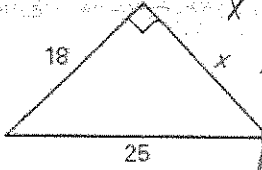


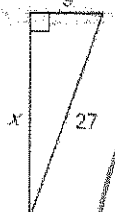
Chapter 7 Test Review

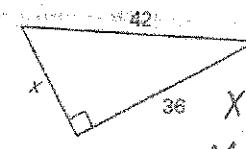
Right Triangles and Trigonometry

Name key
 Date _____ Hour _____

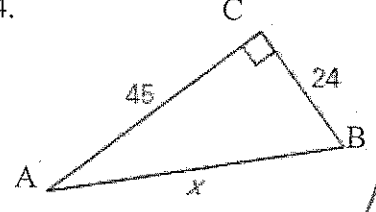
Find the length of the leg of each of these right triangles.

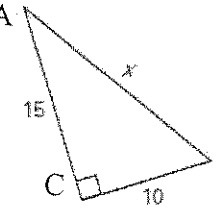
1.  $x^2 + 18^2 = 25^2$
 $x^2 = 301$
 $x = \sqrt{301}$
 $x \approx 17.35$

2.  $x^2 + 27^2 = 29^2$
 $x^2 = 648$
 $x = \sqrt{648}$
 $x \approx 25.46$

3.  $x^2 + 36^2 = 42^2$
 $x^2 = 468$
 $x = \sqrt{468}$
 $x \approx 21.63$

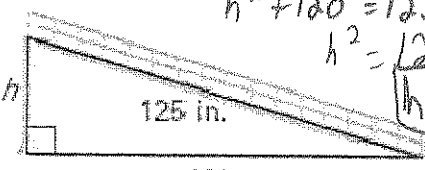
$\triangle ABC$ is a right triangle. Find AB in each of these triangles.

4.  $24^2 + 45^2 = x^2$
 $x^2 = 2601$
 $x = \sqrt{2601}$
 $x = 51$

5.  $10^2 + 15^2 = x^2$
 $325 = x^2$
 $18.03 \approx x$


6. List the four most common Pythagorean Triples. 3-4-5, 5-12-13, 8-15-17, 7-24-25

7. A shipping dock has a mobile ramp that is used to help load and unload cargo from trucks. The ramp is 125 inches long and has a base that is 120 inches long. What is the height h of the ramp?



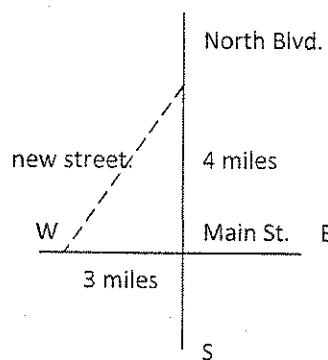
$h^2 + 120^2 = 125^2$
 $h^2 = 1225$
 $h = 35$ in

8. How long is a rope reaching from the top of a 17-ft pole to a point on the ground that is 5 ft from the base of the pole?




$5^2 + 17^2 = L^2$
 $314 = L^2$
 $17.7' = L$

9. The city commission wants to construct a new street that connects Main Street and North Boulevard as shown in the diagram below. The construction cost has been estimated at \$90 per linear foot. Find the estimated cost for constructing the street. (1 mile = 5280 feet)



North Blvd. $\text{New street} = 5 \text{ miles}$
 4 miles $= 5 \cdot 5280 \text{ ft}$
 $= 26400 \text{ ft}$
 Main St. E $\text{Cost} = 90 \cdot (26400) = \$2,376,000$
 3 miles
 S

10. A cell phone company is going to construct a 8 foot tower on top of a building. The tower will be supported by three cables, each attached to the top of the tower and to points on the roof of the building that are 6 feet from the base of the tower. Find the total length of the three cables.



Each cable is 10 ft
 all cables = 30 ft

Decide whether the numbers represent the side lengths of a right, acute, or obtuse triangle.

11. 20, 21, 28

$$20^2 + 21^2 \underline{\quad} 28^2$$

12. 15, 36, 39

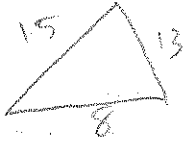
$$15^2 + 36^2 \underline{\quad} 39^2$$

13. $\sqrt{8}, 4, 6$

$$(\sqrt{8})^2 + 4^2 \underline{\quad} 6^2$$

$$24 < 36 \quad \boxed{\text{Obtuse}}$$

14. Maggie started out at her home. She walked 15 miles in one direction and then turned and walked another 13 miles in another direction. At that point she decided to head back home which was 8 miles away. Describe her path as a triangle by the angles (*acute, right or obtuse*) and side lengths (*scalene, isosceles, or equilateral*).

