

Spring 2019

Period: _____

Name: KEY

Chapter 7 Assignment – Trigonometry

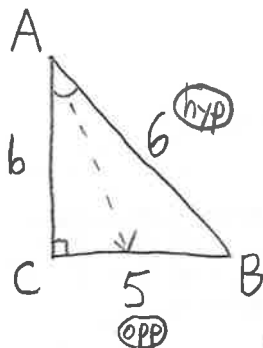
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S O C A T O
S H C H T A

Show all of your work.

1) Sketch and solve the following right triangle to the nearest tenth (3 marks):

$\angle C = 90^\circ, a = 5 \text{ cm}, c = 6 \text{ cm}$



$\angle A:$
 SOH, use sin!
 $\sin A = \frac{5}{6}$
 $\angle A = \sin^{-1}\left(\frac{5}{6}\right)$
 $\angle A = 56.4^\circ$

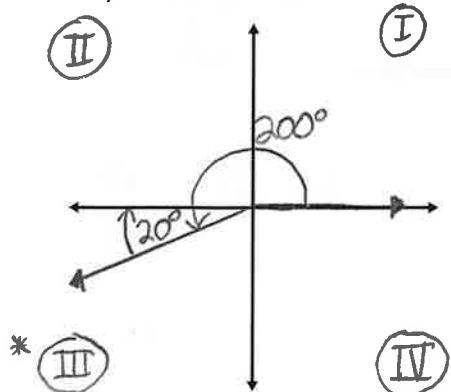
$\angle B:$
 $\angle B = 180^\circ - 90^\circ - 56.4^\circ$
 $\angle B = 33.6^\circ$

side b:
 $a^2 + b^2 = c^2$ hypotenuse!
 $5^2 + b^2 = 6^2$
 $25 + b^2 = 36$
 $\sqrt{b^2} = \sqrt{11}$
 $b = 3.3 \text{ cm}$

ANSWERS:
 $\angle A = 56.4^\circ$
 $\angle B = 33.6^\circ$
 side b = 3.3 cm

2) Draw each angle in standard position (1 mark each), identify the quadrant in which it lies (0.5 each), and state the reference angle (1 mark each):

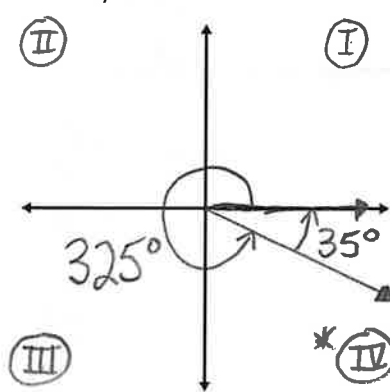
a) 200°



ANSWERS:
 quadrant: III
 ref \angle : 20°

$200^\circ - 180^\circ = \boxed{20^\circ}$

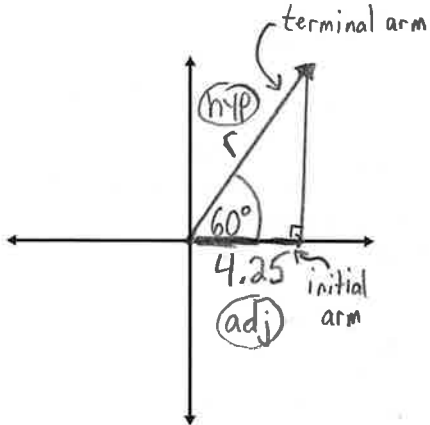
b) 325°



ANSWERS:
 quadrant: IV
 ref \angle : 35°

$360^\circ - 325^\circ = \boxed{35^\circ}$

3) Suppose you have a standard angle of 60° and the length on the initial arm is 4.25cm. What is the length of the terminal arm to the nearest hundredth? (2 marks).



Find r :

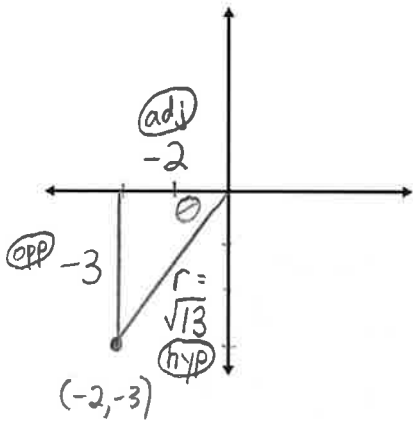
$\cos 60^\circ = \frac{4.25}{r}$

$r = \frac{4.25}{\cos 60^\circ}$

$r = 8.50 \text{ cm}$

ANSWER: 8.50 cm

4) The point $P(-2, -3)$ lies on the terminal arm of an angle θ , in standard position. Sketch and determine the exact trigonometric ratios for $\sin \theta$, $\cos \theta$, & $\tan \theta$ (2 marks).



