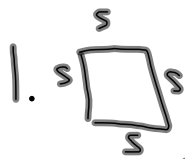


1.2

Function: a relation in which
for every input there is
exactly one output.

- passes VLT



$$A(s) = s^2$$

2. $V(r) = \frac{4}{3}\pi r^3$

$$V(d) = \frac{4}{3}\pi \left(\frac{d}{2}\right)^3$$

$$\begin{aligned} d &= 2r \\ r &= \left(\frac{d}{2}\right) \end{aligned}$$

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Domain: input, x-values
independent

Range: output, y-values
dependent

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Finding Domain

RS #22

1. If $f(x) = \frac{1}{x}$ then $x \neq 0$.

2. If $f(x) = \log_b x$ then $x > 0$.

3. If $f(x) = \sqrt{x}$ then $x \geq 0$.

$$f(x) = \frac{1}{\sqrt{x}} \quad D: x > 0$$

Graphically

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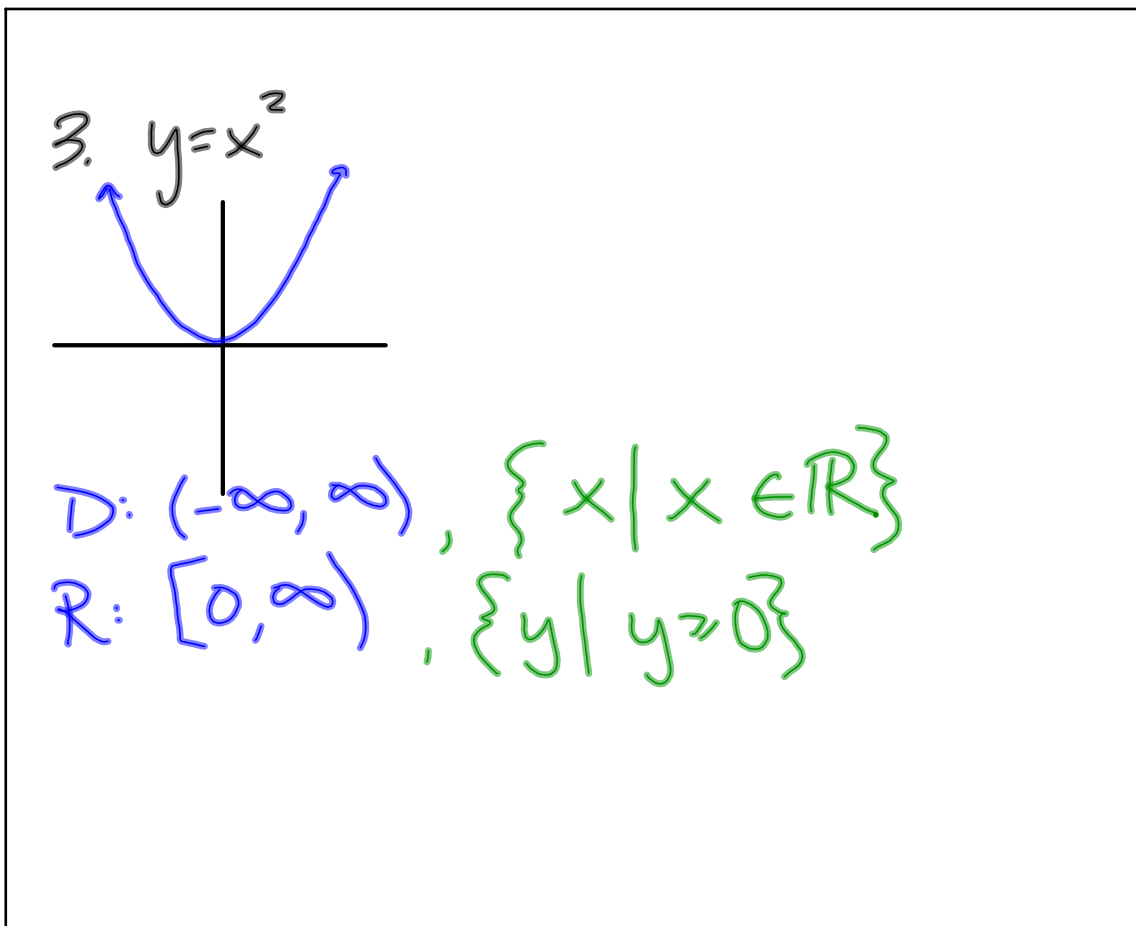
Finding Range: Find HA, Graphically

1. If deg of num < deg of denom: $y = 0$

2. If deg of num = deg of denom: $y = \frac{a}{b}$
(a, b are leading coeff)

3. If deg of num > deg of denom: no HA
oblique/slant

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4. $f(x) = \frac{1 \cdot x^0}{x+5}$ $\forall y = 0$

