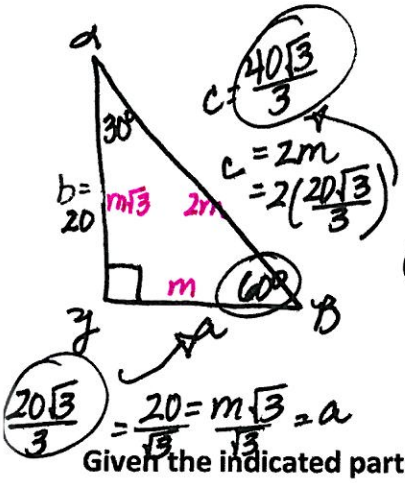
***AAT (IC/HW)-Days 1 & 2**
**Chapter 6: 6-7 Applied Problems**

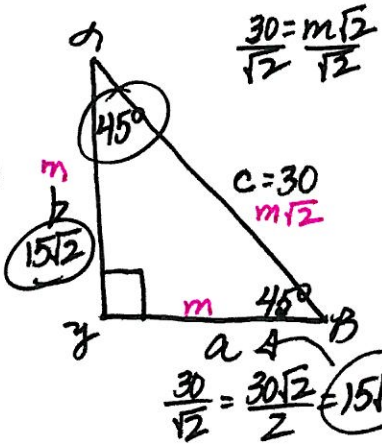
Name Key
Date: _____ Period: _____

**Given the indicated parts of triangle ABC with γ = 90°, find the exact values of the remaining parts.**

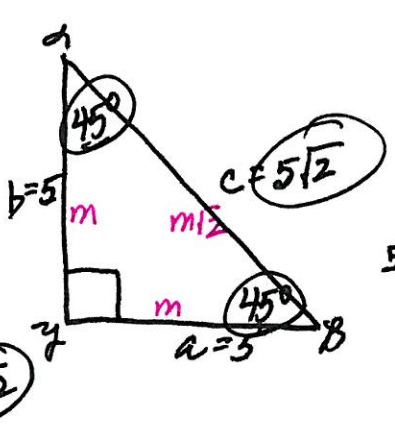
1. α = 30°, b = 20



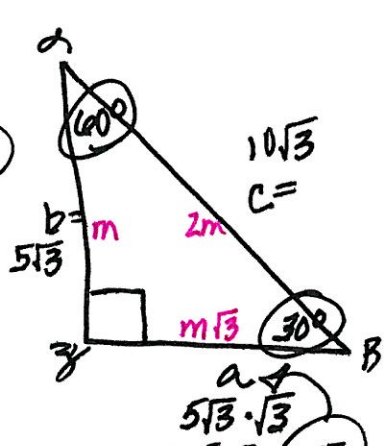

2. β = 45°, c = 30




3. a = 5, b = 5

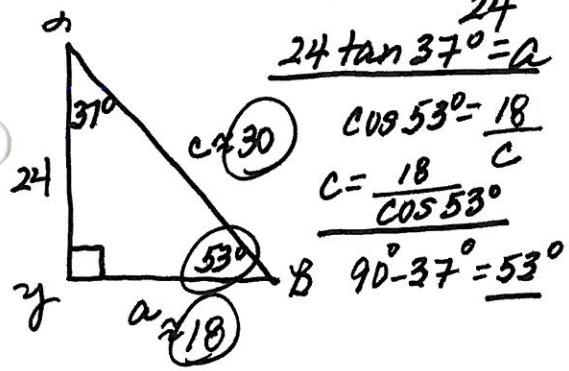



4. b = 5√3, c = 10√3

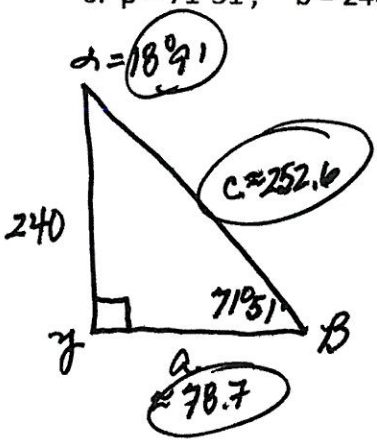



**Given the indicated parts of triangle ABC with γ = 90°, approximate the remaining parts.**

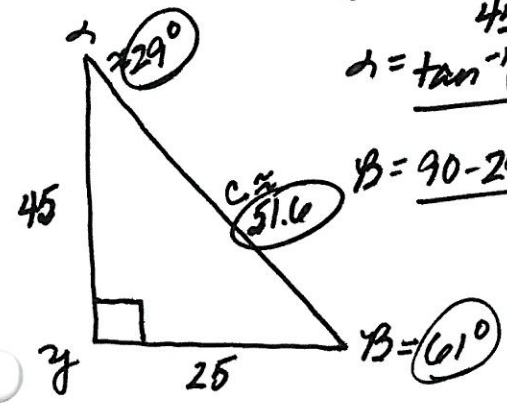
5. α = 37°, b = 24



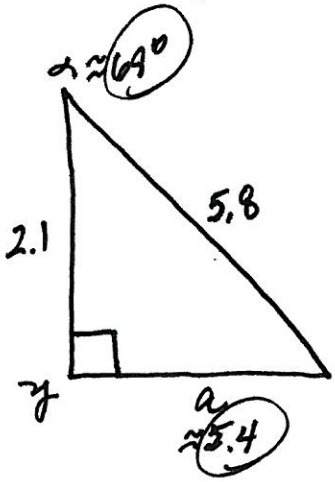

6. β = 71°51', b = 240.0




7. a = 25, b = 45




8. c = 5.8, b = 2.1



**Given the indicated parts of triangle ABC with γ = 90°, express the third part in terms of the first two.**

9. α, c; b

