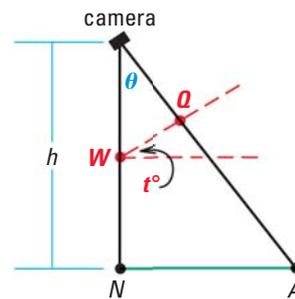


43. **MULTI-STEP PROBLEM** A photographer is at a height h taking aerial photographs. The ratio of the image length WQ to the length NA of the actual object is

$$\frac{WQ}{NA} = \frac{f \tan(\theta - t) + f \tan t}{h \tan \theta}$$

where f is the focal length of the camera, θ is the angle between the vertical line perpendicular to the ground and the line from the camera to point A , and t is the tilt angle of the film.

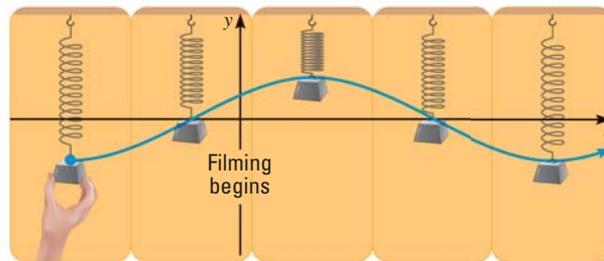


- a. Use the difference formula for tangent to simplify the ratio.

- b. Show that $\frac{WQ}{NA} = \frac{f}{h}$ when $t = 0$.

44. **TAKS REASONING** Your friend pulls on a weight attached to a spring and then releases it. A split second later, you begin filming the spring to analyze its motion. You find that the spring's distance y (in inches) from its equilibrium point can be modeled by $y = 5 \sin(2t + C)$ where $C = \tan^{-1} \frac{3}{4}$ and t is the elapsed time (in seconds) since you began filming.

- a. Find the values of $\sin C$ and $\cos C$.
 b. Use a sum formula to show that $y = 5 \sin(2t + C)$ can be written as $y = 4 \sin 2t + 3 \cos 2t$.
 c. Graph the function found in part (b) and find its maximum value. *Explain* what this value represents.



45. **CHALLENGE** The busy signal on a touch-tone phone is a combination of two tones with frequencies of 480 hertz and 620 hertz. The individual tones can be modeled by the following equations:

$$\text{480 hertz: } y_1 = \cos 960\pi t \quad \text{620 hertz: } y_2 = \cos 1240\pi t$$

The sound of the busy signal can be modeled by $y_1 + y_2$. Show that:

$$y_1 + y_2 = 2 \cos 1100\pi t \cos 140\pi t$$

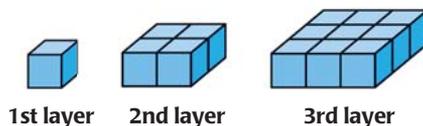
MIXED REVIEW FOR TAKS

TAKS PRACTICE at classzone.com

REVIEW

Lesson 12.1;
TAKS Workbook

46. **TAKS PRACTICE** A stack of boxes forms a square pyramid. The diagram shows the top three layers of the pyramid. Which rule gives the number a_n of boxes in the n th layer of the pyramid? **TAKS Obj. 2**



- (A) $a_n = 2n$ (B) $a_n = 2(n + 1)$ (C) $a_n = n(n + 1)$ (D) $a_n = n^2$

REVIEW

Lesson 1.3;
TAKS Workbook

47. **TAKS PRACTICE** What is the solution of $2(x - 2) - 1.45 = 3(x - 3)$? **TAKS Obj. 4**

- (F) -12.14 (G) 3.55 (H) 6.08 (J) 11.25