exterior angle at vertex B is 125. Which is the longest side of the triangle?

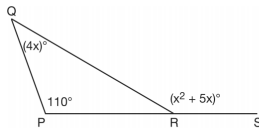
8. In parallelogram $LMNO$, an exterior angle at vertex O measures 72° . Find the measure, in degrees, of $\angle L$.



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9. In the diagram of $\triangle PQR$ shown below, \overline{PR} is extended to S , $m\angle P = 110$, $m\angle Q = 4x$, and $m\angle QRS = x^2 + 5x$.



What is $m\angle Q$?

- (1) 44 (2) 40 (3) 11 (4) 10

10. In $\triangle ABC$, $m\angle A = 58$ and $m\angle B = 64$. Which statement about the sides of the triangle is true?

- (1) $AB > BC$ (2) $AB = BC$ (3) $AB > AC$ (4) $BC > AC$

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11. The legs of an isosceles right triangle each measure 10 inches. What is the length of the hypotenuse of this triangle, to the nearest tenth of an inch?

- (1) 6.3 (2) 7.1 (3) 14.1 (4) 17.1

12. In $\triangle ABC$, $m\angle A = x^2 + 12$, $m\angle B = 11x + 5$, and $m\angle C = 13x - 17$. Determine the longest side of $\triangle ABC$.

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13. Two sides of a triangle are 2 and 3. The third side cannot be

(1) 1 (2) 2 (3) 3 (4) 4

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14. If two sides of a triangle are 1 and 4, then the third side could be

~~(1) 8~~ ~~(2) 5~~ ~~(3) 3~~ (4) 4

$1+4 > 8$ $1+4 > 5$ $1+3 > 4$ $1+4 > 4$

$4-1 < x < 4+1$
 $3 < x < 5$

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15. Which set of numbers can *not* represent the measure of the angles of a triangle?

(1) {35, 125, 10} (2) {20, 100, 60} (3) {30, 110, 40} (4) {97, 59, 24}

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16. Which set of numbers could represent the lengths of the sides of an **isosceles** triangle?

~~(1) {3, 45, 5}~~ (2) {6, 6, 5} ~~(3) {1, 1, 3}~~ ~~(4) {5, 5, 10}~~

$5+6 > 6$ $1+1 > 3$ $5+5 > 10$

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17. If two sides of a scalene triangle measure 10 and 12, the length of the third side could be

(1) 10 (2) 2 (3) 15 (4) 22

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18. Which set of numbers does *not* represent the sides of a **right** triangle?

(1) {6, 8, 10} ✓ (2) {8, 15, 17} ✓ (3) {8, 24, 25} (4) {15, 36, 39} ✓

$6^2+8^2=10^2$ $8^2+15^2=17^2$ $8^2+24^2 \neq 25^2$ $15^2+36^2=39^2$

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19. If the lengths of two sides of a triangle are 6 and 8, the length of the third side may be

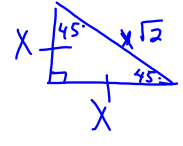
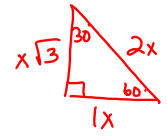
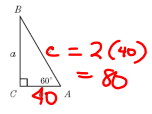
- (1) 7 (2) 2 (3) 14 (4) 15

$$8 - 6 < x < 8 + 6$$

$$2 < x < 14$$

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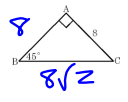
20. In the accompanying diagram of right triangle ABC, $b = 40$ centimeters, $m\angle A = 60^\circ$, and $m\angle C = 90^\circ$. Find the number of centimeters in the length of side c.



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21. In the diagram shown of right triangle BAC, $m\angle A = 90^\circ$, $m\angle B = 45^\circ$, and $AC = 8$. What is the length of BC?

- (1) $8\sqrt{3}$ (2) $8\sqrt{2}$ (3) $4\sqrt{2}$ (4) $16\sqrt{2}$



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22. A base angle of an isosceles triangle measures 30° , and the length of one of the legs is 12. What is the length of the altitude drawn to the base of the triangle?

