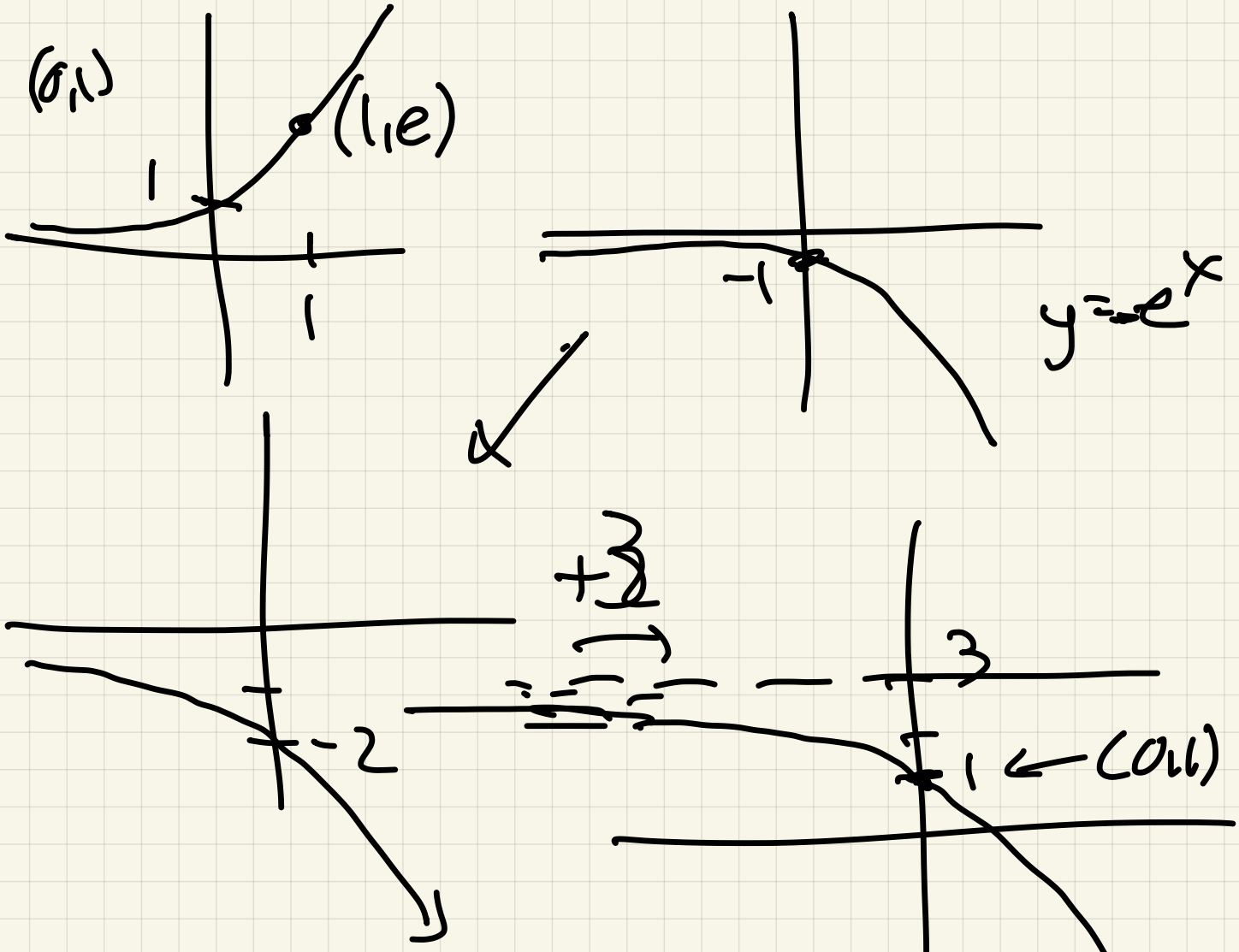