$\cos\alpha = \frac{b}{c}$

$b = c\cos\alpha$

10. β, b; a

$\cot\beta = \frac{a}{b}$

$a = b\cot\beta$

11. α, a; c

$\csc\alpha = \frac{c}{a}$

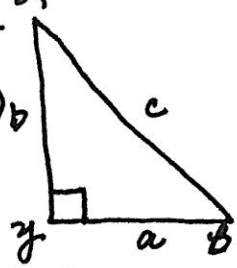
$c = a\csc\alpha$

12. a, c; b

$a^2 + b^2 = c^2$

$b^2 = c^2 - a^2$

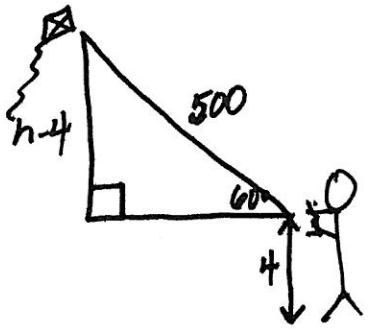
$b = \sqrt{c^2 - a^2}$




13. A person flying a kite holds the string 4 feet above ground level. The string of the kite is taut and makes an angle of 60° with the horizontal. Approximate the height of the kite above level ground if 500 feet of string is payed out.

$h$ = height of kite

$x = h - 4$




$\sin 60° = \frac{h-4}{500}$

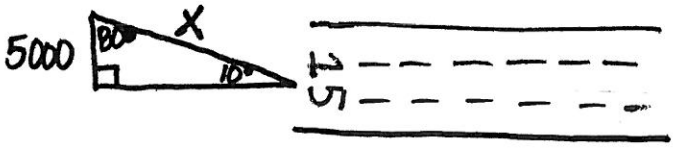
$h = 437$ ft.

14. A pilot, flying at an altitude of 5000 feet, wishes to approach the numbers on a runway at an angle of 10°. Approximate, to the nearest 100 feet, the distance from the airplane to the numbers at the beginning of the descent.

