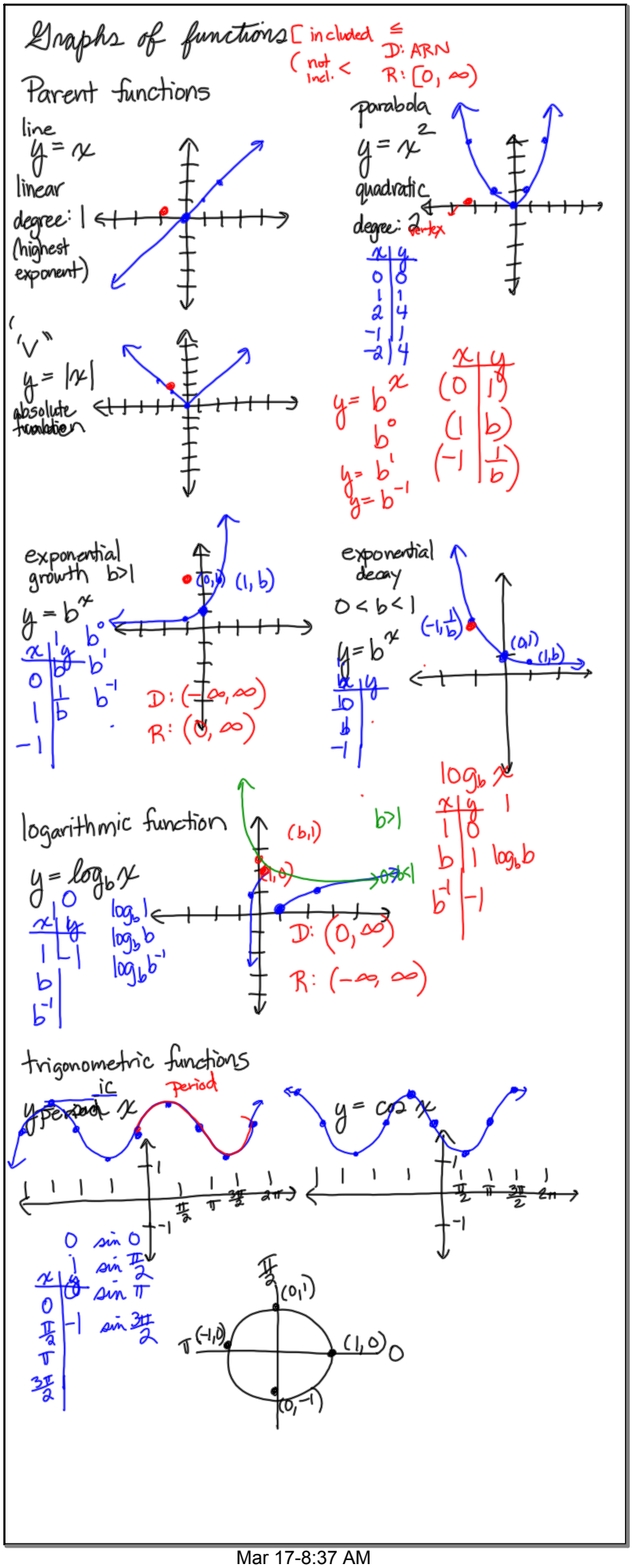
Graphs of functions
[included ≤
(not incl. <
D: ARN
R: [0, ∞)
Parent functions
line
y = x
linear
degree: 1
(highest exponent)
parabola
y = x²
quadratic
degree: 2
vertex
x | y
0 | 0
1 | 1
2 | 4
-1 | 1
-2 | 4
"V"
y = |x|
absolute value
y = b^x
b⁰
y = b¹
y = b⁻¹
x | y
(0 | 1)
(1 | b)
(-1 | 1/b)
exponential growth b>1
(0,1) (1, b)
y = b^x
b⁰
b¹
b⁻¹
D: (-∞, ∞)
R: (0, ∞)
exponential decay
0 < b < 1
y = b^x
(-1, 1/b)
(0,1)
(1,b)
logarithmic function
y = log_b x
log_b 1
log_b b
log_b b⁻¹
(b,1)
(1,0)
b>1
0<b<1
D: (0, ∞)
R: (-∞, ∞)
log_b x
x | y
1 | 0
b | 1
b⁻¹ | -1
log_b b
trigonometric functions
period
y = sin x
y = cos x
x | y
0 | 0
π/2 | 1
π | 0
3π/2 | -1
sin 0
sin π/2
sin π
sin 3π/2
(0,1)
(-1,0)
(1,0)
(0,-1)

