

Work with partners in groups of 2-4. **This is required.**

1. Solve the following equations.

(a) $\ln x + \ln(x+2) = 4$

$$\ln(x(x+2)) = 4$$

$$x(x+2) = e^4$$

$$x^2 + 2x - e^4 = 0$$

$$x = \frac{-2 \pm \sqrt{4 - 4(-e^4)}}{2}$$

$$x = \frac{-2 \pm \sqrt{4 + 4e^4}}{2}$$

$$x = \frac{-2 \pm \sqrt{4(1+e^4)}}{2}$$

$$x = \frac{-2 \pm 2\sqrt{1+e^4}}{2}$$

$$x = -1 \pm \sqrt{1+e^4}$$

$$\boxed{x = -1 + \sqrt{1+e^4}}$$

(b) $3^x = 14$

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$$\log_3(3^x) = \log_3(14)$$

$$\boxed{x = \log_3 14}$$

(c) $1.2^x = (0.5)^{-x}$

$$1.2^x = (0.5)^{-x}$$

$$\log(1.2^x) = \log(0.5^{-x})$$

$$\boxed{x = 0}$$

$$x \log(1.2) = -x \log(0.5)$$

$$x(\log(1.2) + \log(0.5)) = 0$$

(d) $\log_3(3x - 2) = 2$

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

$$3x - 2 = 9$$

$$3x = 11$$

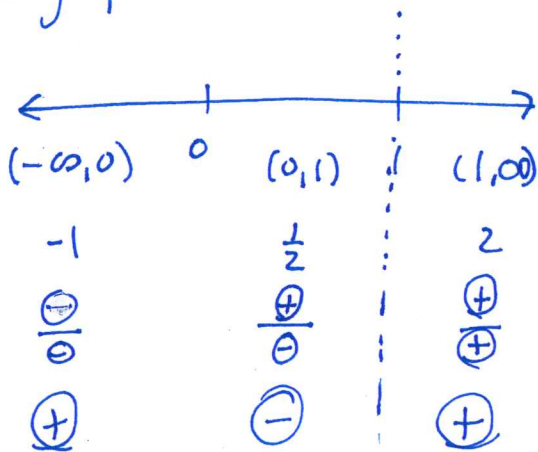
$$\boxed{x = \frac{11}{3}}$$

2. Find the domain of $y = \log\left(\frac{x}{x-1}\right)$.

We require $\frac{x}{x-1} > 0$:

$$\frac{x}{x-1} > 0$$

zeros: $x=0$
asympt: $x=1$



\therefore Domain is

$$\{x \mid x < 0, x > 1\}$$

$$= (-\infty, 0) \cup (1, \infty)$$