Pre-Calculus 11   Name **KEY**

Trigonometry Review

Date _____

Draw an angle with the given measure in standard position.

1) 110°
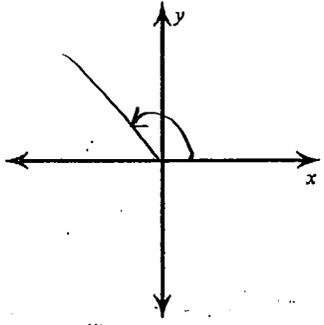
2) −120°
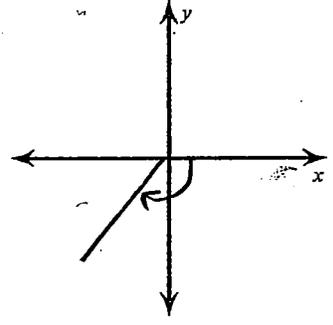
Find the reference angle.

3)
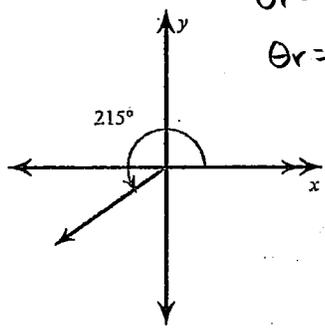
$\theta r = 215° - 180°$

$\theta r = 35°$

4)
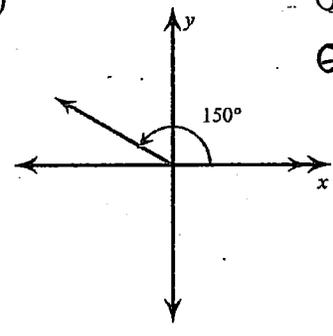
$\theta r = 180° - 150°$

$\theta r = 30°$

Find the exact value of each trigonometric function.

5) $\tan \theta$
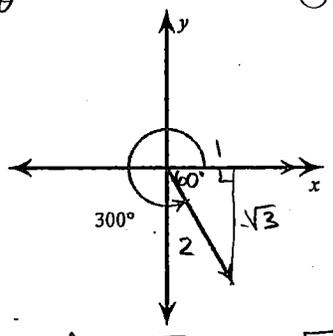
$\theta r = 360° - 300°$

$= 60°$

$\tan 300° = \dfrac{-\sqrt{3}}{1} = -\sqrt{3}$

6) $\sin \theta$
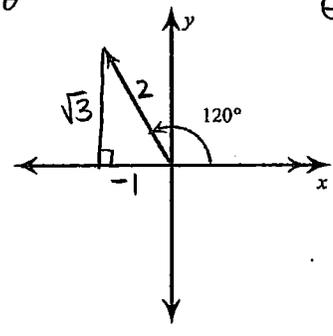
$\theta r = 180° - 120°$

$= 60°$

$\sin 120° = \dfrac{\sqrt{3}}{2}$

7) $\cos\theta$
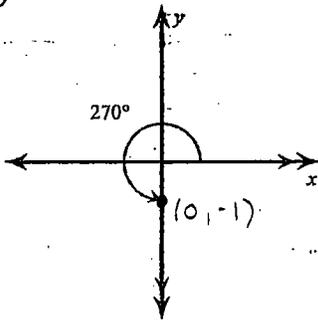
$\cos 270° = \dfrac{0}{1}$

$\cos 270° = 0$

8) $\cos\theta$
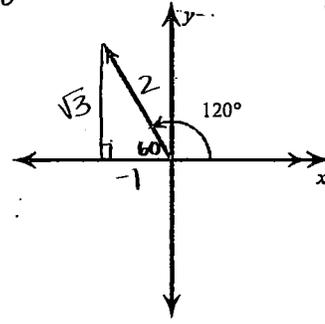
$\theta r = 180° - 120°$
$= 60°$

