

Chapter 11 Review

Form K

Do you know HOW?

Find the value of x . Express your answer in simplest radical form.

1. $12^2 + 16^2 = x^2$ $x = 20$

2. $x^2 + 13^2 = 14^2$ $x = 3\sqrt{3}$

3. $x^2 + 11^2 = 61^2$ $x = 60$

4. $\text{hyp} = \sqrt{2} \cdot \text{leg}$
 $26 = \sqrt{2} \cdot x$
 $x = 13\sqrt{2}$

5. $\text{hyp} = \sqrt{2} \cdot \text{leg}$
 $x = \sqrt{2} (5\sqrt{2})$ $x = 10$

6. $\text{hyp} = 2 \cdot \text{leg}$
 $12 = 2 \cdot y$
 $y = 6$
 $\text{LL} = \sqrt{3} \cdot \text{SL}$
 $x = \sqrt{3} \cdot 6$
 $x = 6\sqrt{3}$

7. A town recreation hall needs to build a ramp. The height of the ramp must be 2 ft. The ramp will start 6 ft from the door. To the nearest tenth of a foot, how long will the ramp be?

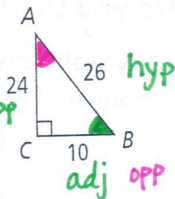
$2^2 + 6^2 = x^2$
 $x = 6.3 \text{ ft}$

Use the figure at the right for Exercises 8-10. Write each ratio.

8. $\sin B = \frac{\text{opp}}{\text{hyp}}$
 $= \frac{24}{26} = \frac{12}{13}$

9. $\cos B = \frac{\text{adj}}{\text{hyp}}$
 $= \frac{10}{26} = \frac{5}{13}$

10. $\tan A = \frac{\text{opp}}{\text{adj}}$
 $= \frac{10}{24} = \frac{5}{12}$



Given the lengths of the sides of a triangle, identify the triangle as *acute*, *right*, or *obtuse*.

11. 9, 40, 41
 $9^2 + 40^2 = 41^2$
 \therefore right

12. 10, 16, 20
 $10^2 + 16^2 < 20^2$
 \therefore obtuse

13. 12, 15, 18
 $12^2 + 15^2 > 18^2$
 \therefore acute

Find the value of x . Round lengths to the nearest tenth and angle measures to the nearest degree.

14. $\tan 40 = \frac{x}{20}$
 $20 \cdot \tan 40 = x$
 $x = 16.8$

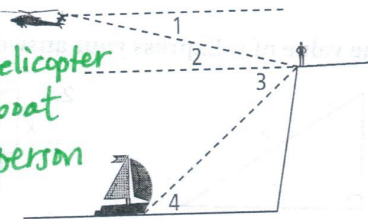
15. $\cos x = \frac{12}{13}$
 $x = \cos^{-1}(12/13)$
 $x = 23^\circ$

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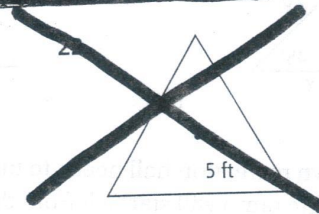
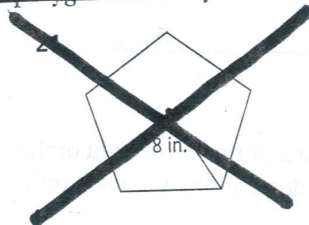
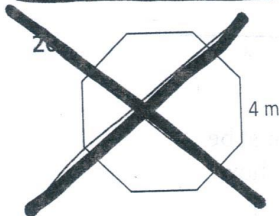
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What is the description of each angle as it relates to the diagram?

- 16. $\angle 1$ → angle of depression from helicopter to person
- 17. $\angle 2$ → angle of elevation from person to helicopter
- 18. $\angle 3$ → angle of depression from person to boat
- 19. $\angle 4$ → angle of elevation from boat to person



~~Find the area of each regular polygon.~~



Do you UNDERSTAND?