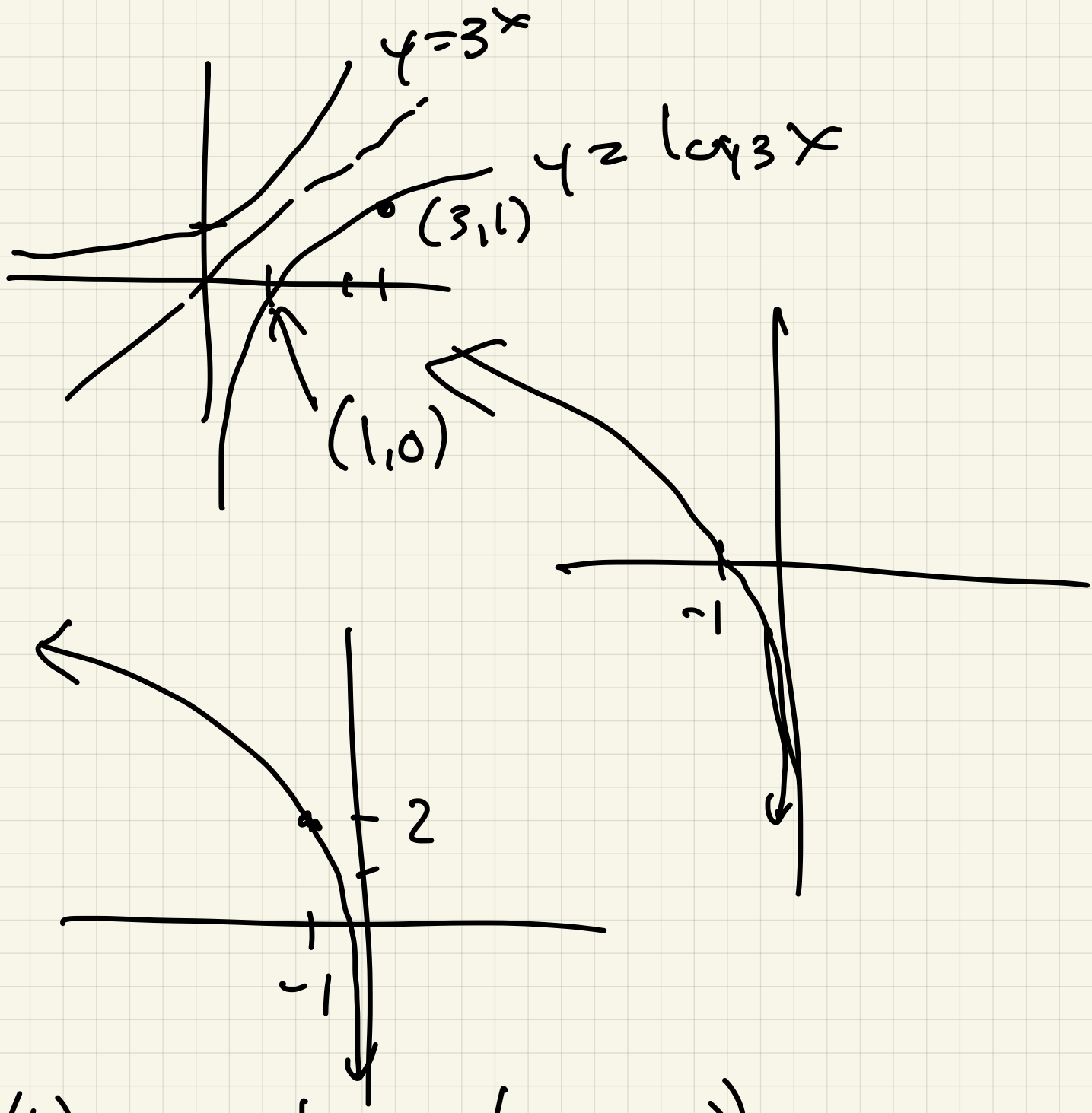
11/10/Precalc Quiz 21 avg 40

