Hwa Chong Institution 华侨中学
Mathematics (SMTP)

Name: Wm Rn Hao (27) Class: 321 Date: 20th Aug

MA304.2.E1 – Trigonometric Ratios Exercise

1. Evaluate, without using the calculator, $\dfrac{\sin 60° - \tan 45°}{\cos 60° - 1} + \dfrac{\tan 15° \tan 75°}{2\sin 30°}$.

2. Additional Mathematics 360 (2nd Edition) Exercise 10.1
   - 2.1 Question 10
   - 2.2 Question 16
   - 2.3 Question 19
   - 2.4 Question 20

3. Given that $\tan A = 0.4$ and $\cos A < 0$, find the exact value of $\sin A + \sin\left(\dfrac{\pi}{2} - A\right)$.

華僑中學
HWA CHONG INSTITUTION

NAME ______ SUBJECT ______ MARKS ______ B-

INDEX NO. ______ CLASS ______ DATE ______

1. $\frac{\sin(60°) - \tan(45°)}{\cos(60°) - 1} + \frac{\tan(15°)\tan(75°)}{2\sin(30°)}$

$= \frac{\frac{\sqrt{3}}{2} - 1}{\frac{1}{2} - 1} + \frac{\frac{1}{\tan(75°)} \cdot \tan(75°)}{2 \times \frac{1}{2}}$

$= 1 - \frac{\frac{\sqrt{3}}{2} - 1}{\frac{1}{2}}$

$= 1 - 2(\frac{\sqrt{3}}{2} - 1)$

$= 3 - \sqrt{3}$

2.1 Given that $\cos(35°) = k$, express $\tan(35°) + \tan(55°)$ in terms of k.

Opposite side of triangle $= \sqrt{1^2 - k^2}$ units

$= \sqrt{1-k^2}$

$\therefore \tan(35°) + \tan(55°) = \frac{\sqrt{1-k^2}}{k} + \frac{k}{\sqrt{1-k^2}}$

$= \frac{1-k^2+k^2}{k\sqrt{1-k^2}}$

$= \frac{1}{k\sqrt{1-k^2}}$

2.2 Given that $\sin(130°) = k$, where k is a constant, express in terms of k,

(i) $\sin(50°)$

$\sin(130°) = \sin(50°)$ (as sine is positive when the angle is in the second quadrant)

$\sin(50°) = k$

(ii) $\cos(40°)$

$\cos(40°) = \cos(90° - 50°)$

$= \sin(50°)$

$\cos(40°) = k$

(iii) $\tan(230°)$

$\sin(230°) = \sin(360° - 130°)$

$= -\sin(130°)$

$= -k$

$\tan(230°) = \frac{k}{\sqrt{1-k^2}}$ why? no working?

(iv) $\sin(-220^\circ)$

$$\sin(-220) = \frac{-\sqrt{1-k^2}}{-1}$$

$$= \sqrt{1-k^2}$$

what's the method?

2.3 Given that $\tan A = 2$ and $\sin B = -\frac{2}{3}$, where $A > \frac{\pi}{2}$ and $B > \frac{\pi}{2}$, find the value of $\sin A$ and $\tan B$ if

(i) angles A and B are in the same quadrant

As tan A is positive, A and B are in the third quadrant.

?? $= \sqrt{1^2+2^2} = \sqrt{5}$

$\sin A = -\frac{2}{\sqrt{5}}$

?? $= \sqrt{3^2-2^2} = \sqrt{5}$

$\tan B = \frac{2}{\sqrt{5}}$

(ii) angles A and B are in different quadrants.

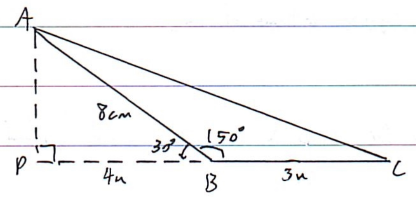
? tan A is in the third quadrant as it is positive.