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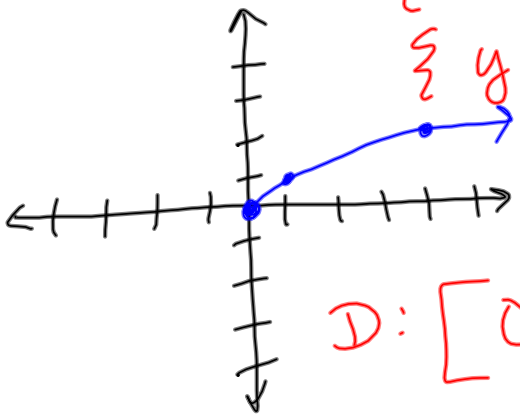
square root function

$y = \sqrt{x}$ ←

x	y	
0	0	
1	1	$\sqrt{1}$
4	2	$\sqrt{4}$
−1	i	$\sqrt{-1}$



$\{x \mid x \geq 0\}$

$\{y \mid y \geq 0\}$

$D: [0, \infty)$

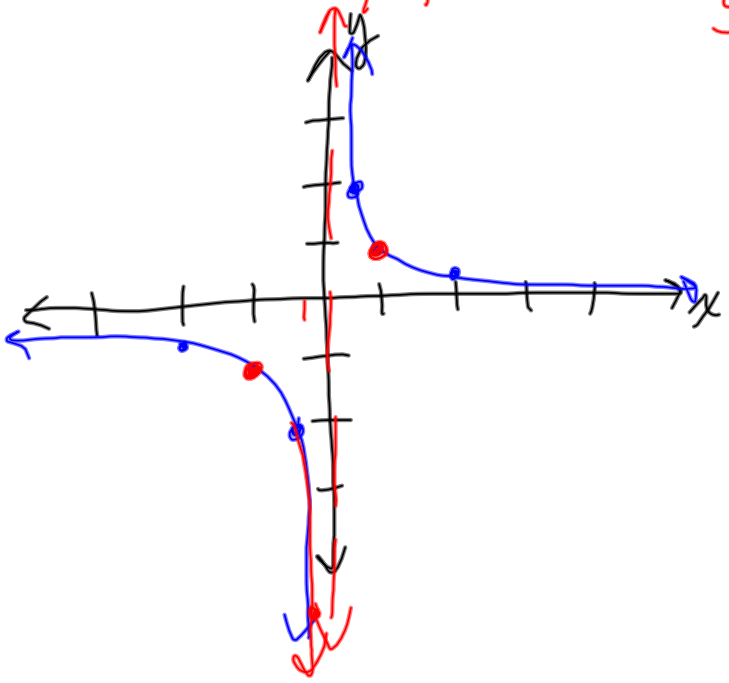
$R: [0, \infty)$

rational function

$y = \frac{1}{x}$

x	y	
0	und	$\frac{1}{0}$
1	1	$\frac{1}{1}$
2	$\frac{1}{2}$	
−1	−1	
−2	$-\frac{1}{2}$	
$\frac{1}{2}$	2	
$-\frac{1}{2}$	−2	

asymptote



$-\frac{1}{5} = \frac{1}{-\frac{1}{5}}$

$= -5$

Convert to degrees or radians

a. $225^\circ \cdot \frac{\pi}{180^\circ}$ (5 · 45; 5 · 9; 3 · 3; 18 · 10; 3 · 6; 2 · 5; 2 · 3)

b. $\frac{2\pi}{3} \cdot \frac{180^\circ}{\pi} = 120^\circ$

$\frac{5 \cdot 2 \cdot 2 \cdot 3 \cdot \pi}{3 \cdot 2 \cdot 2 \cdot 2} = \frac{5\pi}{4}$

(*) Find the arc length and area of a sector with a radius of 2 meters and central angle of $\theta = \frac{\pi}{2}$.