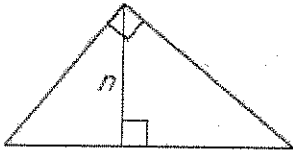


$$8^2 + 13^2 \underline{\quad} 15^2$$

$$233 > 225 \Rightarrow \boxed{\text{acute}} \ \& \ \boxed{\text{scalene}}$$

Find the value of the variable.

15.



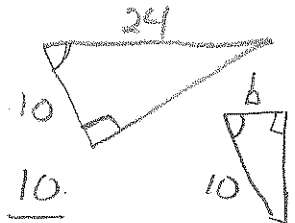
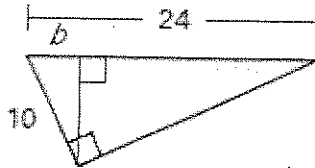
$$\frac{n}{9} = \frac{6}{n}$$

$$\sqrt{n^2} = \sqrt{54}$$

$$n = \sqrt{54}$$

$$n \approx 7.35$$

16.



$$\frac{b}{10} = \frac{10}{24}$$

$$b = 100/24 \approx 4.16$$

17. The diagonal of a square is 12 inches. Find the perimeter and area.

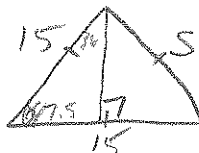


$$\frac{12}{\sqrt{2}} = 6\sqrt{2} \approx 8.49$$

$$P = 33.94$$

$$A = 72 \text{ in}^2$$

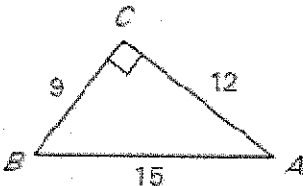
18. The perimeter of an equilateral triangle is 45 meters. Find the length of an altitude. Round to the nearest tenth.



$$P = 45 \Rightarrow S = 15$$

$$\text{altitude} = 7.5\sqrt{3} \approx 12.99$$

Use the following diagram to answer the next four questions.



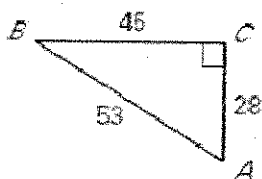
19. $\cos A = \frac{12}{15}$

20. $\tan A = \frac{9}{12}$

21. $\sin A = \frac{9}{15}$

22. Find $m\angle A \approx 36.87^\circ$

Use the following diagram to answer the next four questions.



23. $\cos B = \frac{45}{53}$

24. $\tan B = \frac{28}{45}$

25. $\sin B = \frac{28}{53}$

26. Find $m\angle B \approx 31.89^\circ$

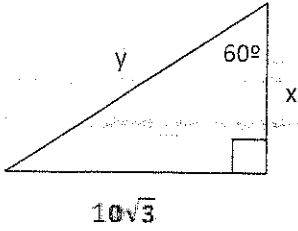
27. You are 50 feet from the screen at a drive-in movie. Your eye is on a horizontal line with the bottom of the screen and the angle of elevation to the top of the screen is 58° . How tall is the screen?



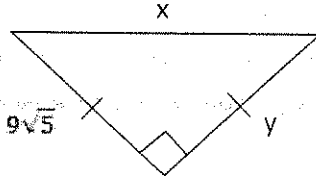
$$\tan 58 = \frac{x}{50}$$

$$x = 80.02$$

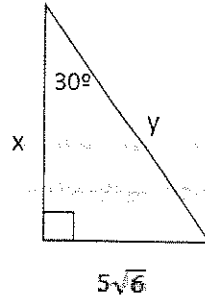
28. Find x and y in each diagram below.



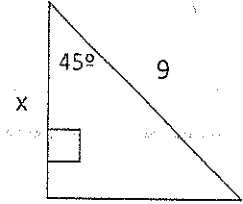
$$x = 10 \quad y = 20$$



$$x = 9\sqrt{10} \quad y = 9\sqrt{5}$$

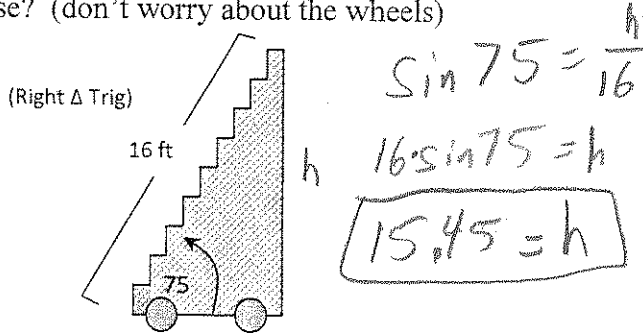
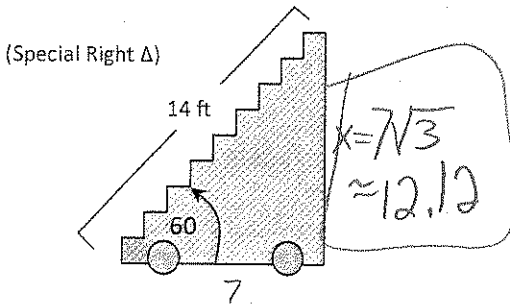


