

SHARP

Worksheet 6: Trigonometric Functions

Grade 11 Mathematics

1. Sketch the following graphs on their own set of axes for $x \in [-180; 360]$:

a) $y = \sin x$

b) $y = \cos x$

(R)

c) $y = \tan x$

d) $y = 2 \sin x$

(R)

e) $y = 3 \cos x$

f) $y = \frac{1}{2} \tan x$

(R)

g) $y = \sin 2x$

h) $y = \cos \frac{1}{2}x$

(R)

i) $y = \tan 3x$

j) $y = \sin(x + 30)$

(C)

k) $y = \cos(x - 30)$

l) $y = \tan(x + 45)$

(C)

m) $y = 2 \sin 3x$

n) $y = 3 \cos(x + 15)$

(C)

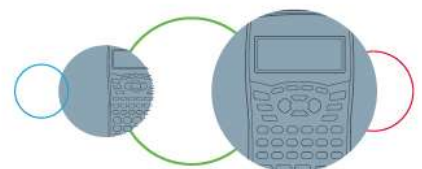
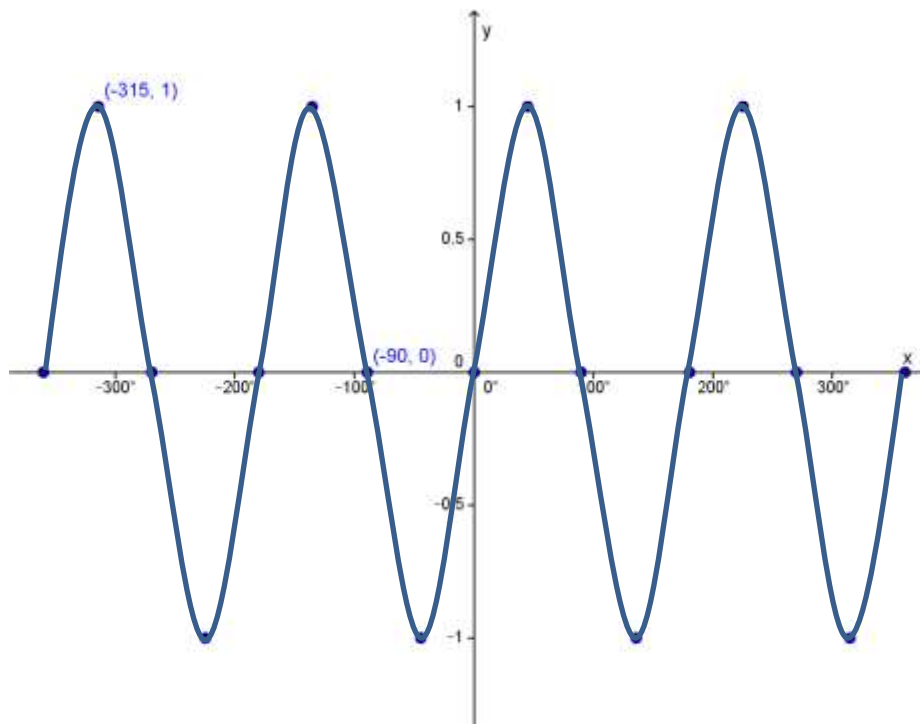
o) $y = \frac{1}{2} \tan(x - 15)$

(C)

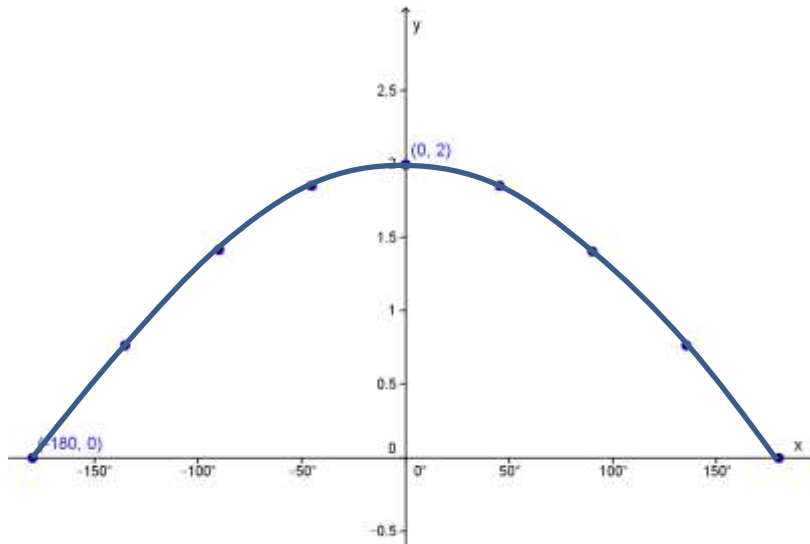
2. Give the period and amplitude for each of the graphs in question 1. (C)