Find r ! (hypotenuse)

$a^2 + b^2 = c^2$

$(-2)^2 + (-3)^2 = r^2$

$4 + 9 = r^2$

$r^2 = 13$

$r = \sqrt{13}$

ANSWERS:

$\sin \theta = \frac{-3}{\sqrt{13}}$

$\cos \theta = \frac{-2}{\sqrt{13}}$

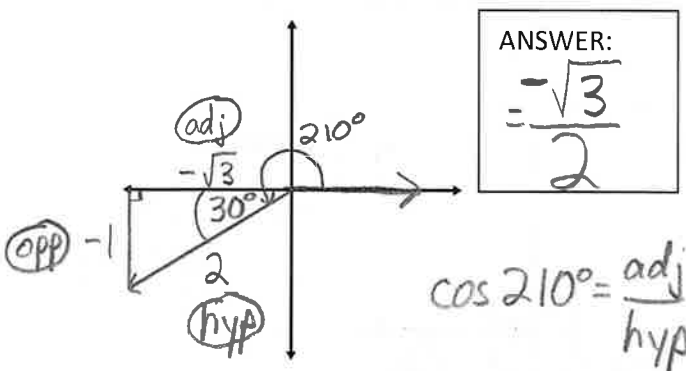
$\tan \theta = \frac{-3}{-2} = \frac{3}{2}$

SACATA!

5) Determine the exact value (2 marks each).

a) $\cos 210^\circ$

Special triangles!

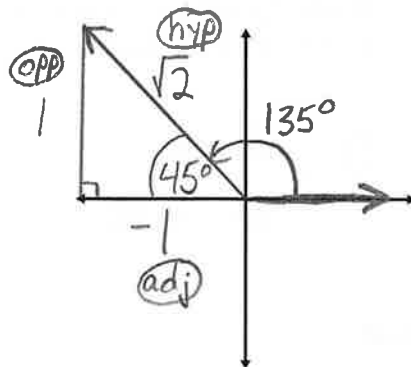


ANSWER: $-\frac{\sqrt{3}}{2}$

$\cos 210^\circ = \frac{\text{adj}}{\text{hyp}}$

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

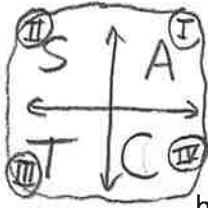
b) $\sin 135^\circ$



ANSWER: $\frac{1}{\sqrt{2}}$

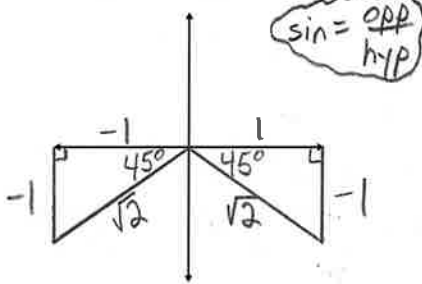
$\sin 135^\circ = \frac{\text{opp}}{\text{hyp}}$

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



6) Solve for θ (2 marks each).

a) $\sin \theta = -\frac{1}{\sqrt{2}}, 0^\circ \leq \theta \leq 360^\circ$



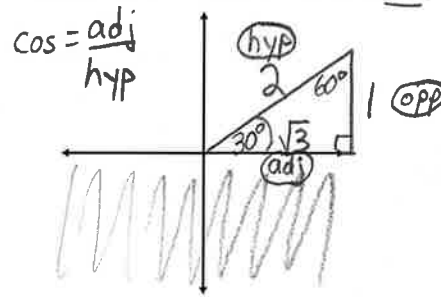
$\sin = \frac{\text{opp}}{\text{hyp}}$

$\theta = 180^\circ + 45^\circ = 225^\circ$

and $\theta = 360^\circ - 45^\circ = 315^\circ$

ANSWER(S):
 $\theta = 225^\circ, 315^\circ$

b) $\cos \theta = \frac{\sqrt{3}}{2}, 0^\circ \leq \theta \leq 180^\circ$



$\cos = \frac{\text{adj}}{\text{hyp}}$

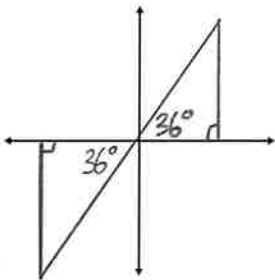
careful!
means only in Quads I and II!

ANSWER(S):
 $\theta = 30^\circ$

7) Determine the measure(s) of θ to the nearest degree (2 marks).

$\tan \theta = 0.7265, 0^\circ \leq \theta < 360^\circ$

\tan^+ in Quads I and III!