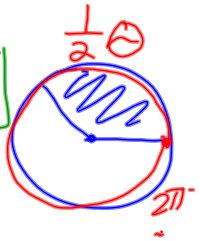
$s = \theta r$

$s = \frac{\pi}{2} \cdot 2 = \pi$

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

$A = \frac{1}{2}\left(\frac{\pi}{2}\right)(2)^2$

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



$s = \theta r$

$C = 2\pi r$

$\theta = 2\pi$

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

$A = \pi r^2$

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

8ft. $\theta = 135^\circ \cdot \frac{\pi}{180} \rightarrow \frac{3\pi}{4}$

$s = \theta r \rightarrow \frac{3\pi}{4} \cdot 8^2 = 6\pi$

$135^\circ \cdot 8$

1080°

$A = \frac{1}{2}\theta r^2 = \frac{1}{2}\left(\frac{3\pi}{4}\right)(8)^2 = \frac{3\pi \cdot 8 \cdot 8}{2 \cdot 4}$

24π

Transformations

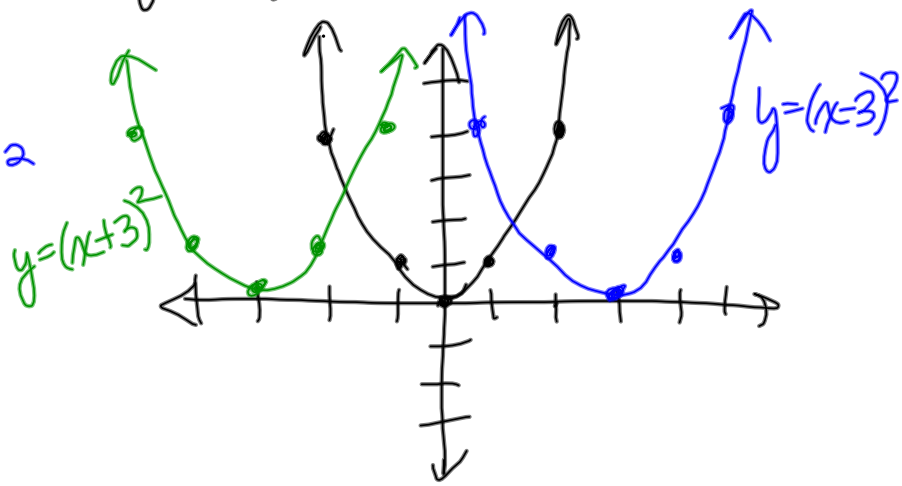
Shift right: $y = f(x-a)$ $a>0$
a units

Shift left: $y = f(x+a)$
a units

$y = x^2$

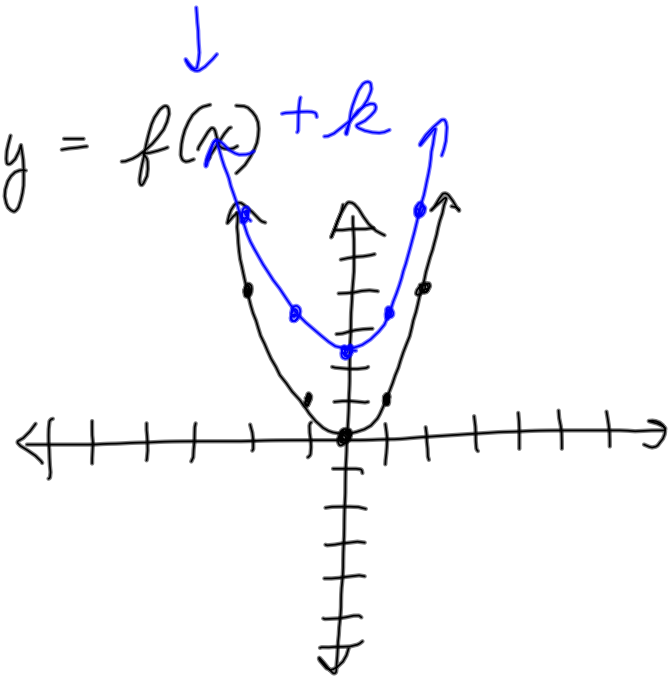
$y = (x-3)^2$

x	y
3	0
4	1
5	4



Shift up $k>0$ $y = f(x) + k$

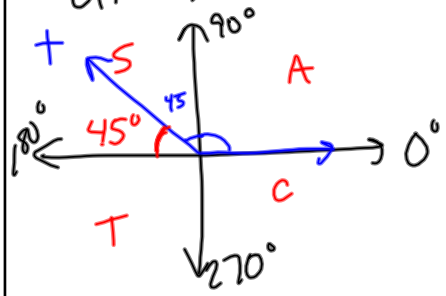
x	$y=x^2$	
0	0	+2
1	1	+2
2	4	+2
-1	1	+2
-2	4	



