

Precalculus Unit 3 Review

- 1) There are two options that Caleb must consider for investing his \$1200. One option is to put his money into an account that earns interest at 4% compounded quarterly for 2 years. The other option is to put his money into an account that earns interest at 12% compounded monthly for 2 years. Which option gives him the most money at the end of the 2-year span?

- 2) An isotope of cesium-137 has a half-life of 25 years. How much cesium-137 would remain from Timothy's 10 gram sample after 90 years? Round to the nearest hundredth.

- 3) A rumor spreads through a track team according to the model $R(t) = 162(1 - 3^{-t})$, where t is the number of hours since the rumor was started and $R(t)$ is the number of people who have heard the rumor. How many hours will it take for 160 people to hear the rumor?

- 4) You invest \$2000 into an account that earns 3.2% interest compounded continuously. How long will it take for you to have \$6500?

Solve each equation. Write the exact answer and then write the decimal approximation.

5) $4^{2x-1} = \left(\frac{1}{16}\right)^{x-1} \cdot 64^{3x}$

6) $\log_4 x + \log_4(x + 6) = 2$

$$7) \log_2(2x - 5) - \log_2(x - 7) = \log_2 8$$

$$8) 2e^{2x+4} + 5 = 26$$

$$9) 4^{2x-1} = 7^{3x+1}$$

$$10) 4(3)^{x+1} + 15 = 3$$

$$11) 2e^{2x} + 12e^x = 110$$

$$12) \frac{243^{-2n}}{27} = 9^{2-n}$$

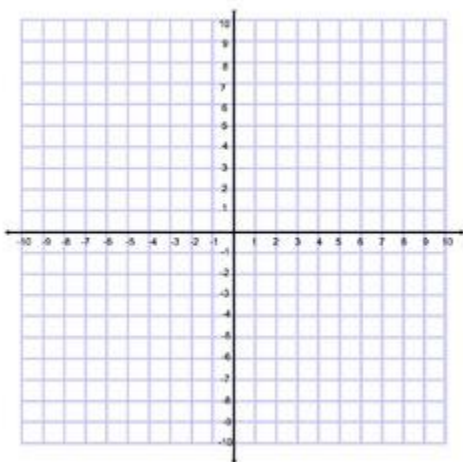
13) Find a logistic equation in the form $y = \frac{c}{1+ab^x}$ that fits the graph if the y-intercept is 5, has a limit to growth of 150, and the point (24, 135) is on the curve.

14) The number of students infected with the flu after t days at Springfield High School is modeled by the function $P(t) = \frac{1600}{1+99e^{-0.4t}}$

- What was the initial number of infected students?
- After 5 days, how many students will be infected?
- What is the maximum number of students that will be infected?
- According to this model, when will the number of students infected by 800?

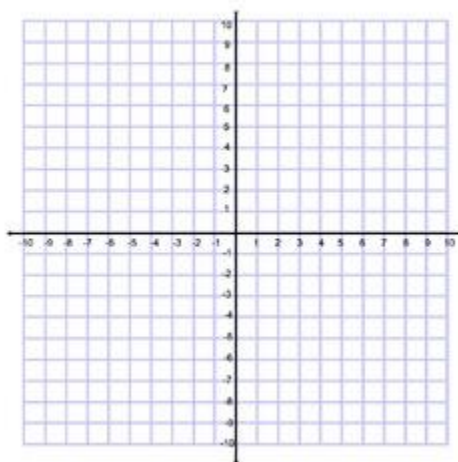
Graph the following equations. Then find the domain, range, asymptote(s), increasing/decreasing, end behavior and x and y intercepts.

15) $f(x) = \ln(x + 4) - 2$



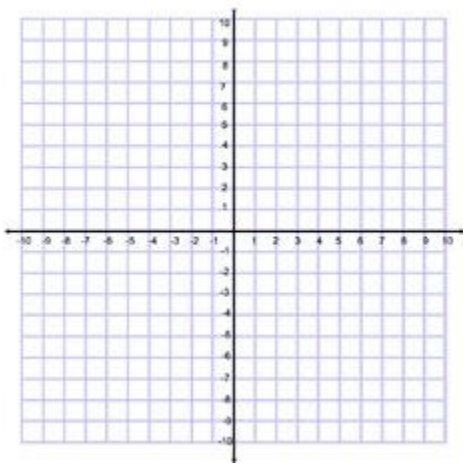
Domain:
 Range:
 Asymptote:
 Increasing:
 Decreasing:
 x-intercept:
 y-intercept:
 End behavior:

16) $f(x) = 3 \cdot 4^{x-1} - 5$



Domain:
 Range:
 Asymptote:
 Increasing:
 Decreasing:
 x-intercept:
 y-intercept:
 End behavior:

17) $f(x) = \frac{8}{1+3\left(\frac{1}{2}\right)^x}$



Domain:
 Range:
 Asymptote:
 Increasing:
 Decreasing:
 x-intercept:
 y-intercept:
 End behavior:

18) Find the inverse of 15-17.