$\cos 120° = \dfrac{-1}{2}$

9) $\cos\theta$
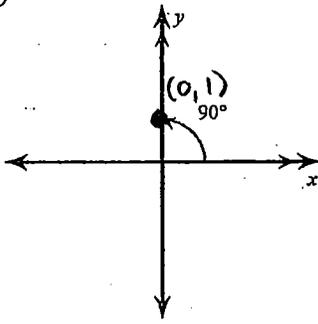
$\cos 90° = \dfrac{0}{1}$

$\cos 90° = 0$

10) $\tan\theta$

$\tan 120° = \dfrac{\sqrt{3}}{-1} = -\sqrt{3}$

11) $\cos\theta$

$\theta r = 180° - 135°$
$\theta r = 45°$

$\cos 135° = \dfrac{-1}{\sqrt{2}}$

12) $\sin\theta$
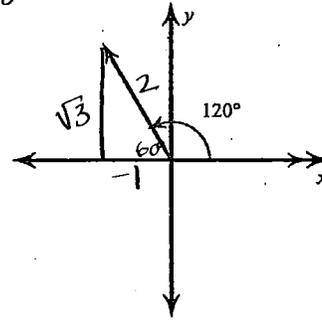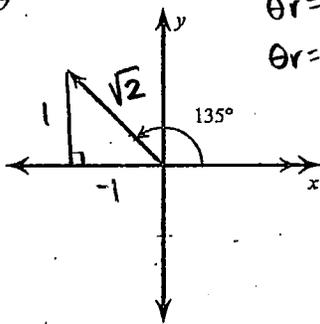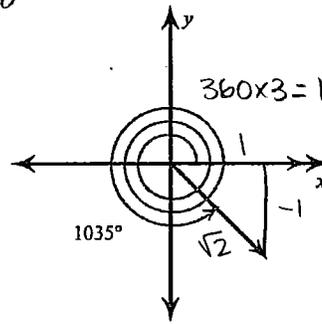
$\theta r = 1080 - 1035°$
$360 \times 3 = 1080$ $\theta r = 45°$

$\sin 1035° = \dfrac{-1}{\sqrt{2}}$

Use the given point on the terminal side of angle θ to find the value of the trigonometric function indicated.

13) $\sin\theta$
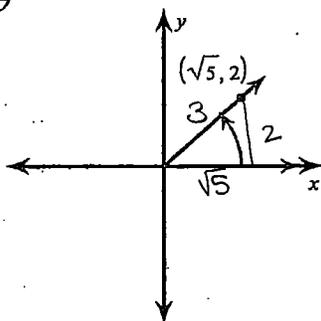
$r^2 = (\sqrt{5})^2 + (2)^2$
$r^2 = 5 + 4$
$r = \sqrt{9}$
$r = 3$

$\sin\theta = \dfrac{2}{3}$

14) $\sin\theta$
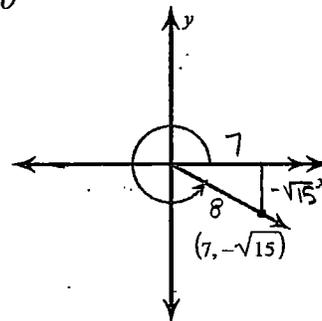
$r^2 = (-\sqrt{15})^2 + (7)^2$
$r^2 = 15 + 49$
$r = \sqrt{64}$
$r = 8$

$\sin\theta = -\dfrac{\sqrt{15}}{8}$

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Find each measurement indicated. Round your answers to the nearest tenth.