1 $f(x) = 3 - 2e^x$



(b) $y = 3$

2 $y = 2 + \log_3(-x)$



(b) dom $(-\infty, 0)$

Also: $2t \log_3(-x)$

$-x > 0$

$0 > x$ $(-\infty, 0)$

(c) $2 + \log_3(-x) = 0$

$\log_3(-x) = -2$

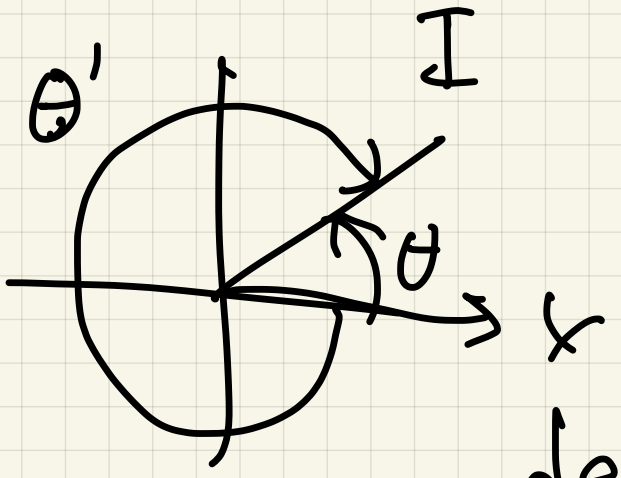
$3^{\log_3(-x)} = 3^{-2}$

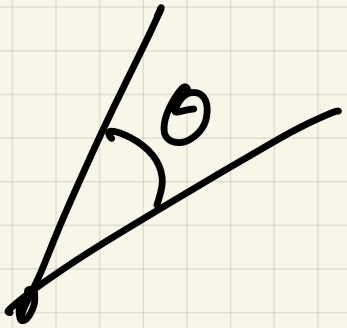
$a^{\log_a y} = y$

$-x = 3^{-2} = \frac{1}{3^2} = \frac{1}{9}$

$x = -\frac{1}{9}$

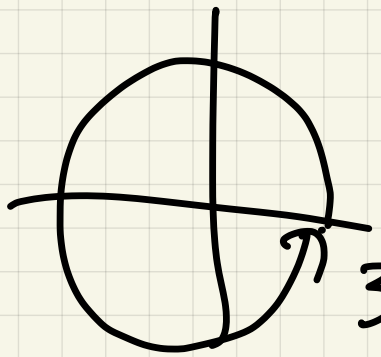
Last time





Angles determined

degree = $\frac{1}{360}$ way around



Notice: α & β coterminal if

$$\boxed{\alpha = \beta + n(360)}, \quad n \in \mathbb{Z}$$

Ex: (a) $\alpha = 60 \quad \beta = -300$

$60 = -300 + 1(360)$

coterminal

(b) $\alpha = 500 \quad \beta = 60$

not coterminal

(c) $\alpha = 900 \quad \beta = 180$

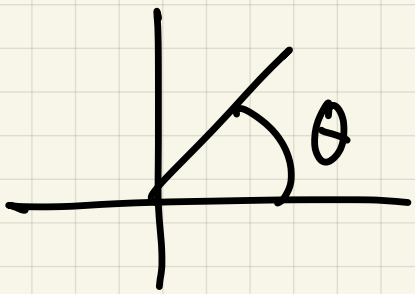
$\alpha - \beta = 900 - 180 = 720$

$\alpha - \beta = n(360)$ $2(360)$

so α, β coterminal

$0 < \theta < 90$

<u>acute</u>



$\theta = 90^\circ$ <u>right angle</u>

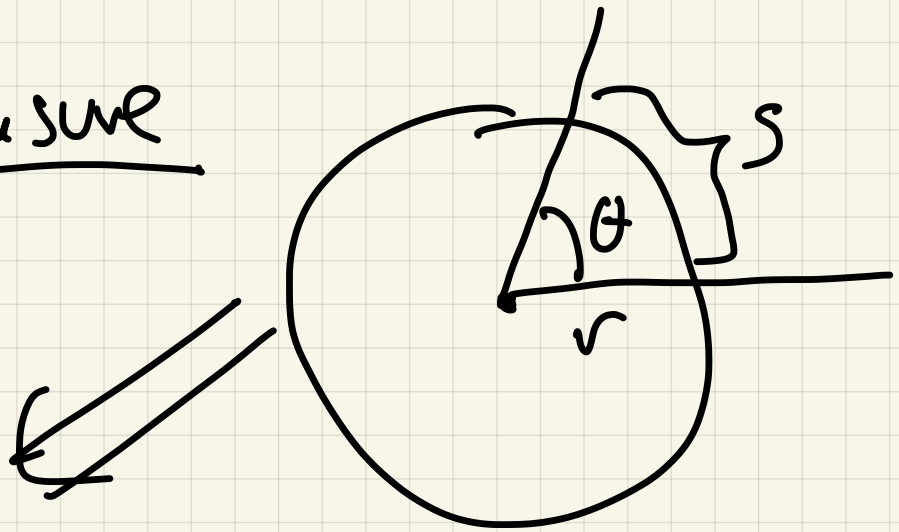
$90^\circ < \theta < 180^\circ$ <u>obtuse angle</u>