3. Determine the equation of each of the following graphs:

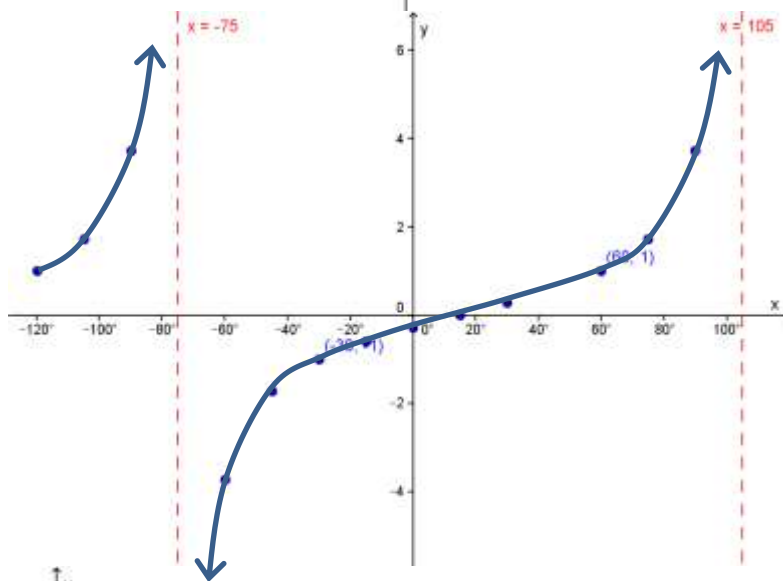
a)



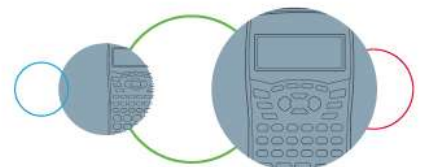
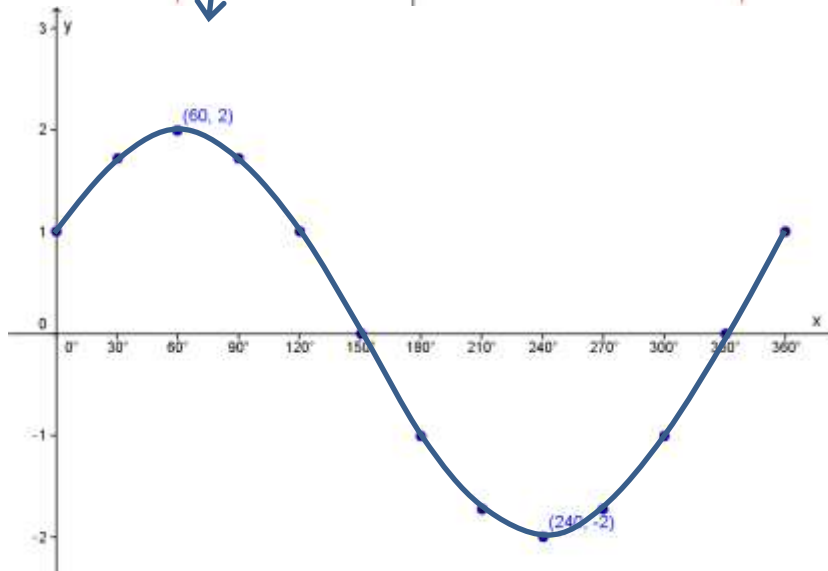
b)



