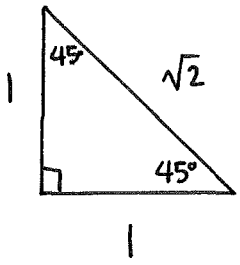
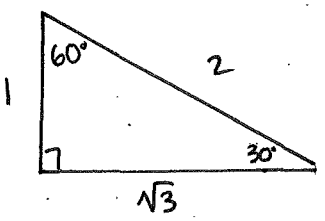
Name : _____

Chapter 8 Review – Trigonometry

PART 1 – Angles in Standard Position

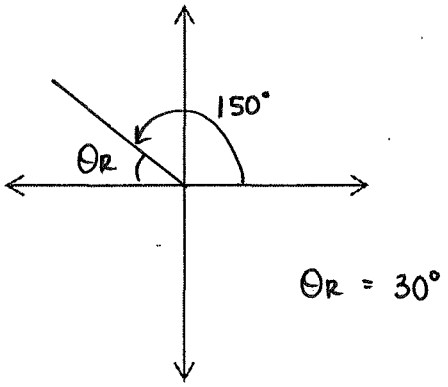
1. Draw and label your two special triangles. Label all three sides and angles.



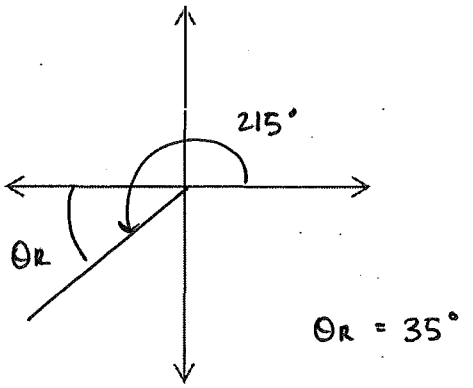


2. Sketch the following angles in standard position and find their reference angles.

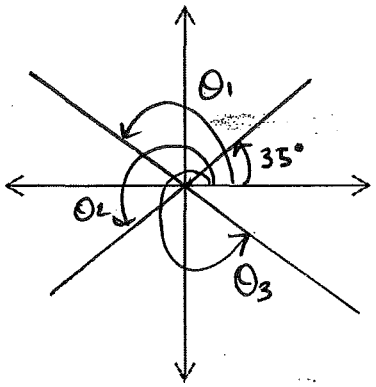
a) $\theta = 150^\circ$



b) $\theta = 215^\circ$



3. Determine the measure of the three other angles in standard position, $0^\circ \le \theta \le 360^\circ$, that have a reference angle of 35°.

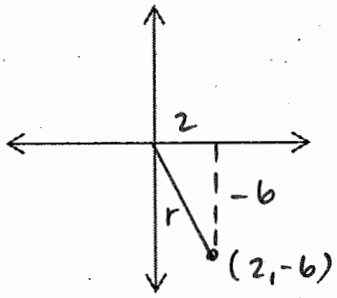


$\theta_1 = 180^\circ - 35^\circ = 145^\circ$

$\theta_2 = 180 + 35^\circ = 215^\circ$

$\theta_3 = 360 - 35^\circ = 225^\circ$

4. Point $P\ (2,-6)$ lies on the terminal arm of angle θ, in standard position. Determine the exact trig ratios for $\sin\theta$, $\cos\theta$, and $\tan\theta$.



$2^2 + (-6)^2 = r^2$

$40 = r^2$

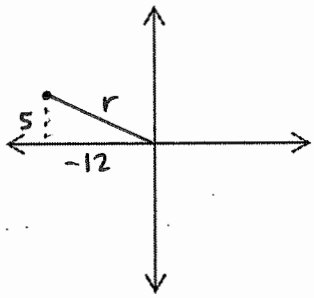
$r = \sqrt{40}$

$\sin\theta = \frac{-6}{\sqrt{40}}$

$\cos\theta = \frac{2}{\sqrt{40}}$

$\tan\theta = \frac{-6}{2} = -3$

5. Point $P\ (-12,5)$ lies on the terminal arm of angle θ, in standard position. Determine the exact trig ratios for $\sin\theta$, $\cos\theta$, and $\tan\theta$.



