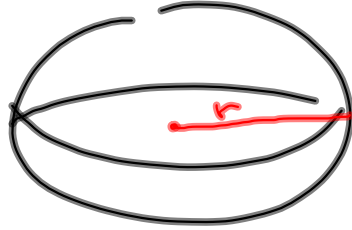


§1.1 #22



$V = \frac{4}{3}\pi r^3$ what's the difference /
change in vol. when radius goes from
 r to $r+1$

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

$$V(r+1) = \frac{4}{3}\pi (r+1)^3$$

$$\Delta V = V(r+1) - V(r)$$

$$= \frac{4}{3}\pi (r^3 - (r+1)^3)$$

$$= \frac{4}{3}\pi (r^3 - (r^3 + 3r^2 + 3r + 1))$$

$$= \frac{4}{3}\pi (r^3 - r^3 - 3r^2 - 3r - 1)$$

$$= \frac{4}{3}\pi (-3r^2 - 3r - 1)$$

$$= \frac{4}{3}\pi ((r+1)^3 - r^3) = \dots = \frac{4}{3}\pi (3r^2 + 3r + 1)$$

$$\begin{array}{ccccccc} & & & & 1 & & \\ & & & 1 & & 1 & \\ & & 1 & & 2 & & 1 \\ & 1 & & 3 & & 3 & & 1 \\ 1 & & 4 & & 6 & & 4 & & 1 \end{array}$$

I got them
reversed, when
I subtracted.

Diagnostic Tests pg xxiv
 Website has concordance between
 Tests & Review Materials.

Find Domain of $\frac{x^2 + 37x + 529\pi}{x^2 + 5x + 6} = f(x)$

$\sqrt{\text{Negative}}$ Bad

$\frac{\cancel{529\pi}}{0}$ Bad



$\sqrt{\text{stuff}}$: Need $\text{stuff} \geq 0$

$\frac{\text{Numer}}{\text{Denom}}$: Need $\text{Denom} \neq 0$

Continuing Example:
 Need $x^2 + 5x + 6 \neq 0$

Solve $x^2 + 5x + 6 = 0$ & Ditch the solution.

$\Rightarrow (x+3)(x+2) = 0$

$\Rightarrow x+3=0$ OR $x+2=0$
 $x=-3$ OR $x=-2$

$\Rightarrow D = \{x \mid x \neq -3 \text{ AND } x \neq -2\}$

$= \mathbb{R} \setminus \{-3, -2\}$

$= (-\infty, -3) \cup (-3, -2) \cup (-2, \infty)$



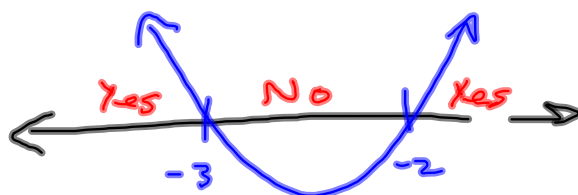
Find Domain

$$g(x) = \sqrt{x^2 + 5x + 6}$$

Need: $x^2 + 5x + 6 \geq 0$

Solve $x^2 + 5x + 6 = 0$ to find boundary points.

... $x = -2, x = -3$



where's it ≥ 0 ?

$$(-\infty, -3] \cup [-2, \infty)$$

Find Domain of $\frac{x^2 + 37x + 529\pi}{\sqrt{x^2 + 5x + 6}} = f(x)$

Need $x^2 + 5x + 6 \geq 0$ because of $\sqrt{\quad}$
 $\sqrt{x^2 + 5x + 6} \neq 0$ which means
 $x^2 + 5x + 6 \neq 0$

Combine: We need $x^2 + 5x + 6 > 0$

 By previous work, we have

$$(-\infty, -3) \cup (-2, \infty)$$

(Threw out the endpoints from " ≥ 0 " problem.)

S'1.1 Thursday
S'1.2 Thursday/Friday.

Diagnostic Tests. Keep pluggin' on this.
Tomorrow: Questions from S'1.1, 1.2, 1.3