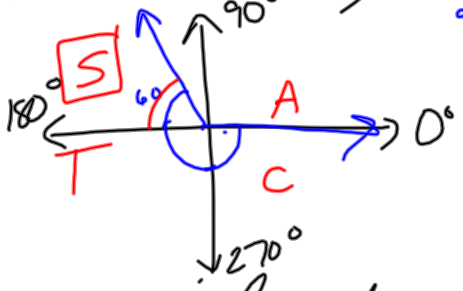
Shift down:

Evaluate without using a calculator.

a. $\sin 135° = \frac{\sqrt{2}}{2}$



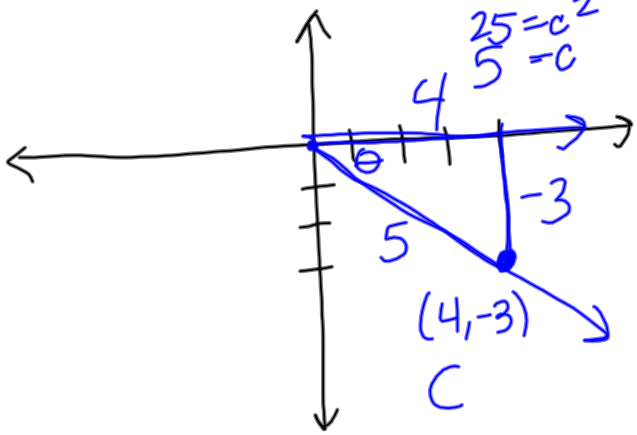
b. $\cos(-240°) = -\frac{1}{2}$



Use the given point or the terminal side at angle θ in standard position to evaluate ~~the six trigonometric functions of~~ θ.

a. $(4, -3)$

$a^2+b^2=c^2$
$4^2+(-3)^2=c^2$
$16+9=c^2$
$25=c^2$
$5=c$

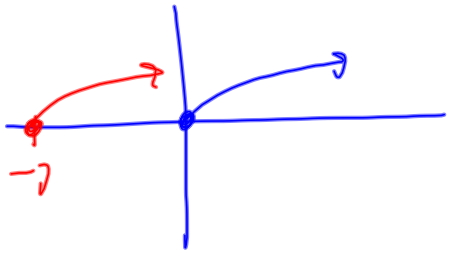


$-\sin\theta = \frac{-3}{5}$
$+\cos\theta = \frac{4}{5}$
$-\tan\theta = -\frac{3}{4}$
$-\csc\theta = -\frac{5}{3}$
$+\sec\theta = \frac{5}{4}$
$-\cot\theta = -\frac{4}{3}$

What shift occurs?

a. $y = \sqrt{x+7}$ left 7

$y = \sqrt{x}$

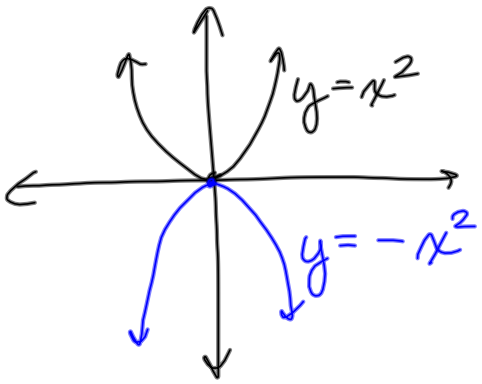


b. $y = (x-5)^2$

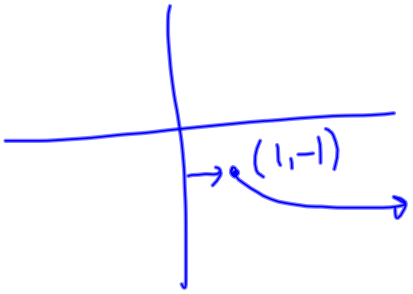
c. $y = (x+2)^2 - 4$

reflection over the x-axis (flip):

$y = -f(x)$



x	y	
0	0	0
1	1	-1
2	4	-4
-1	1	-1
-2	4	-4



$y = \sqrt{x}$

$y = -\sqrt{x}$ flip

$y = -\sqrt{x-1} - 1$

rt 1 down 1

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