

**Show all work for any credit**

List the potential rational zeros of the polynomial function. Do not find the zeros. (5 pts)

1)  $f(x) = 6x^4 + 3x^3 - 4x^2 + 2$

1) \_\_\_\_\_

Find all zeros of the function and write the polynomial as a product of linear factors. (12 pts)

2)  $f(x) = x^3 + 11x^2 + 36x + 26$

2) \_\_\_\_\_

Solve the inequality. Express the solution using interval notation. (10 pts)

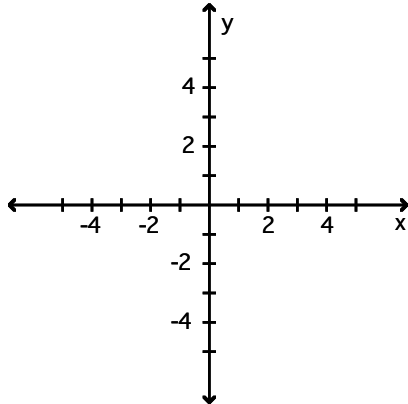
3)  $\frac{x+13}{x+5} < 7$

3) \_\_\_\_\_

Graph the function. (12 pts)

$$4) f(x) = \frac{x^2 + 5x + 6}{(x - 3)^2}$$

4) \_\_\_\_\_



Find a formula for the inverse of the function described below. (10 pts)

5) An organization determines that the cost per person of chartering a bus is given by the formula

5) \_\_\_\_\_

$$C(x) = \frac{150 + 3x}{x},$$

where  $x$  is the number of people in the group and  $C(x)$  is in dollars.

**Solve the problem. (10 pts)**

- 6) The logistic growth model  $P(t) = \frac{1}{1 + 5.67e^{-0.877t}}$  represents the proportion of the total market of a new product as it penetrates the market  $t$  years after introduction. When will the product have 70% of the market? ↖ \_\_\_\_\_

**Solve the equation. Express irrational answers in exact form and as a decimal rounded to 3 decimal places. (12 pts)**

7)  $\left(\frac{1}{2}\right)^x = 5^{1-x}$  ↖ \_\_\_\_\_

Solve the equation. (10 pts)

8)  $\log_3 (x - 2) + \log_3 (x - 8) = 3$

8) \_\_\_\_\_

Solve the problem. Round your answer to three decimals. (7 pts)

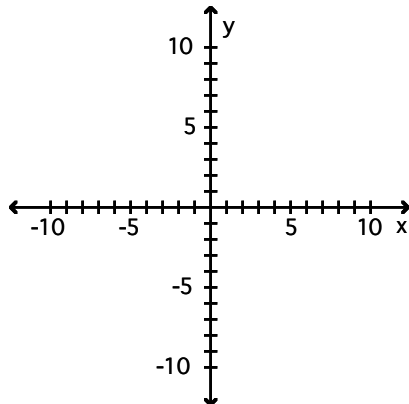
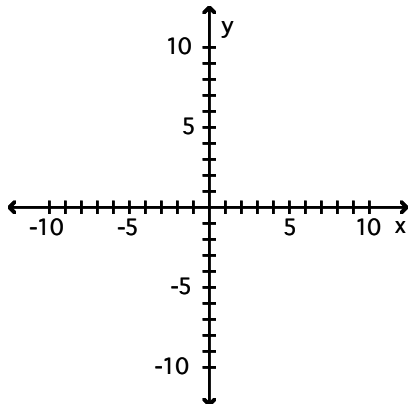
9) What annual rate of interest (compounding one time per year) is required to triple an investment in 7 years?

9) \_\_\_\_\_

Graph the function using transformations of  $\ln x$ . Show all asymptotes and approximate intercepts. (12 pts)

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

10) \_\_\_\_\_



# Answer Key

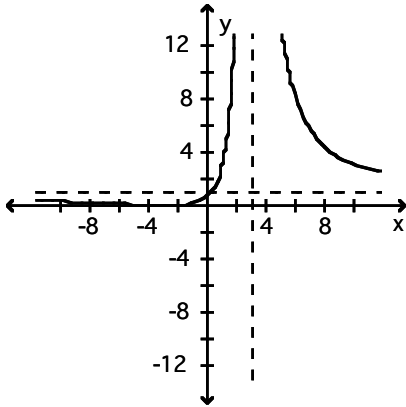
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1)  $\pm \frac{1}{6}, \pm \frac{1}{3}, \pm \frac{1}{2}, \pm \frac{2}{3}, \pm 1, \pm 2$

2)  $f(x) = (x+1)(x+5+i)(x+5-i)$

3)  $(-\infty, -5)$  or  $\left[-\frac{11}{3}, \infty\right)$

4)



5)  $C^{-1}(x) = \frac{150}{x-3}$

6) 2.94 yr

7)  $\frac{\ln 5}{\ln\left(\frac{1}{2}\right) + \ln 5} \approx 1.756$

8) {11}

9) 16.993%

10)