15) Find $m\angle C$
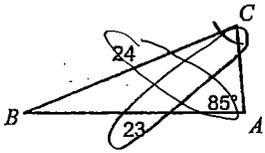
$$\frac{\sin C}{23} = \frac{\sin 85°}{24}$$

$$\sin C = \frac{23\sin 85°}{24}$$

$$\angle C = \sin^{-1}(ans) \rightarrow \boxed{\angle C = 72.7°}$$

16) Find $m\angle A$
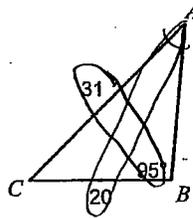

$$\frac{\sin A}{20} = \frac{\sin 95°}{31}$$

$$\sin A = \frac{20\sin 95°}{31}$$

$$\angle A = \sin^{-1}(ans) \rightarrow \boxed{\angle A = 40°}$$

17) Find AB
$180 - 98 - 48 = 34°$
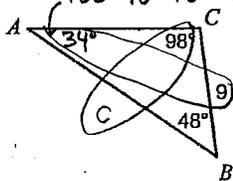
$$\frac{c}{\sin 98°} = \frac{9}{\sin 34°}$$

$$c = \frac{9}{\sin 34°} \times \sin 98°$$

$$\boxed{c = 15.9}$$

18) Find AC
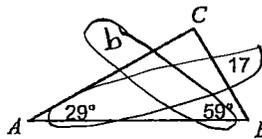
$$\frac{b}{\sin 59°} = \frac{17}{\sin 29°}$$

$$b = \frac{17}{\sin 29°} \times \sin 59°$$

$$\boxed{b = 30.1}$$

19) Find AB
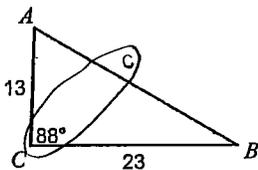
$$c^2 = a^2 + b^2 - 2ab\cos C$$

$$c^2 = 23^2 + 13^2 - 2(23)(13)\cos 88°$$

$$c^2 = 698 - 20.869\ldots$$

$$c = \sqrt{ans}$$

$$\boxed{C = 26.0}$$

20) Find BC
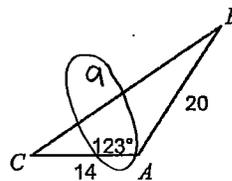
$$a^2 = b^2 + c^2 - 2bc\cos A$$

$$a^2 = 14^2 + 20^2 - 2(14)(20)\cos 123°$$

$$a^2 = 596 - (-304.997\ldots)$$

$$a = \sqrt{ans}$$

$$\boxed{a = 30.0}$$

21) Find $m\angle C$
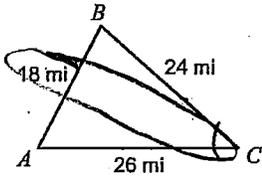
$$\cos C = \frac{c^2 - a^2 - b^2}{-2ab}$$

$$\cos C = \frac{18^2 - 24^2 - 26^2}{-2(24)(26)}$$

$$\cos C = 0.7435\ldots$$

$\rightarrow \angle C = \cos^{-1}(\text{ans})$

$\boxed{\angle C = 42°}$

22) Find $m\angle A$
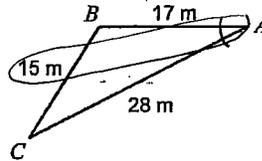
$$\cos A = \frac{a^2 - b^2 - c^2}{-2bc}$$

$$\cos A = \frac{15^2 - 28^2 - 17^2}{-2(28)(17)}$$

$$\cos A = 0.89075\ldots$$

$\rightarrow \angle A = \cos^{-1}(\text{ans})$

$\boxed{\angle A = 27.0°}$

Solve each triangle. Round your answers to the nearest tenth.