$r^2 = 5^2 + (-12)^2$

$r^2 = 169$

$r = 13$

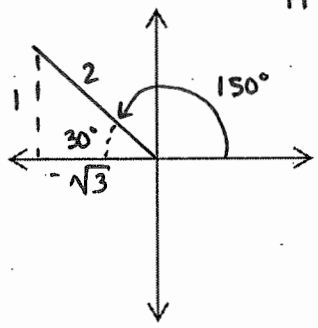
$\sin\theta = \frac{5}{13}$

$\cos\theta = -\frac{12}{13}$

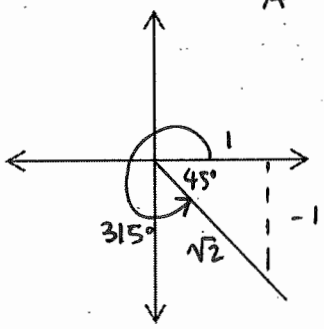
$\tan\theta = \frac{5}{-12}$

6. Determine the exact value of the following angles:

a) $\sin 150^\circ = \frac{O}{H} = \frac{1}{2}$



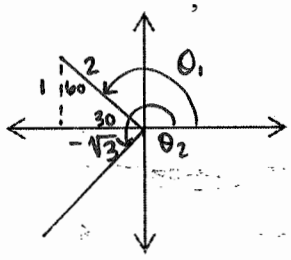
b) $\tan 315^\circ = \frac{O}{A} = \frac{-1}{1}$



7. Solve for θ. (Find the values of angle θ.)

a) $\cos\theta = -\frac{\sqrt{3}}{2}$ $\quad 0^\circ \le \theta < 360^\circ$

cos is neg. in quad. II & III



$\theta_1 = 180^\circ - 30^\circ$

$\theta_1 = 150^\circ$

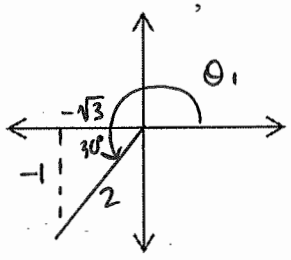
$\theta_2 = 180^\circ + 30^\circ$

$\theta_2 = 210^\circ$

b) $\sin\theta = -\frac{1}{2}$ $\quad 0^\circ \le \theta < 270^\circ$

sine is neg in quad III & IV

↑ no good

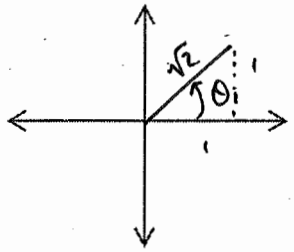


$\theta_1 = 180^\circ + 30^\circ$

$\theta_1 = 210^\circ$

tan is positive in quad I & III

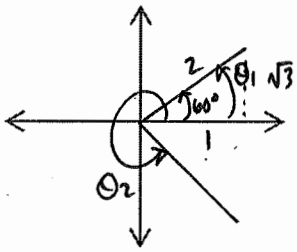
c) $\tan\theta = \frac{1}{1}$, $0° \le \theta < 180°$ → not valid



$\theta_1 = 45°$

cosine is positive in quad I & IV

d) $\cos\theta = \frac{1}{2}$, $0° \le \theta < 360°$



$\theta_1 = 60°$

$\theta_2 = 360° - 60°$

$\theta_2 = 300°$

PART 2 – Sine Law and The Ambiguous Case

8. Determine the number of solutions for $\Delta ABC\ \angle A = 139°, a = 16\ cm,\ b = 14\ cm$. You must prove this, guessing won't count.