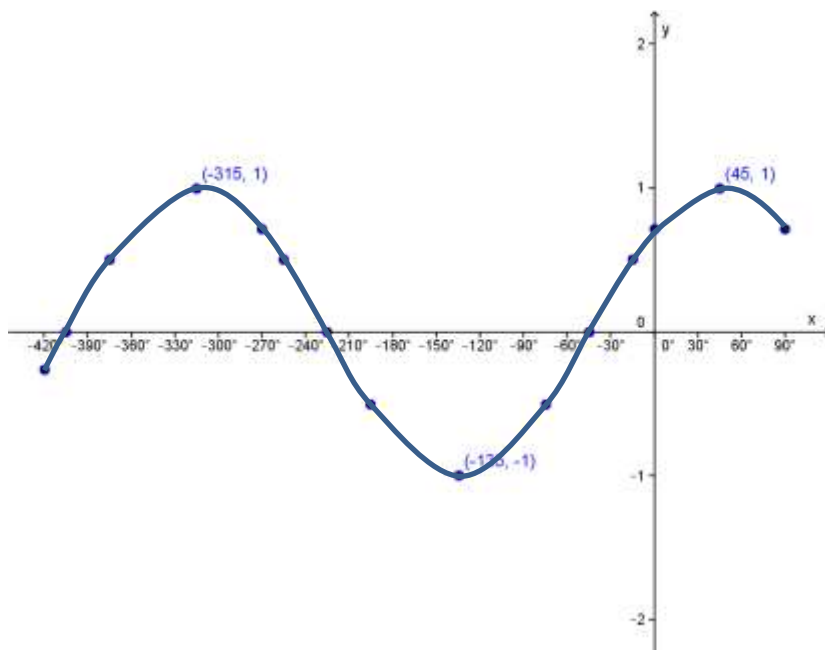
c)



d)

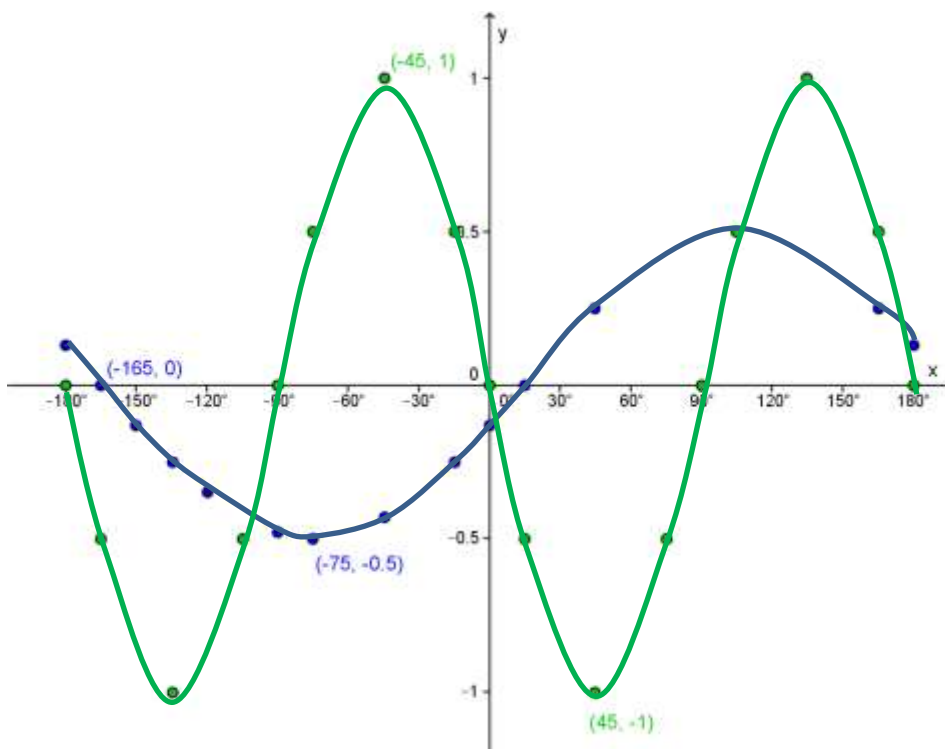


e)

