Question 1:

(a)[**5 points**] Find the exact value of $\cos\left(-\frac{5\pi}{12}\right)$. (Hint: $-\frac{5}{12} = \frac{3}{12} - \frac{8}{12}$.)

(b)[**5 points**] Find the exact value of $\sin\left(\frac{\pi}{12}\right)$. (Hint: $\frac{\pi}{12} = \frac{(\pi/6)}{2}$.)

Question 2 [10 points]: Find all solutions $0 \leq x < 2\pi$ to

$$2\cos^2 x + 3\cos x + 1 = 0 \ .$$

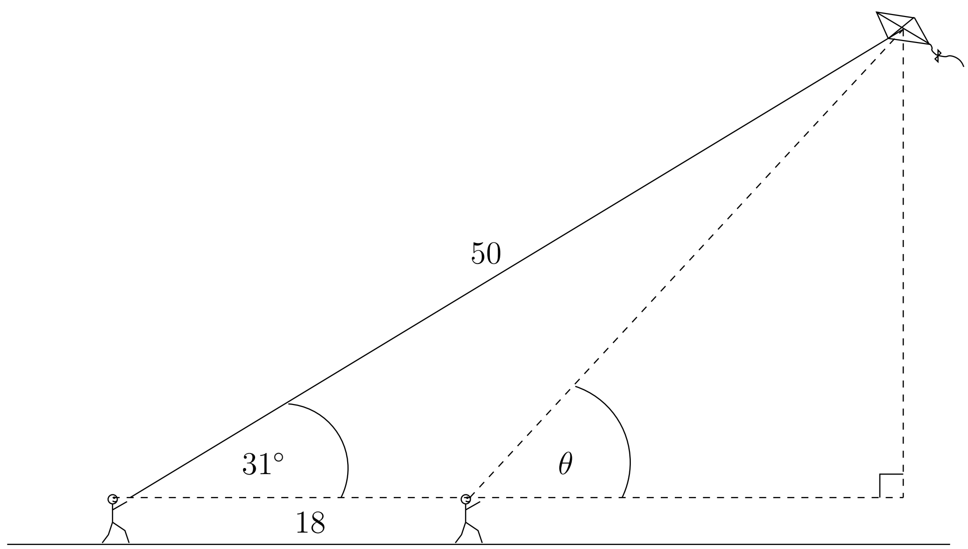
Question 3:

(a)[3 points] Simplify without using a calculator: $\cos\left(\sin^{-1}(1/3)\right)$.

(b)[3 points] Simplify without using a calculator: $\arctan(-1)$.

(c)[4 points] Simplify to a fraction containing no trigonometric functions: $\tan(\arccos(x))$.

Question 4: Two friends standing 18 m apart on level ground are flying a kite. The kite, at the end of 50 m of string, is observed by the person holding the string to be at an angle of elevation of 31°.

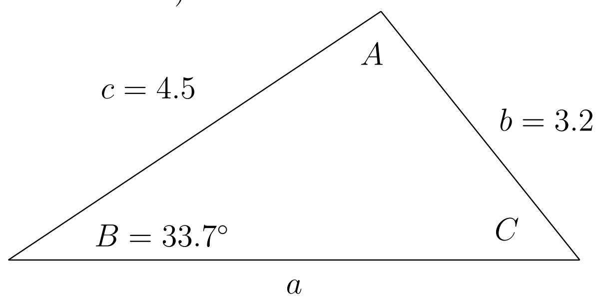


(a)[5 points] If the friends are each 2 m tall, how high is the kite above the ground?

(b)[5 points] At what angle of elevation θ does the second friend see the kite?

Question 5:

(a)[5 points] Angle C in the following triangle is acute. Solve the triangle (round final answers to 1 decimal):



(b)[5 points] There is another triangle with $B = 33.7°$, $b = 3.2$ and $c = 4.5$. Sketch and solve it (round final answers to 1 decimal).

You may find some of the following formulas useful:

$$\sin^2(A) + \cos^2(A) = 1$$

$$\sin(A+B) = \sin(A)\cos(B) + \cos(A)\sin(B)$$

$$\sin(A-B) = \sin(A)\cos(B) - \cos(A)\sin(B)$$

$$\cos(A+B) = \cos(A)\cos(B) - \sin(A)\sin(B)$$

$$\cos(A-B) = \cos(A)\cos(B) + \sin(A)\sin(B)$$

$$\sin(2A) = 2\sin(A)\cos(A)$$

$$\cos(2A) = \cos^2(A) - \sin^2(A)$$

$$\cos(2A) = 1 - 2\sin^2(A)$$

$$\cos(2A) = 2\cos^2(A) - 1$$

$$\sin^2(A/2) = \frac{1-\cos(A)}{2} \qquad \cos^2(A/2) = \frac{1+\cos(A)}{2}$$

$$\frac{\sin(A)}{a} = \frac{\sin(B)}{b} = \frac{\sin(C)}{c}$$

$$c^2 = a^2 + b^2 - 2ab\cos(C)$$

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

$$a_n = a + (n-1)d \qquad a_n = ar^{n-1}$$

$$S_n = n\frac{(a_1+a_n)}{2} \qquad S_n = \frac{n[2a+(n-1)d]}{2} \qquad S_n = \frac{a(1-r^n)}{1-r}$$