$\therefore \sin A = -\frac{2}{\sqrt{5}}$

$\tan B = -\frac{2}{\sqrt{5}}$

working?

2.4



The diagram shows a triangle ABC in which AB = 8cm and angle ABC = 150°. AP is the height of the triangle and $BC = \frac{3}{4}BP$.

(i) Find the exact value of BP.

$\measuredangle ABP = 180^\circ - \measuredangle ABC$

$= 180^\circ - 150^\circ$

$= 30^\circ$

$\cos(30^\circ) = \frac{BP}{8\text{ cm}}$ cm

$BP = 8\cos(30^\circ)$ cm

$= 4\sqrt{3}$ cm

华侨中学

HWA CHONG INSTITUTION

NAME ______ SUBJECT ______ MARKS ______

INDEX NO. ______ CLASS ______ DATE ______

(ii) Given that angle $ACB = \tan^{-1} k\sqrt{3}$, find the value of k.

$\tan(ACB) = k\sqrt{3}$

$\therefore \frac{AP}{PC} = \frac{k\sqrt{3}}{1}$? from where?

$PC = 4\sqrt{3} \times \frac{7}{4}$ units

$= 7\sqrt{3}$

$k\sqrt{3} = 7\sqrt{3}$

$\therefore k = 7$ X

??3. $\sqrt{5^2+2^2} = \sqrt{29}$

$\sin A = \frac{2}{\sqrt{29}}$

$\sin(\frac{\pi}{2} - A) = \cos A$

$= \frac{5}{\sqrt{29}}$

$\therefore \sin A + \sin(\frac{\pi}{2} - A) = \frac{2}{\sqrt{29}} + \frac{5}{\sqrt{29}}$

$= \frac{7}{\sqrt{29}}$

fail to understand basic concepts.

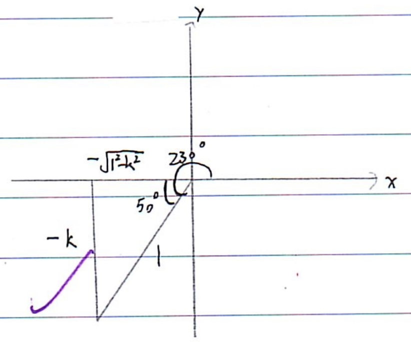
lack of essential workings and demonstration of key concepts 24/8/21

HWA CHONG INSTITUTION
華僑中學

NAME Correction SUBJECT MARKS
INDEX NO. CLASS DATE

2.2 (iii) $\sin(50^\circ) = -k$

$= -\frac{k}{1}$ (as sine is negative in the third quadrant)

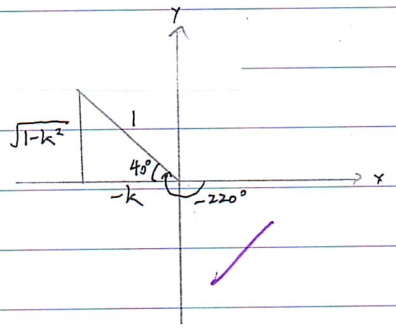


$\sqrt{1^2-k^2}$ units is the adjacent side's length of the triangle.

$\tan(230^\circ) = \frac{-k}{-\sqrt{1^2-k^2}}$

$= \frac{k}{\sqrt{1-k^2}}$

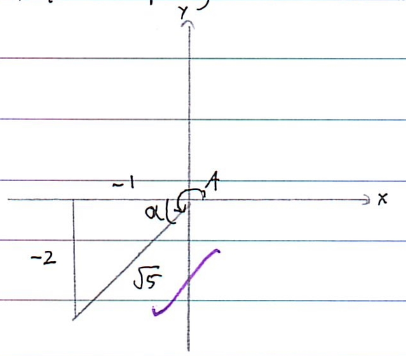
(iv)