- (1) $6\sqrt{3}$ (2) 12 (3) 6 (4) 9

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23. In right triangle ABC, CD is the altitude to hypotenuse \overline{AB} . If $AD = 2$ and $DB = 18$, find CD.

24. In right triangle ABC, altitude \overline{CD} is drawn to hypotenuse \overline{AB} . If $CD = 4$ and $AD = 2$, find DB.

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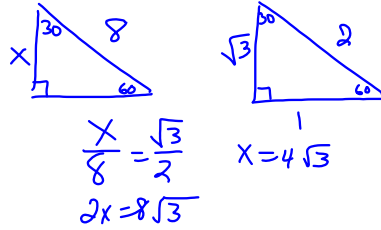
25. In right triangle ABC , altitude \overline{CD} is drawn to the hypotenuse. If $CD = 10$ and $AD = 4$, then DB equals

- (1) 2.5 (2) 14 (3) 25 (4) 40

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26. What is the length of the altitude of an equilateral triangle whose side has a length of 8?

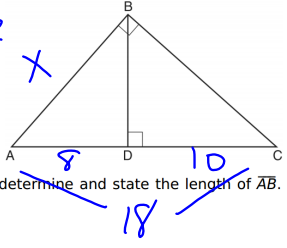
- (1) 32 (2) $4\sqrt{2}$ (3) $4\sqrt{3}$ (4) 4



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27. In right triangle ABC shown below, altitude \overline{BD} is drawn to hypotenuse \overline{AC} .

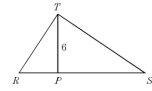
$\frac{H}{L} = \frac{L}{S}$ $x = 12$
 $\frac{18}{x} = \frac{x}{8}$
 $x^2 = 144$



If $AD = 8$ and $DC = 10$, determine and state the length of \overline{AB} .

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28. In the accompanying diagram of right triangle RST , altitude \overline{TP} is drawn to hypotenuse \overline{RS} . If $TP = 6$ and RP is 5 less than PS , find the length of hypotenuse \overline{RS} . [Only an algebraic solution will be accepted.]



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29. In the accompanying diagram, $\triangle ABC$ is a right triangle and \overline{CD} is the altitude to hypotenuse \overline{AB} . If $AC = 4$ and DB is 4 more than the length of AD , find AD .

$\frac{H}{L} = \frac{L}{S}$ $2x^2 + 4x - 16 = 0$
 $\frac{4}{2x+4} = \frac{2x+4}{x}$ $2(x^2 + 2x - 8) = 0$
 $\frac{4}{4} = \frac{4}{x}$ $(x+4)(x-2) = 0$
 $x = 2$ $x+4 = 0$ $x-2 = 0$
 $x = -4$ $x = 2$
 reject reject

$x(2x+4) = 4 \cdot 4$
 $2x^2 + 4x = 16$

$AD = 2$
 $DB = 2 + 4 = 6$
 $AB = 6 + 2 = 8$

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30. In the accompanying diagram of right triangle ABC , \overline{CD} is drawn perpendicular to hypotenuse \overline{AB} . If $CD = 2$ and AD exceeds DB by 3, find the lengths of BD and AD .

$\frac{S}{A} = \frac{A}{S}$
 $\frac{x+3}{2} = \frac{2}{x}$
 $x^2 + 3x = 4$
 $x^2 + 3x - 4 = 0$
 $(x+4)(x-1) = 0$
 $x = -4$ $x = 1$
 reject reject

$BD = 1$
 $AD = 1 + 3 = 4$
 $AB = 5$

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31. The sides of a triangle are 8, 12, and 15. An angle bisector meets the side of length 12. Find the lengths x and y .

$\frac{8}{x} = \frac{15}{y}$
 $8y = 15x$ $x = \frac{96}{23}$
 $8(12-x) = 15x$ $y = 12 - \frac{96}{23}$
 $96 - 8x = 15x$ $y = \frac{180}{23}$
 $\frac{96}{23} = \frac{23x}{23}$

$y = 12 - x$

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32. The sides of a triangle are 8, 12, and 15. An angle bisector meets the side of length 8. Find the lengths x and y .

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