$$x = \frac{5\sqrt{18}}{0.51512} \quad y = 10\sqrt{6}$$



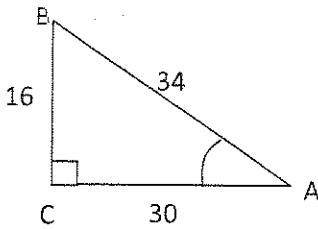
$$x = \frac{9}{\sqrt{2}} \quad y = \frac{9}{\sqrt{2}} \approx 6.36$$

29. Each diagram shows a portable staircase that is placed at an airplane door for boarding. Approximately how high is each staircase? (don't worry about the wheels)



30. Find the tangent, cosine, and sine for angle A.

Write these ratios as fractions in simplified form and as decimals rounded to four decimal places.

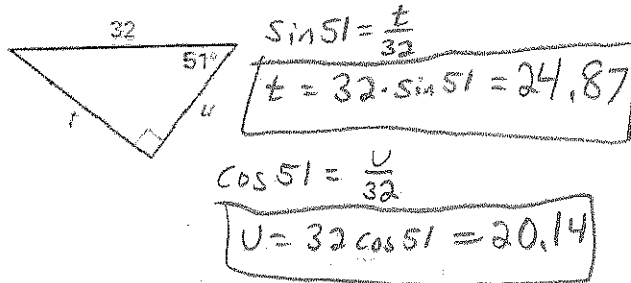
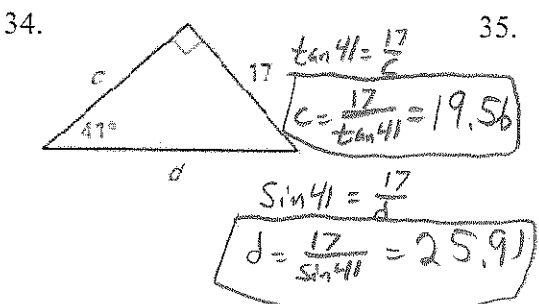
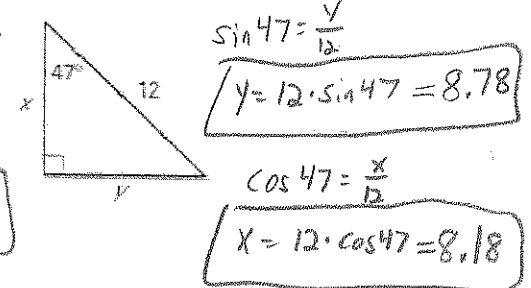
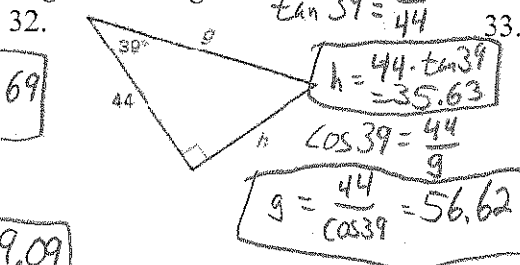
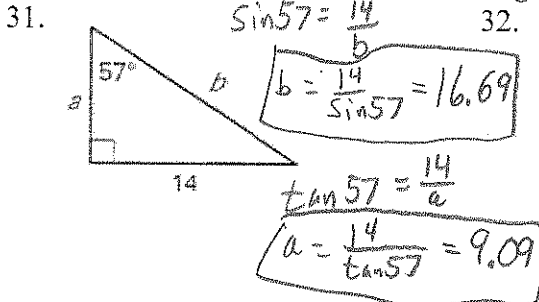


$$\sin A = \frac{16}{34} = \frac{8}{17} \approx 0.4706$$

$$\cos A = \frac{30}{34} = \frac{15}{17} \approx 0.8824$$

$$\tan A = \frac{16}{30} = \frac{8}{15} \approx 0.5333$$

Find the value of each variable in the given triangles.



Use your calculator to find each of the following.