23. **Vocabulary** Explain how triangles can be classified by comparing the squares of their sides.

if the sides squared = the hyp squared: its a right Δ .
 if the sides squared > the hyp squared: its acute.
 if the sides squared < the hyp squared: its obtuse

~~24. Open-Ended On a sheet of grid paper, draw a regular polygon. Measure the side length and use those to calculate the area. Then measure the radius and calculate the area using the formula. If the answers are not close, discuss why.~~

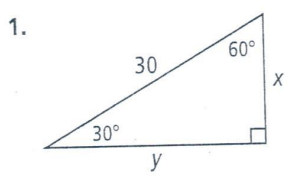
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Form G

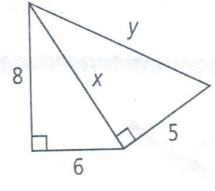
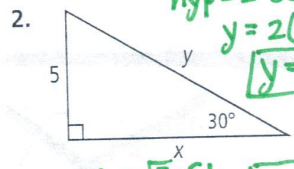
Do you know HOW?

Find the value of each variable. Express in simplest radical form.

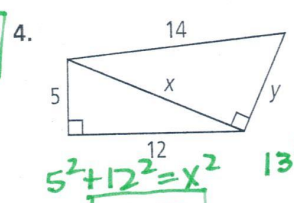
$hyp = 2 \cdot SL$
 $30 = 2 \cdot X$
 $X = 15$
 $LL = \sqrt{3} \cdot SL$
 $y = \sqrt{3} \cdot 15$
 $y = 15\sqrt{3}$



$hyp = 2 \cdot SL$
 $y = 2(5)$
 $y = 10$
 $LL = \sqrt{3} \cdot SL$
 $x = \sqrt{3}(5)$
 $x = 5\sqrt{3}$

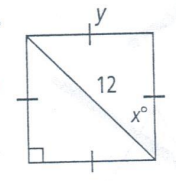
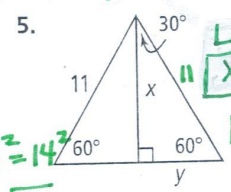


$8^2 + 6^2 = x^2$
 $x = 10$
 $10^2 + 5^2 = y^2$
 $y = \sqrt{125}$
 $y = 5\sqrt{5}$



$5^2 + 12^2 = x^2$
 $x = 13$

$LL = \sqrt{3} \cdot SL$
 $x = \sqrt{3}(5.5)$
 $hyp = 2 \cdot SL$
 $11 = 2y$
 $y = 5.5$



$x = 45^\circ$
 $hyp = \sqrt{2} \cdot leg$
 $12 = \sqrt{2} \cdot y$
 $y = \frac{12}{\sqrt{2}} = 6\sqrt{2}$

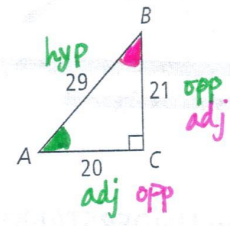
Write each ratio.

7. $\sin A = \frac{21}{29}$

8. $\cos A = \frac{20}{29}$

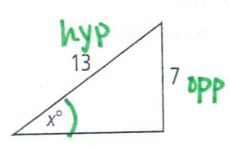
9. $\tan A = \frac{21}{20}$

10. $\sin B = \frac{20}{29}$

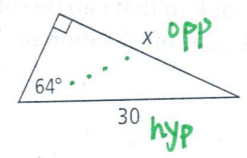


Find the value of x to the nearest tenth.

$\sin X = \frac{7}{13}$
 $X = \sin^{-1}(\frac{7}{13})$
 $X = 32.6^\circ$



$\sin 64 = \frac{x}{30}$
 $30 \cdot \sin 64 = x$
 $x = 27$



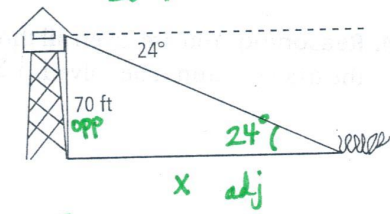
Given the lengths of the sides of a triangle, identify the triangle as acute, right, or obtuse.