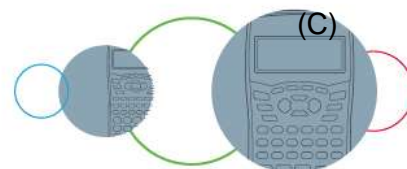


4. For each of the graphs is question 3, give the period and amplitude of each graph. (R)

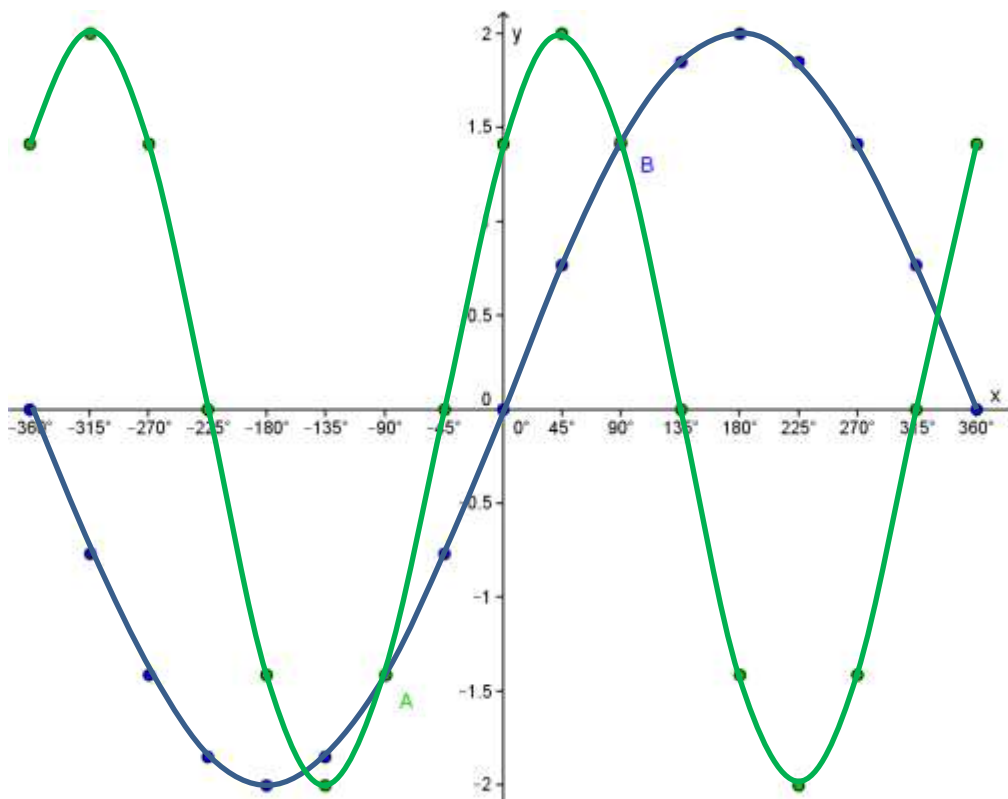
5. Given the graph of $f(x) = a \sin(x - 15)$ and $g(x) = \cos 2(x + b)$ and the coordinates $(-45, 1)$ and $(45; 1)$ lie on the $g(x)$ graph, and $(-165; 0)$ and $(-75; -0.5)$ lie on the graph of $f(x)$.



- a) Determine the values of a and b. (C)
- b) Determine the period and amplitude of both graphs. (R)
- c) Determine the values for x where $f(x) - g(x) = 0$ (P)
- d) For which values of x is $g(x) \leq f(x)$? (P)
- e) Determine the x - and y -intercepts of $f(x)$ and $g(x)$. (C)



6. Given the graph of $m(x) = 2\sin\frac{1}{2}x$ and $p(x) = 2\cos(x - 45)$.



- Determine the four different points of intersection of the two graphs. (C)
- Give the values of x where the distance between the two graphs is at a minimum. (P)
- Give the period and amplitude of each graph. (R)
- Give the x - and y -intercepts for both graphs. (R)
- Determine the distance between $p(x)$ and $m(x)$ when $x = 225^\circ$. (C)

7. Given the graphs $h(x) = \sin(x - 15)$, $j(x) = \cos(x - 15)$ and $k(x) = \tan(x - 15)$.

- Draw the graphs of $h(x)$, $j(x)$ and $k(x)$ on the same set of axes for $x \in [-180; 360]$ (R)
- Give the asymptotes of $k(x)$. (R)
- Give the period and amplitude of each graph. (R)
- Where do the graphs of $h(x)$ and $j(x)$ intersect? (C)
- For which values of x does $\frac{h(x)}{j(x)} = 0$? (P)
- For which values of x is $h(x) - j(x) \geq 0$? (P)
- Determine the distance between $h(x)$ and $j(x)$ when $x = 105^\circ$. (C)

