Lesson 12.2 • Problem Solving with Right Triangles

Name _____ Period _____ Date _____

For Exercises 1–3, find the area of each figure to the nearest square unit.

1. Area ≈ $2cm^2$ $\frac{1}{2}bh$

$\tan 25° = \frac{1}{h}$

$h = \frac{1}{\tan 25°}$

$h ≈ 2.14$

$A = \frac{1}{2}(2)(2.14...) = \boxed{2cm^2}$

50° 25 h 2.0 cm

2. Area ≈ $325 ft^2$

13.14 28 ft h 28°

$A = bh = (13.14)(24.72)$

$b = 24.72$

$\sin 28 = \frac{h}{28}$ $\cos 28 = \frac{b}{28}$

$28\sin 28 = 13.14$ $28\cos 28 = 24.72$

3. Area ≈ $109 in^2$

$\sin 70° = \frac{h}{13}$

$13\sin 70° = 12.216$

13 in. 70° 140° b h

$\cos 70 = \frac{b}{13}$

$13\cos 70 = 4.446$

$A_\Delta = 2bh$

$= 2(12.216)(4.446) =$

For Exercises 4–9, find each unknown to the nearest tenth of a unit.

4. Area = 88 cm² $= \frac{1}{2}(b)(h)$

$2 \cdot 88 = \frac{1}{2}(16)h$

$\frac{16}{16}$ $h = 11$

$x ≈ 54°$

$88 = \frac{1}{2}(16)(h)$

$h = 11$

$\tan^{-1}\left(\frac{11}{8}\right) =$

h x 16 cm h

5. $y ≈ 31°$

28 ft y 17 ft 17

$\tan^{-1}\left(\frac{17}{28}\right) =$

6. $a ≈$ ~~10 in²~~ $\boxed{7.6 in}$

$A = bh$

$A = 14a$

$14(7.608)$

14 in. 72° 8 in. a 8 in. 14 in.

8 12 9 $\sin 72 = \frac{a}{8}$

$8\sin 72 = 7.608$

7. $\overline{PS}$ and $\overline{PT}$ are tangents.

Diameter ≈ $21cm$

$\tan 65 = \frac{22}{r}$

$r = \frac{22}{\tan 65}$

$= 10.258$

$d =$

S 22 P r 65° 22 cm T

8. Right cone

$\theta ≈ 45°$

$X = \frac{1}{2}\theta$

$\sin x \cdot \frac{5}{13}$

$X = \sin^{-1}\left(\frac{5}{13}\right)$

22.619

$\theta =$

θ X 13 ft

9. Right rectangular prism

$m\angle ABC = \beta ≈ 28.3$

10 in. 24 in. 14 in. C h B A

$\cos^{-1}\left(\frac{x}{h}\right) = \beta$

$x^2 = 10^2 + 24^2 = 676$

$X = 26$

$h^2 = x^2 + 14^2$

$h^2 = 676 + 196 = 872$

$h = 29.5$

$\cos^{-1}\left(\frac{26}{29.5}\right) = \beta$

$\boxed{\beta = 28.3°}$

In Exercises 10–12, give each answer to the nearest tenth of a unit.

10. A ladder 7 m long stands on level ground and makes a 73° angle with the ground as it rests against a wall. How far from the wall is the base of the ladder?

11. To see the top of a building 1000 feet away, you look up 24° from the horizontal. What is the height of the building?

12. A guy wire is anchored 12 feet from the base of a pole. The wire makes a 58° angle with the ground. How long is the wire?

OR $\tan\beta = \frac{14}{X}$

10) Ladder 7m
73° ∠ w/ground
base to wall?
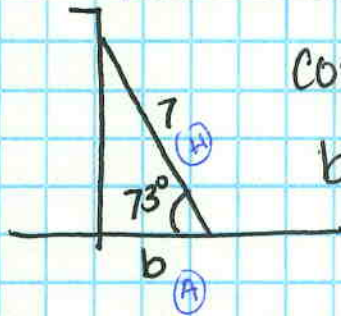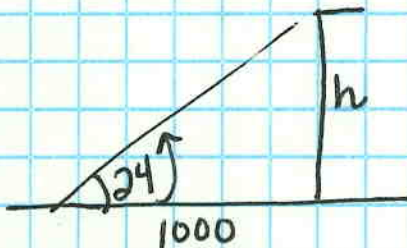
$\cos 73 = \dfrac{b}{7}$

$b = 7\cos 73$
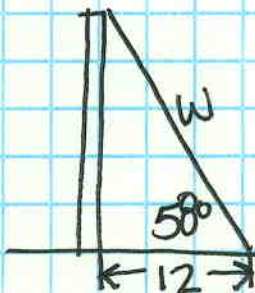
$b = 2.0$ ft from the wall

11) bldg 1000 ft away
up 24°

$\tan 24° = \dfrac{h}{1000}$

$1000 \tan 24° = 445.2$

The building is
445.2 feet tall

12) guy 12 ft from base
58° to ground

$\cos 58° = \dfrac{12}{w}$

$w = \dfrac{12}{\cos 58°} = 22.64$

The wire is 22.64 ft bag.