13. 37, 12, 34 **obtuse**
 $12^2 + 34^2 < 37^2$

14. 5, 12, 13 **Right**
 $5^2 + 12^2 = 13^2$

15. 20, 21, 28 **acute**
 $20^2 + 21^2 > 28^2$

16. A fire ranger stands at an observation window 70 ft above the ground. She sees a fire in the distance. She takes a reading of the angle of depression and finds it to be 24° . To the nearest tenth of a foot, how far away from the base of the tower is the fire?

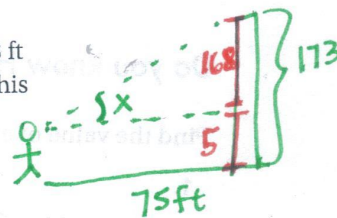


$\tan 24^\circ = \frac{70}{x}$
 $x = \frac{70}{\tan 24}$
 $x = 157.2 \text{ ft}$

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Form G

17. Raul is 75 ft from the world's tallest totem pole in Alert Bay, Canada. It is 173 ft tall. If Raul's eyes are 5 ft from the ground, what is the angle of elevation for his line of sight to the top of the totem pole? Round to the nearest tenth.

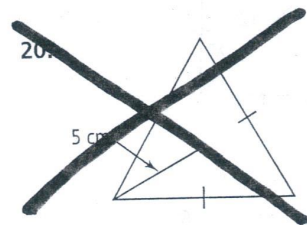
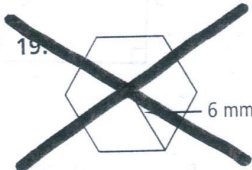
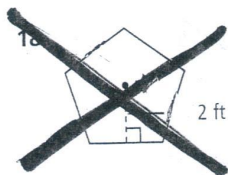


$$\tan x = \frac{168}{75}$$

$$x = \tan^{-1}(168/75)$$

$$x = 65.9^\circ$$

~~Find the area of each regular polygon.~~



~~21. A regular 10-gon has a perimeter of 150. To the nearest tenth, what is the area of the figure?~~

Do you UNDERSTAND?

22. **Writing** Write a problem that can be solved using trigonometry and an understanding of angles of elevation or depression. Draw a picture and solve the problem.

23. **Vocabulary** What is the difference between $\sin x$ and $\sin^{-1}(x)$?

$\sin(x)$ finds the ratio of the opposite to the hyp. } They are inverses!
 $\sin^{-1}(x)$ finds the angle from the ratio of $\frac{\text{opp}}{\text{hyp}}$.

24. **Reasoning** You are given all three angle measures for a triangle. Explain why the triangle cannot be solved. (Solved means find all angle & side measures.)

You must know one side to find the ratios of all sides.
 A triangle can form infinite # of triangles if just given the angles.

Factoring Review

Factor each completely.

1) $9n^2 - 1$

$$(3n+1)(3n-1)$$

2) $8r^2 - 2$

$$2(4r^2 - 1) = 2(2r-1)(2r+1)$$

3) $x^2 + 4x - 21 < \frac{7}{3}$

$$(x+7)(x-3)$$

4) $x^2 - 13x + 36 < \frac{9}{4}$

$$(x-9)(x-4)$$

5) $3x^2 + 21x + 18$

$$3(x^2 + 7x + 6)$$

$$3(x+1)(x+6)$$

6) $5x^2 - 55x + 150$

$$5(x^2 - 11x + 30)$$

$$5(x-6)(x-5)$$

7) $7a^2 + 36a + 5 = \underline{7a^2 + 35a} + \underline{a + 5}$
 \uparrow $35 < \frac{35}{1}$ \uparrow
 $7a(a+5) + 1(a+5)$
 $(7a+1)(a+5)$

8) $10k^2 - 29k + 10 = \underline{10k^2 - 25k} - \underline{4k + 10}$
 \uparrow $100 < \frac{25}{4}$ \uparrow
 $5k(2k-5) - 2(2k-5)$
 $(5k-2)(2k-5)$

9) $x^3 + 1$

$$(x+1)(x^2 - x + 1)$$

10) $125x^3 - 64$

$$(5x-4)(25x^2 + 20x + 16)$$