$x+5 \neq 0$
 $x \neq -5$

D: $(-\infty, -5) \cup (-5, \infty)$
 R: $(-\infty, 0) \cup (0, \infty)$

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5. $(y = \sqrt{4-x^2})^2$ semi-circle w/ $r=2$

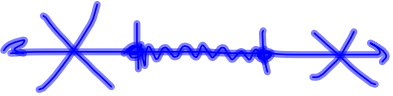
$$4-x^2 \geq 0$$

$$4-x^2 = 0$$

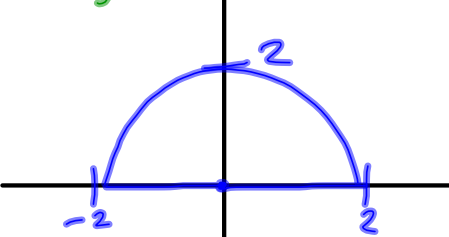
$$4 = x^2$$

$$x = \pm 2$$

$y^2 = 4 - x^2$
 $+x^2 \quad +x^2$
 $x^2 + y^2 = 4$



$D: [-2, 2]$



$R: [0, 2]$

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6. $g(x) = \sqrt{9-x^2}$

$$9-x^2 \geq 0$$

$$\vdots$$

$D: [-3, 3]$

$R: [0, 3]$

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$$7. y = \frac{1}{\sqrt{1-x^2}}$$

$$1-x^2 > 0$$

$$D: (-1, 1)$$

$$R: [1, \infty)$$

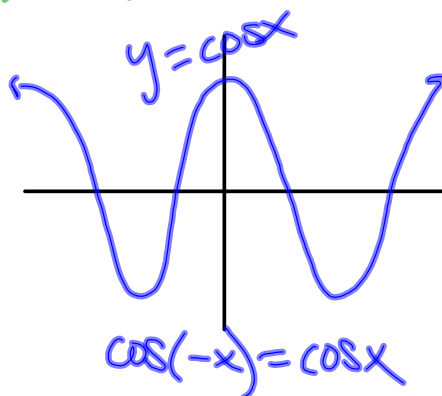
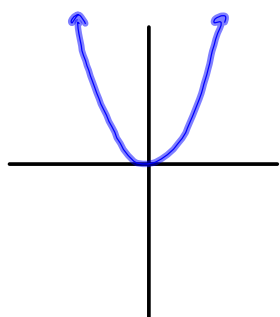
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Even Fncs

Symmetric over y-axis

$$f(-x) = f(x)$$

ex: $f(x) = x^2$
 $f(-x) = (-x)^2 = x^2 = f(x) \checkmark$



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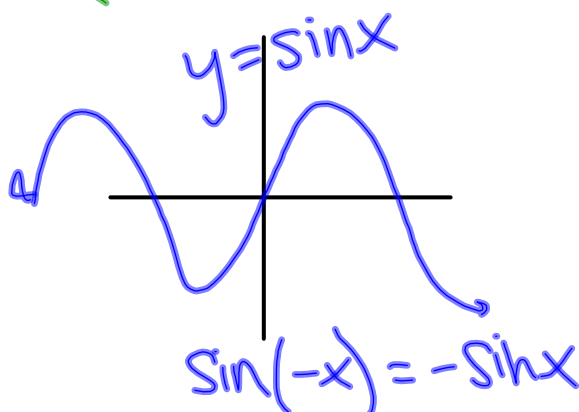
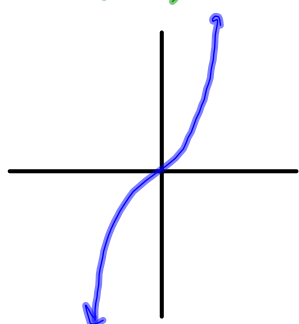
Odd Fncs

symmetric over origin

$$f(-x) = -f(x)$$

ex: $f(x) = x^3$

$$f(-x) = (-x)^3 = -x^3 = -f(x) \checkmark$$



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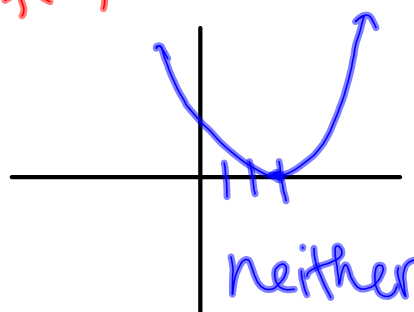
8. $f(x) = x^2 - 3$