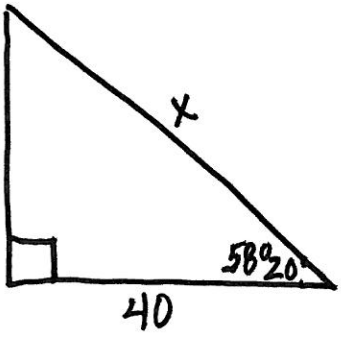
$\sin 10° = \frac{5000}{x}$

$x = 5000 / \sin 10°$

$x \approx 28{,}800$ ft.




15. A guy wire is attached to the top of a radio antenna and to a point on horizontal ground that is 40.0 meters from the base of the antenna. if the wire makes an angle of 58°20' with the ground, approximate the length of the wire.

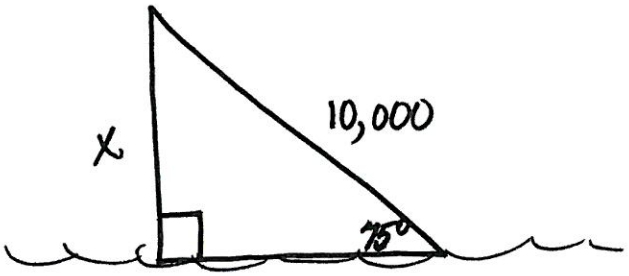



$\cos 58°20' = \frac{40}{x}$

$x = 40 / \cos 58°20'$

$x \approx 76.2$ m.

16. A rocket is fired at sea level and climbs at a constant angle of 75° through a distance of 10,000 feet. Approximate its altitude to the nearest foot.

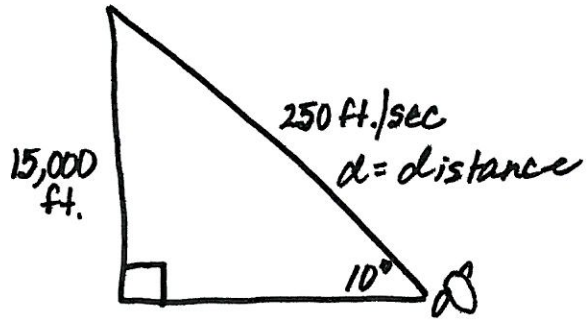



$\sin 75° = \frac{x}{10{,}000}$

$x = 10{,}000(\sin 75°)$

$x \approx 9659$ ft.

17. An airplane takes off at a 10° angle and travels at the rate of 250 ft/sec. Approximately how long does it take the airplane to reach an altitude of 15,000 feet?




$\sin 10° = \frac{15000}{d}$

$d = 15000 / \sin 10°$

$d = 86{,}382$ ft.

$r \cdot t = d$

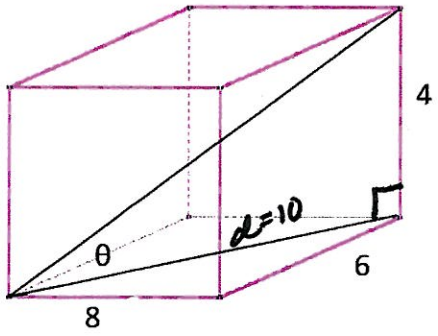
$(250)t = 86{,}382$

$t = \frac{86382}{250}$

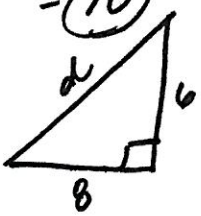
$t = 345$ sec.

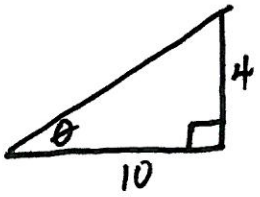
or $345/60 \approx 5.75$ min.

18. A rectangular box has dimensions 8" x 6" x 4". Approximate, to the nearest tenth of a degree, the angle θ formed by a diagonal of the base and the diagonal of the box.




diagonal of base $= \sqrt{8^2 + 6^2} = 10$




$\tan\theta = \frac{4}{10}$

$\theta = \tan^{-1}\left(\frac{4}{10}\right)$

$\theta \approx 21.8°$