α, β (1) <u>complementary</u> if

$\alpha + \beta = 90^\circ$

(2) <u>supplementary</u> $\alpha + \beta = 180^\circ$

<u>Radian measure</u>



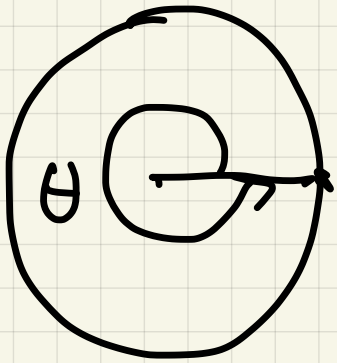
The radian measure of θ

is $\theta = \frac{s}{r}$

r = radius of circle

s = distance s corresp to angle θ

How to understand this?



r =

s = circumference of circle

$= 2\pi r$

So $\theta = \frac{2\pi r}{r} = \underline{\underline{2\pi}} \sim \underline{\underline{360^\circ}}$

$\theta = \pi \sim 180^\circ$

$\theta = \frac{\pi}{2} \sim 90^\circ$

Conversion:

$$1 \text{ rad} = \left(\frac{360}{2\pi}\right)^\circ = \left(\frac{180}{\pi}\right)^\circ$$

$$1 \text{ degree} = 1^\circ = \frac{2\pi}{360} \text{ rad}$$

$$= \frac{\pi}{180} \text{ rad}$$

Ex1 convert

(a) $3 \text{ rad} = 3\left(\frac{180}{\pi}\right)^\circ$

$$= \left(\frac{540}{\pi}\right)^\circ$$

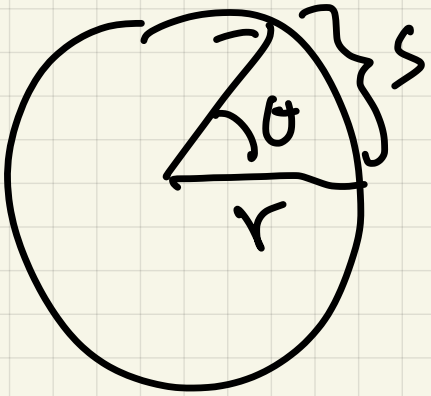
(b) $\frac{3\pi}{4} \text{ rad} = \frac{3\cancel{\pi}}{4} \cdot \frac{180}{\cancel{\pi}} =$

$$\frac{3}{4}\, 180 = 135^\circ$$

(c) $60^\circ = 60 \cdot \frac{\pi}{180} = \frac{\pi}{3} \text{ rad}$

Why radians?

Geometry:



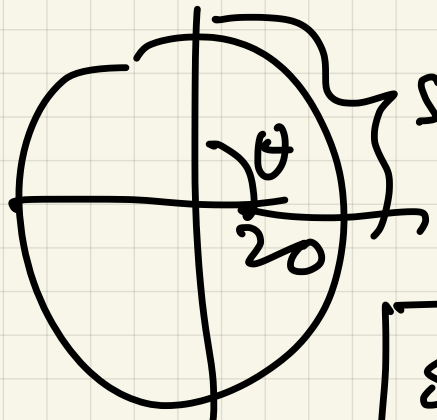
$$\theta = \frac{s}{r} \Rightarrow$$

$$s = r\theta$$

(1) For an angle θ in radians, the distance s around a circle of radius r is

$$s = r\theta$$

Ex 2: Find distance:



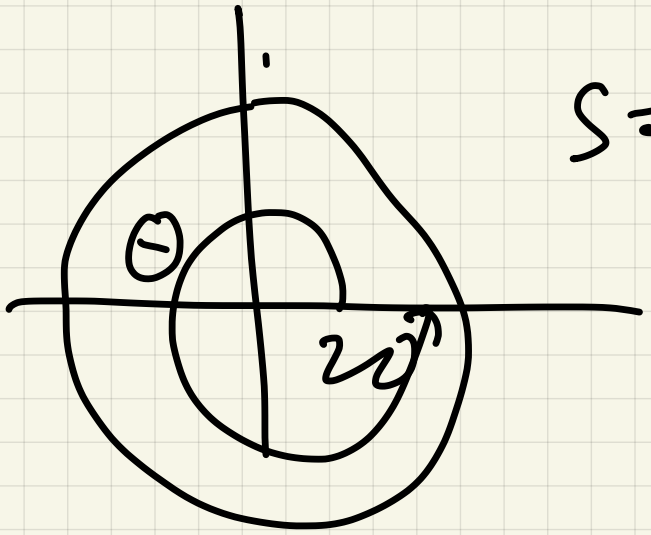
$$\boxed{s = r\theta}$$

but θ in radians:

$\theta = 90^\circ \sim \frac{\pi}{2}$ radians, so

$$s = 20 \times \frac{\pi}{2} = 10\pi$$

(b)



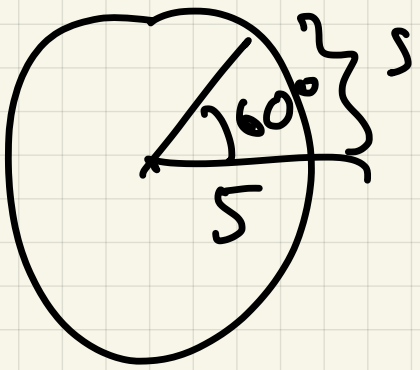
$s = r\theta$

$r = 20$, $\theta = 2\pi$

$= 40\pi$

(check: Circum $2 \cdot r \cdot \pi = 40\pi$ ✓)

(c)



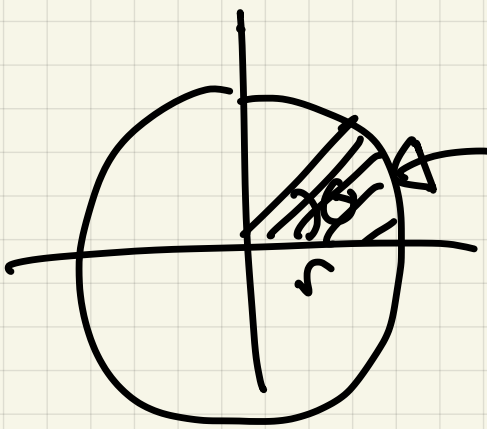
$60° = 60 \cdot \frac{\pi}{180}$ rad

$= \frac{\pi}{3}$ rad

So $s = r\theta$

$= 5 \cdot \frac{\pi}{3} = \frac{5\pi}{3}$

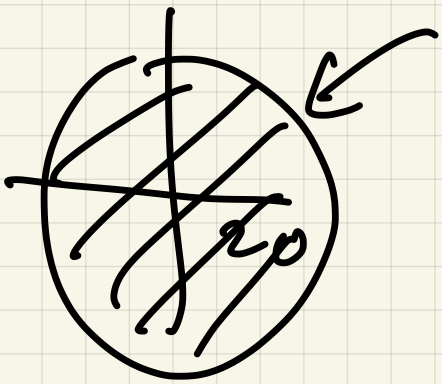
(2) Area:



Area = $\frac{1}{2}r^2\theta$

θ in radians

Ex 3 (a)



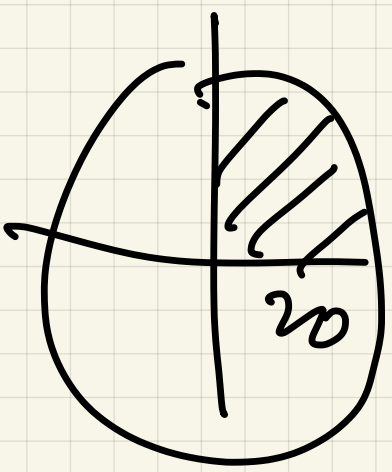
$$\text{Area} = \frac{1}{2} \cdot 20^2 \cdot \theta$$

$$\theta = 2\pi$$

$$\frac{1}{2} \cdot 20^2 \cdot 2\pi =$$

$$400\pi$$

(check: $A = \pi r^2 \Rightarrow \pi \cdot 20^2 = 400\pi$ ✓)