$\sin(-220^\circ) = \frac{\sqrt{1-k^2}}{1}$

$= \sqrt{1-k^2}$

2.3 (i) As $\tan A$ is positive, A and B are in the third quadrant

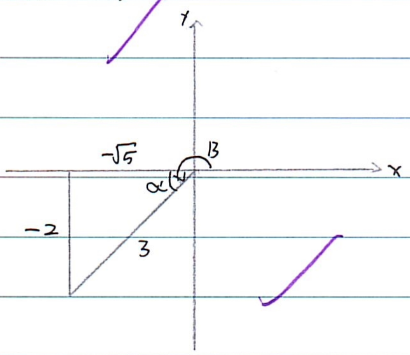


Let the basic angle of A be α.

Hypotenuse of triangle $= \sqrt{1^2+2^2}$ units

$= \sqrt{5}$ units

$\sin A = -\frac{2}{\sqrt{5}}$



Hypotenuse of triangle $= \sqrt{3^2-2^2}$ units

$= \sqrt{5}$ units

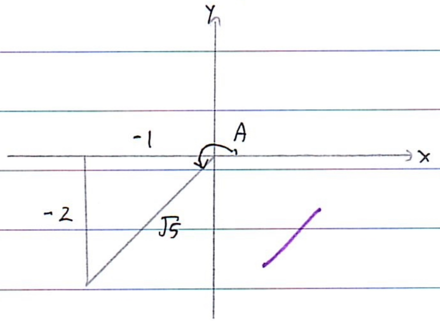
$\tan B = \frac{2}{\sqrt{5}}$

華僑中學
HWA CHONG INSTITUTION

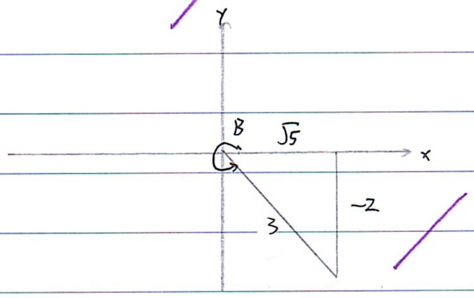
NAME ______ SUBJECT ______ MARKS ______

INDEX NO. ______ CLASS ______ DATE ______

(ii) A is in the third quadrant as tan A is positive



$\therefore \sin A = -\frac{2}{\sqrt{5}}$



$\tan B = -\frac{2}{\sqrt{5}}$

2.4 (ii) $\tan(30°) = \frac{AP}{4\sqrt{3}}$ cm

$AP = 4\sqrt{3}\tan(30°)$ cm

$= 4$ cm

$PC = 4\sqrt{3} \div \frac{4}{7}$ cm

$= 7\sqrt{3}$ cm

$\measuredangle ACB = \tan^{-1}\left(\frac{4}{7\sqrt{3}}\right)$

$\tan(ACB) = \tan^{-1}(k\sqrt{3})$

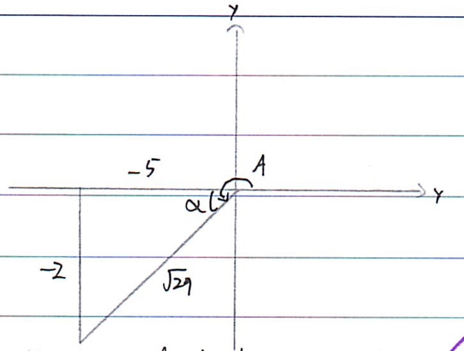
$\therefore \frac{4}{7\sqrt{3}} = k\sqrt{3}$

$\frac{4}{7} = 3k$

$k = \frac{4}{21}$

8887036222215

3.



Hypotenuse of triangle = $\sqrt{29}$ units

$\sin A + \sin\left(\frac{\pi}{2} - A\right) = \sin A + \cos A$

$= -\frac{2}{\sqrt{29}} + \left(-\frac{5}{\sqrt{29}}\right)$

$= -\frac{7}{\sqrt{29}}$