Geometry **Name**_____

8.5 Angles of Elevation & [redacted] **Date**____ **Period**____

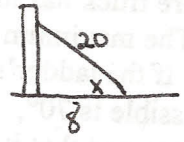
Draw a picture, write a trig [redacted] rewrite the equation so that it is calculator ready and then solve each problem. Round [redacted] segments to the nearest tenth and measures of angles to the nearest degree.

66° 1. A 20-foot ladd[redacted]inst a wall so that the base of the l[redacted]et from the base of the building. W[redacted]dder's angle of elevation?

$\cos x = \frac{8}{20}$

$x = \cos^{-1}\frac{8}{20}$

$x \approx 66°$

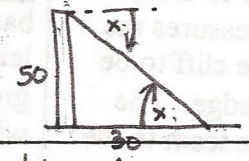


59° 2. A 50-meter vertical tower is braced with a cable secured at the top of the tower and tied 30 meters from the base. What is the angle of depression from the top of the tower to the point on the ground where the cable is tied?

$\tan x = \frac{50}{30}$

$x = \tan^{-1}\frac{50}{30}$

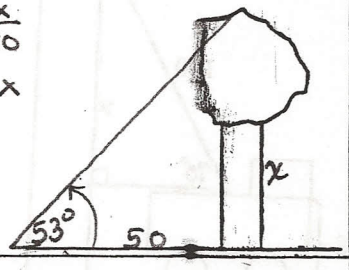
$x \approx 59°$



66.4′ 3. At a point on t[redacted]50 feet from the foot of a tree, the [redacted]vation to the top of the tree is 53°. [redacted]ght of the tree.

$\tan 53° = \frac{x}{50}$

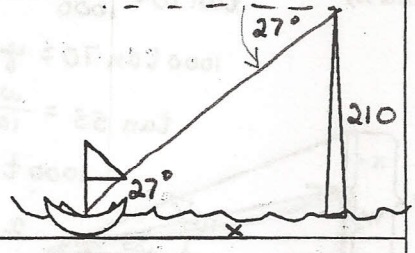
$50 \tan 53° = x$



412.1′ 4. From the top of a lighthouse 210 feet high, the angle of depression of a boat is 27°. Find the distance from the boat to the foot of the lighthouse. The lighthouse was built at sea level.

$\tan 27 = \frac{210}{x}$

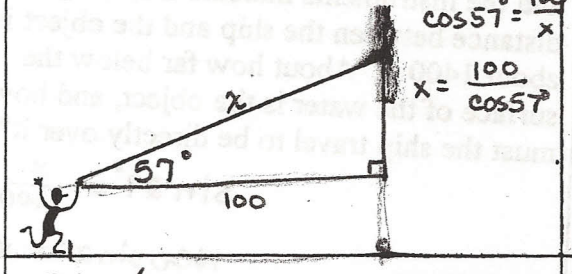
$x = \frac{210}{\tan 27}$



183.6′ 5. Richard is flyi[redacted] The kite string has an angle of eleva[redacted]. If Richard is standing 100 fee[redacted]point on the ground directly below [redacted]d the length of the kite string.

$\cos 57° = \frac{100}{x}$

$x = \frac{100}{\cos 57°}$

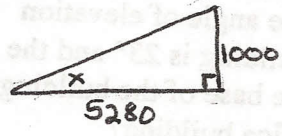


11° 6. An airplane rises vertically 1000 feet over a horizontal distance of 5280 feet. What is the angle of elevation of the airplane's path?

$\tan x = \frac{1000}{5280}$

$x = \tan^{-1}\left(\frac{1000}{5280}\right)$

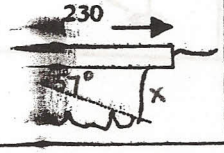
$x = 10.7°$



354.2′ 7. A person at c[redacted]a 230-foot bridge spots the river's ed[redacted] below the opposite end of the bridge[redacted]the angle of depression to be 57°. [redacted]ow the bridge is the river?

$\tan 57° = \frac{x}{230}$

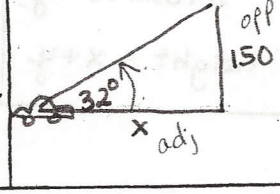
$230 \tan 57° = x$



240.1′ 8. The angle of elevation from a car to a tower is 32°. The tower is 150 ft. tall. How far is the car from the tower?