$\theta_R = \tan^{-1}(0.7265)$

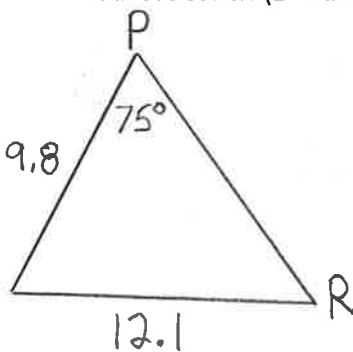
$\theta_R = 36^\circ$

$\theta = 36^\circ$

and $\theta = 180^\circ + 36^\circ = 216^\circ$

ANSWER(S):
 $\theta = 36^\circ, 216^\circ$

8) In an oblique triangle, $\angle P = 75^\circ$, side $p = 12.1$ cm, & side $r = 9.8$ cm. What is $\angle R$ to the nearest tenth (2 marks)?



* we have $\angle P$, side p (Full partners), and side r (half partner):

so... $\frac{\sin P}{p} = \frac{\sin R}{r}$

$\frac{\sin 75^\circ}{12.1} = \frac{\sin R}{9.8}$

$\sin R = \frac{9.8(\sin 75^\circ)}{12.1}$

$\sin R = 0.78232009$

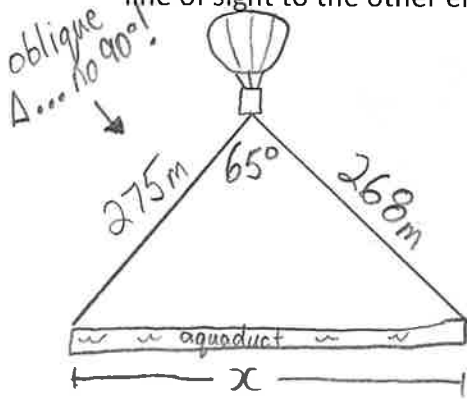
$\angle R = \sin^{-1}(0.78232009)$

$\angle R = 51.473^\circ$

ANSWER:
 $\angle R = 51.5^\circ$

TURN OVER

9) A hot air balloon is travelling over a Roman aqueduct. The angle (at the balloon) between the line of sight to one end of the aqueduct and the line of sight to the other end of the aqueduct is 65° . The length along the line of sight to one end is 275m, and the length along the line of sight to the other end is 268m. How long is the aqueduct to the nearest tenth (3 marks)?



* three half partners, at least two are sides:

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

$$x^2 = (275)^2 + (268)^2 - 2(275)(268) \cos 65^\circ$$

$$x^2 = 75625 + 71824 - 62293.93178$$

$$\sqrt{x^2} = \sqrt{85155.06822}$$

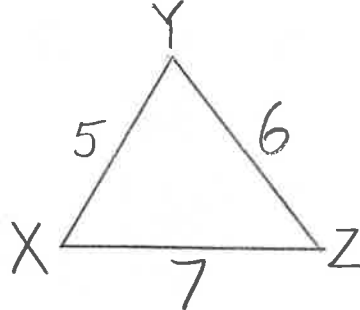
$$x = 291.8134 \text{ m}$$

SENTENCE ANSWER:

The aqueduct is 291.8m long.

10) Solve the following triangle to the nearest tenth (3 marks):

$$x = 6 \text{ m}, y = 7 \text{ m}, z = 5 \text{ m}$$



Find $\angle X$:

3 half partner, at least 2 are sides:

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

these are partners!

$$x^2 = y^2 + z^2 - 2yz \cos X$$

$$6^2 = (7)^2 + (5)^2 - 2(7)(5) \cos X$$

$$36 = 49 + 25 - 70 \cos X$$

$$36 = 74 - 70 \cos X$$

$$-74 \quad -74$$

$$\frac{-38}{-70} = \frac{-70 \cos X}{-70}$$

$$0.5428571 = \cos X$$

$$\angle X = \cos^{-1}(0.5428571) = 57.1^\circ$$

find $\angle Y$:

full partners

now, $\angle X, x$, side y :

$$\frac{\sin X}{x} = \frac{\sin Y}{y}$$

$$\frac{\sin 57.1^\circ}{6} = \frac{\sin Y}{7}$$

$$\sin Y = \frac{7(\sin 57.1^\circ)}{6}$$

$$\sin Y = 0.9795565$$

$$\angle Y = \sin^{-1}(0.9795565)$$

$$\angle Y = 78.4^\circ$$

Find $\angle Z$:

now, we have 2 \angle 's in a Δ :

$$\angle Z = 180^\circ - 57.1^\circ - 78.4^\circ$$

$$\angle Z = 44.5^\circ$$

ANSWERS:

$$\angle X = 57.1^\circ$$

$$\angle Y = 78.4^\circ$$

$$\angle Z = 44.5^\circ$$