$$\theta = \frac{\pi}{2}$$

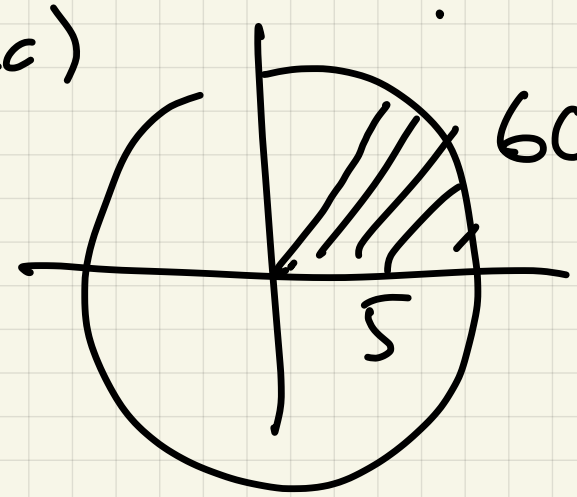
$$r = 20$$

$$A = \frac{1}{2} r^2 \theta$$

$$= \frac{1}{2} 20^2 \frac{\pi}{2} =$$

$$\frac{400\pi}{4} = 100\pi$$

(c)

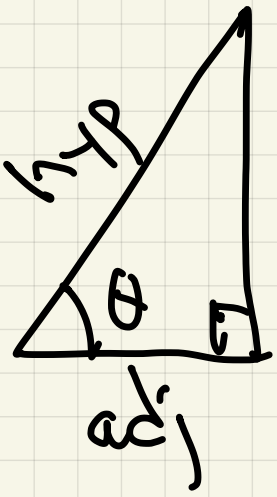


60° $\theta = 60° \sim \frac{\pi}{3}$ rad

$\frac{1}{2} \cdot 5^2 \cdot \frac{\pi}{3} = \frac{25\pi}{6}$

r^2 θ

6.2 Right triangle trig



θ acute angle, get $\triangle$

3 sides hypotenuse
opposite
adjacent

The 6 ratios give standard trig functions

sine

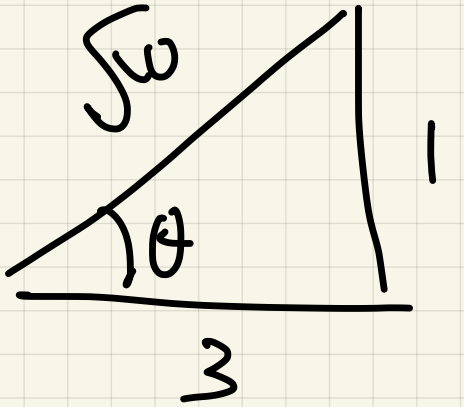
"sine" $\sin\theta = \frac{opp}{hyp}$ $\quad \csc\theta = \frac{hyp}{opp}$

"cosine" $\cos\theta = \frac{adj}{hyp}$ $\quad \sec\theta = \frac{hyp}{adj}$

"tangent" $\tan\theta = \frac{opp}{adj}$ $\quad \cot\theta = \frac{adj}{opp}$

Ex 1 Find all 6 trig functions:

(a)



$\sin\theta = \frac{1}{\sqrt{10}}$

$\cos = \frac{3}{\sqrt{10}}$

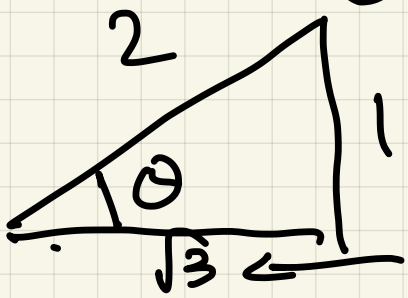
$\tan\theta = \frac{1}{3}$

$\csc\theta = \sqrt{10}$

$\sec\theta = \frac{\sqrt{10}}{3}$

$\cot\theta = 3$

(b)



$\sqrt{3}$

$\sin\theta = \frac{1}{2}$ $\quad$ $\csc\theta = 2$

$\cos\theta = \frac{\sqrt{3}}{2}$ $\quad$ $\sec\theta = \frac{2}{\sqrt{3}}$

$\tan\theta = \frac{1}{\sqrt{3}}$ $\quad$ $\cot\theta = \sqrt{3}$