$\tan 32° = \frac{150}{x}$

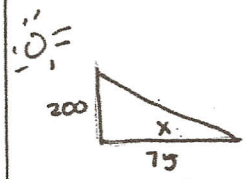
$x = \frac{150}{\tan 32}$



69° 9. A radio tower 200 ft. high casts a shadow 75 ft. long. What is the angle of elevation of the sun?

$\tan x = \frac{200}{75}$

$x = \tan^{-1} \frac{200}{75}$

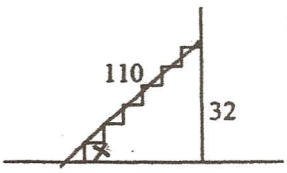


17° 10. An escalator from the ground floor to the second floor of a department store is 110 ft long and rises 32 ft. vertically. What is the escalator's angle of elevation?

$\sin x = \frac{32}{110}$

$x = \sin^{-1}\left(\frac{32}{110}\right)$

$x \approx 16.91$



1319.3' 11. A rescue team 1000 ft. away from the base of a vertical cliff measures the angle of elevation to the top of the cliff to be 70°. A climber is stranded on a ledge. The angle of elevation from the rescue team to the ledge is 55°. How far is the stranded climber from the top of the cliff? (Hint: Find y and w using trig ratios. Then subtract w from y to find x)

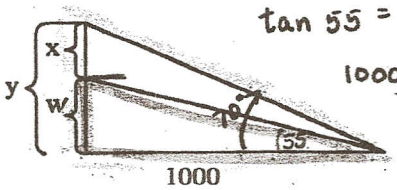
$\tan 70 = \frac{y}{1000}$

$1000 \tan 70 = y$

$\tan 55 = \frac{w}{1000}$

$1000 \tan 55 = w$

$x = y - w$



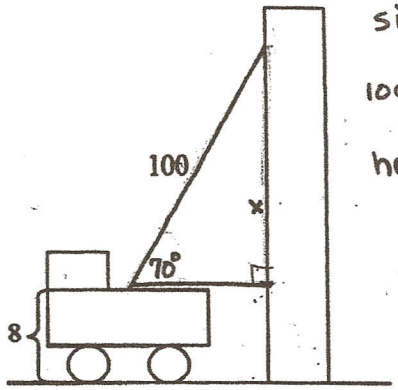
102.0' 12. A ladder on a fire truck has its base 8 ft. above the ground. The maximum length of the ladder is 100 ft. If the ladder's greatest angle of elevation possible is 70°, what is the highest above the ground that it can reach?

$\sin 70 = \frac{x}{100}$

$100 \sin 70 = x \approx 93.96$

height $= x + 8$

≈ 101.96



808.1' 13. A person in an apartment building sights the top and bottom of an office building 500 ft. away. The angle of elevation for the top of the office building is 23° and the angle of depression for the base of the building is 50°. How tall is the office building?

$\tan 23 = \frac{x}{500}$

$500 \tan 23 = x$

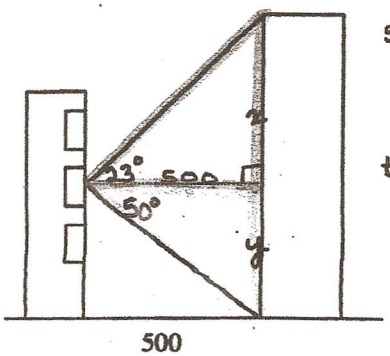
$212.237 \approx x$

$\tan 50 = \frac{y}{500}$

$500 \tan 50 = y$

$595.876 \approx y$

height $= x + y$



14. Electronic instruments on a treasure-hunting ship detect a large object on the sea floor. The angle of depression is 29°, and the instruments indicate that the direct-line distance between the ship and the object is about 1400 ft. About how far below the surface of the water is the object, and how far must the ship travel to be directly over it?

$\sin 29° = \frac{x}{1400}$

$1400 \sin 29 = x$

$678.7' \approx x$

$\cos 29 = \frac{y}{1400}$

$1400 \cos 29 = y$

$1224.5' \approx y$