∠A is obtuse

since a > b ▸ one solution possible

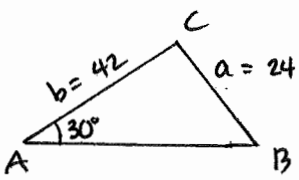
9. Solve the triangle if, in $\Delta ABC\ \angle A = 30°, a = 24\ cm,\ b = 42\ cm$ Round your answers to the nearest unit.

∠A is acute

check : $b \cdot \sin A = 42 \sin 30 = 21$ cm

since : $b \cdot \sin A < a < b$ ($21 < 24 < 42$) ⟩ 2 possible solutions (Ambiguous Case)

case 1 : ∠B is acute



① ∠B

$\frac{\sin B}{b} = \frac{\sin A}{a}$

$\sin B = \frac{(42)\sin 30}{24}$

$= 0.875$

$\angle B = \sin^{-1}(0.875)$

$\angle B = 61°$

② $\angle C = 180° - 30° - 61°$

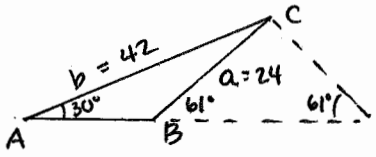
$\angle C = 89°$

③ $\frac{c}{\sin C} = \frac{a}{\sin A}$

$c = \frac{(24)(\sin 89)}{\sin 30}$

$c = 48$ cm

case 2 : ∠B is obtuse



① $\angle B = 180° - 61°$

$\angle B = 119°$

② $\angle C = 180° - 30° - 119°$

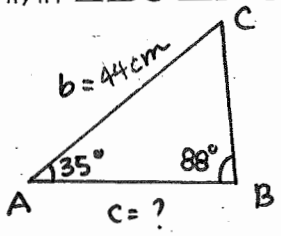
$\angle C = 31°$

③ $\frac{c}{\sin C} = \frac{a}{\sin A}$

$c = \frac{(24)(\sin 31)}{\sin 30}$

$c = 24.7$ cm

10. Find side c if, in $\Delta ABC\ \angle A = 35°, \angle B = 88°,\ b = 44cm$



① $\angle C = 180° - 35° - 88°$

$\angle C = 57°$

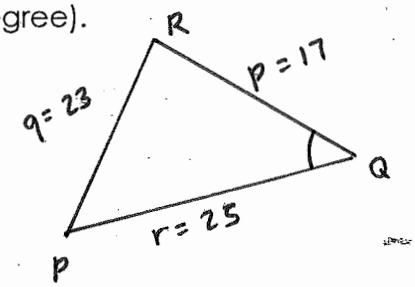
$$\frac{b}{\sin B} = \frac{c}{\sin C}$$

$$c = \frac{(44)(\sin 57°)}{\sin 88°}$$

$c = 37$ cm

PART 3 – Cosine Law

11. In triangle PQR: $p = 17,\ q = 23,$ and $r = 25$. Find the measure of angle Q (to the nearest degree).



$$\cos Q = \frac{q^2 - p^2 - r^2}{-2pr}$$

$$= \frac{23^2 - 17^2 - 25^2}{-2(17)(25)}$$

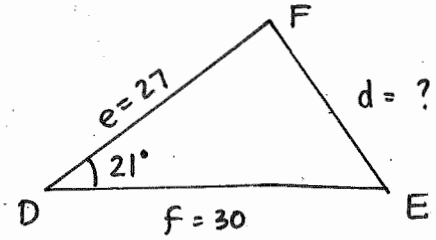
$$= \frac{-385}{-850}$$

$$= +0.4529$$

$\angle Q = \cos^{-1}(0.4529)$

$\angle Q = 63°$

12. In triangle DEF: $\angle D = 21°,\ e = 27,$ and $f = 30$. Find the measure of side d, to the nearest tenth.



$d^2 = e^2 + f^2 - 2ef\cos D$

$= 27^2 + 30^2 - 2(27)(30)\cos 21$

$= 729 + 900 - 1512.40$

$= 116.6$

$d = \sqrt{116.6}$

$d = 10.8$

Review: p. 129 # 1 - 6, 8 - 10, 13, 20 (NEXT CLASS)