23)
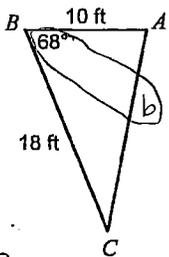
SIDE B

$$b^2 = a^2 + c^2 - 2ac\cos B$$

$$b^2 = 18^2 + 10^2 - 2(18)(10)\cos 68°$$

$$b^2 = 289.1416\ldots$$

$$b = \sqrt{\text{ans}}$$

$\boxed{b = 17}$

Angle C

$$\frac{\sin C}{10} = \frac{\sin 68°}{17}$$

$$\sin C = \frac{10\sin 68°}{17}$$

$$\angle C = \sin^{-1}(\text{ans})$$

$\boxed{\angle C = 33°}$

Angle A

$$180° - 68° - 33°$$

$\boxed{\angle A = 79°}$

24)
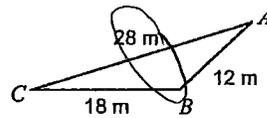
Angle B

$$\cos B = \frac{b^2 - a^2 - c^2}{-2ac}$$

$$\cos B = \frac{28^2 - 18^2 - 12^2}{-2(18)(12)}$$

$$\cos B = -0.73148\ldots$$

$$\angle B = \cos^{-1}(\text{ans})$$

$\boxed{\angle B = 137°}$

Angle A

$$\frac{\sin A}{18} = \frac{\sin 137°}{28°}$$

$$\sin A = \frac{18\sin 137°}{28°}$$

$$\angle A = \sin^{-1}(\text{ans})$$

$\boxed{\angle A = 26°}$

Angle C

$$\angle C = 180° - 137° - 26°$$

$\boxed{\angle C = 17°}$

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**25)** In $\triangle CAB$, $a = 24$ cm, $m\angle C = 83°$, $b = 25$ cm

Angle B

$$\frac{\sin B}{25} = \frac{\sin 83°}{32.5}$$

$$\sin B = \frac{25 \sin 83°}{32.5}$$

$$\boxed{\angle B = 49.8°}$$

Angle A
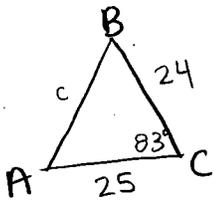
$$\angle A = 180° - 49.8° - 83°$$

$$\boxed{\angle A = 47.2°}$$

SIDE C

$$c^2 = 24^2 + 25^2 - 2(24)(25)\cos 83°$$

$$c^2 = 1054.756\ldots \rightarrow \boxed{c = 32.5}$$

26) In $\triangle QRP$, $m\angle Q = 126.7°$, $p = 30$ in, $r = 15.6$ in

**Angle R**

$$\frac{\sin R}{15.6} = \frac{\sin 126.7}{41.3}$$

$$\sin R = \frac{15.6 \sin 126.7}{41.3}$$

$$\boxed{\angle R = 17.6°}$$

Angle P
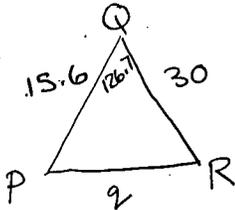
$$\angle P = 180° - 126.7° - 17.6°$$

$$\boxed{\angle P = 35.7°}$$

SIDE q

$$q^2 = 15.6^2 + 30^2 - 2(15.6)(30)\cos 126.7$$

$$q^2 = 1702.737\ldots \rightarrow \boxed{q = 41.3}$$

27) $m\angle B = 16°$, $a = 27$, $b = 23$

Find $\angle A$:

$$\frac{\sin A}{27} = \frac{\sin 16'}{23}$$

$$\boxed{\angle A = 19°}$$

Angle C
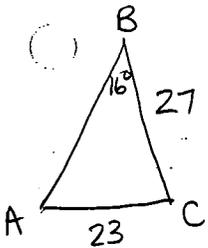
$$\angle C = 180 - 16° - 19°$$

$$\boxed{\angle C = 145°}$$

SIDE C:

$$\frac{C}{\sin 145°} = \frac{23}{\sin 16°}$$

$$\boxed{C = 47.9}$$

Check when $\angle A$ is obtuse

$$\angle A = 180° - 19°$$

$$\boxed{\angle A = 161°}$$

Angle C

$$\angle C = 180 - 16° - 161°$$

$$\boxed{\angle C = 3°}$$

SIDE C:

$$\frac{C}{\sin 3°} = \frac{23°}{\sin 16°}$$

$$\boxed{C = 4.4}$$

28) $m\angle C = 25°$, $m\angle A = 22°$, $b = 45$
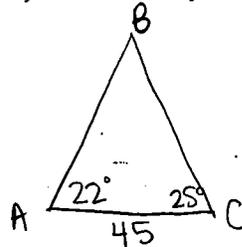
$\angle B$

$$\angle B = 180° - 22° - 25°$$

$$\boxed{\angle B = 133°}$$

SIDE C

$$\frac{c}{\sin 25°} = \frac{45}{\sin 133°}$$

$$\boxed{c = 26}$$

SIDE A

$$\frac{a}{\sin 22°} = \frac{45}{\sin 133°}$$

$$\boxed{a = 23}$$

29) $m\angle B = 57°$, $a = 11$, $b = 7$
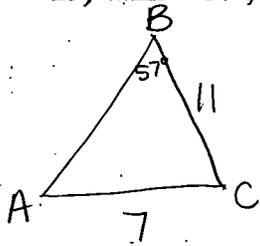
Find $\angle A$

$$\frac{\sin A}{11} = \frac{\sin 57°}{7}$$

$\sin A = 1.3179...$

$\angle A = \sin^{-1}(\text{ans})$
  ↳not possible

∴ no triangles

30) $m\angle B = 35°$, $a = 30$, $b = 29$
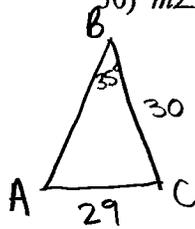
Find $\angle A$

$$\frac{\sin A}{30} = \frac{\sin 35°}{29}$$

$\boxed{\angle A = 36°}$

Angle C

$\angle C = 180° - 35° - 36°$

$\boxed{\angle C = 109°}$

SIDE C

$$\frac{c}{\sin 109°} = \frac{29}{\sin 35°}$$

$\boxed{c = 47.8}$

check when $\angle A$ is obtuse

$\angle A = 180° - 36°$

$\boxed{\angle A = 144°}$

Angle C

$\angle C = 180° - 144° - 35°$

$\boxed{\angle C = 1°}$

SIDE C

$$\frac{c}{\sin 1°} = \frac{29}{\sin 35°}$$

$\boxed{c = 0.9}$

Answers to Trigonometry Review (ID: 1)

1)

2)

3) 35°

4) 30°

5) $-\sqrt{3}$

6) $\frac{\sqrt{3}}{2}$

7) 0

8) $-\frac{1}{2}$

9) 0

10) $-\sqrt{3}$

11) $-\frac{1}{\sqrt{2}}$

12) $-\frac{1}{\sqrt{2}}$

13) $\frac{2}{3}$

14) $-\frac{\sqrt{15}}{8}$

15) 72.7°

16) 40°

17) 15.9

18) 30.1

19) 26

20) 30

21) 42°

22) 27°

23) $m\angle C = 33°$, $m\angle A = 79°$, $b = 17$ ft

24) $m\angle C = 17°$, $m\angle A = 26°$, $m\angle B = 137°$

25) $m\angle A = 47.2°$, $m\angle B = 49.8°$, $c = 32.5$ cm

26) $m\angle R = 17.7°$, $m\angle P = 35.6°$, $q = 41.3$ in

27) $m\angle C = 145.1°$, $m\angle A = 18.9°$, $c = 47.7$
  Or $m\angle C = 2.9°$, $m\angle A = 161.1°$, $c = 4.2$
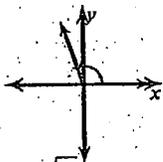
28) $m\angle B = 133°$, $a = 23$, $c = 26$

29) Not a triangle

30) $m\angle C = 108.6°$, $m\angle A = 36.4°$, $c = 47.9$
  Or $m\angle C = 1.4°$, $m\angle A = 143.6°$, $c = 1.2$