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

$$= x^2 - 3$$

even

what about:
 $f(x) = (x-3)^2$



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9. $y = x^3 + 6$
 $f(-x) = (-x)^3 + 6 = -x^3 + 6$
 $f(x) = -(x^3 + 6) = -x^3 - 6 \neq f(-x)$

neither

10. $g(x) = 4x - x^3$
 $g(-x) = 4(-x) - (-x)^3 = -4x + x^3 = -g(x)$ odd

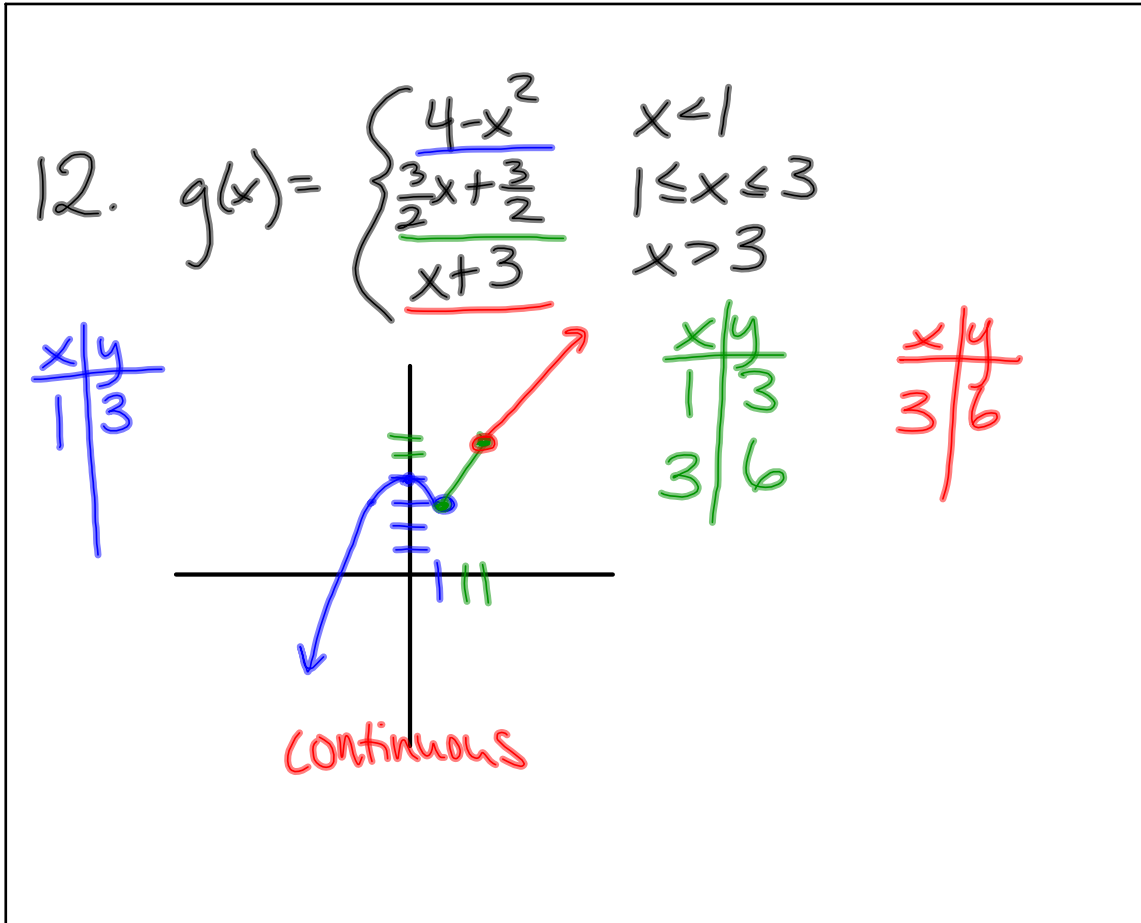
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11. $f(x) = \begin{cases} \frac{x+3}{x^2} & x < 0 \\ \frac{x}{4x} & 0 \leq x < 2 \\ \frac{x}{4} & x \geq 2 \end{cases}$

x	y
0	0
2	4

x	y
2	8

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14. $f(x) = x^2 + x + 1$ $g(x) = x - 2$

$(f \circ g)(x) = f(g(x))$

$$f(g(x)) = (x-2)^2 + (x-2) + 1$$

$$(x-2)(x-2)$$

$$x^2 - 4x + 4 + x - 2 + 1$$

$$= x^2 - 3x + 3$$

15. $f(g(1))$
 $g(1) = 1 - 2 = -1$
 $f(-1) = (-1)^2 - 1 + 1 = 1$

16. $g(f(1))$
 $f(1) = 1^2 + 1 + 1 = 3$
 $g(3) = 3 - 2 = 1$

Aug 21-2:05 PM