36. $\tan 38$

0.7813

37. $\cos 45$

0.7071

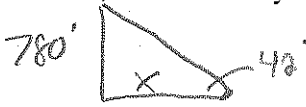
38. $\sin 24$

0.4067

39. $\tan 19$

0.3443

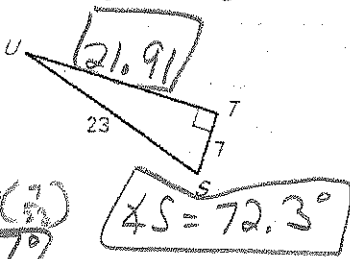
40. A skyscraper is 780 feet tall. The angle of elevation from your position to the top of the skyscraper is 42° . To the nearest foot, how far away are you from the skyscraper?



$\tan 42 = \frac{780}{x}$
 $x = \frac{780}{\tan 42} = 866'$

Solve each right triangle.

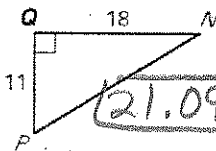
41.



$\sin U = \frac{7}{23}$
 $\angle U = \sin^{-1}(\frac{7}{23})$
 $\angle U = 17.7^\circ$

$\angle S = 72.3^\circ$

42.

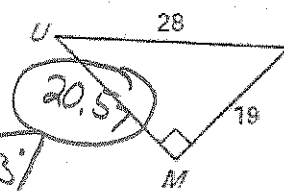


$\tan P = \frac{18}{11}$
 $\angle P = \tan^{-1}(\frac{18}{11}) = 58.57^\circ$

21.095

$\angle N = 31.43^\circ$

43.



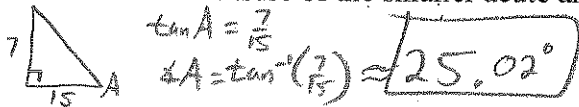
$\cos E = \frac{19}{28}$
 $\angle E = \cos^{-1}(\frac{19}{28})$

20.57

44. Let $\angle A$ be an acute angle and $\sin A = 0.36$. The measure of $\angle A$ is 21.1° .

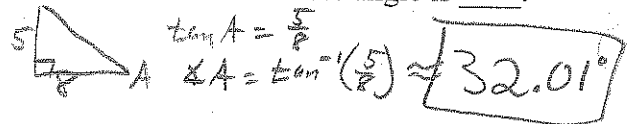
45. Let $\angle A$ be an acute angle and $\tan A = 0.8$. The measure of $\angle A$ is 38.6° .

46. Two legs of a right triangle have lengths of 7 & 15. The measure of the smaller acute angle is 25.02° .



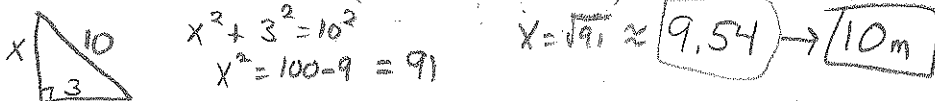
$\tan A = \frac{7}{15}$
 $\angle A = \tan^{-1}(\frac{7}{15}) \approx 25.02^\circ$

47. Two legs of a right triangle have lengths of 5 & 8. The measure of the smaller acute angle is 32.01° .



$\tan A = \frac{5}{8}$
 $\angle A = \tan^{-1}(\frac{5}{8}) \approx 32.01^\circ$

48. A 10-m ladder leans against a wall so that the base of the ladder is 3 meters from the wall. How high up on the wall will the ladder reach (to the nearest meter)?



$x^2 + 3^2 = 10^2$
 $x^2 = 100 - 9 = 91$
 $x = \sqrt{91} \approx 9.54 \rightarrow 10m$

49. To find the height of a building, a surveyor positions a transit that is 5 feet tall at a spot 110 feet away from the base of the building. She measures the angle of elevation to the top of the building to be 26° . What is the height of the building, to the nearest foot?



$\tan 26 = \frac{x}{110}$
 $x = 110 \tan 26 \approx 53.65$
 + 5 for transit

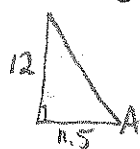
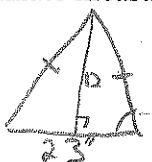
height = 58.65

50. Mary drives 16 miles up a hill that is at a grade of 15° . What horizontal distance, to the nearest tenth of a mile, has she covered?



$\cos 15 = \frac{x}{16}$
 $x = 16 \cos 15 \approx 15.5 \text{ mile}$

51. The base of an isosceles triangle is 23 inches long. The altitude to the base is 12 inches long. What is the approximate measure of the base angle of the triangle?



$\tan A = \frac{12}{11.5}$
 $\angle A = 46.22^\circ$