



MATH 140: WEEK-IN-REVIEW 10 (CHAPTERS 5.5 & 5.6)

1. Compute the following values for the function $f(x) = \begin{cases} 5x - 3 & \text{if } x < -4, \\ 2x^2 - 1 & \text{if } -4 \leq x \leq 4, \\ 6 & \text{if } 4 < x \leq 6, \\ \frac{3}{x-4} & \text{if } x > 8. \end{cases}$

(a) $f(-5)$

(b) $f(-4)$

(c) $f(0)$

(d) $f(4)$

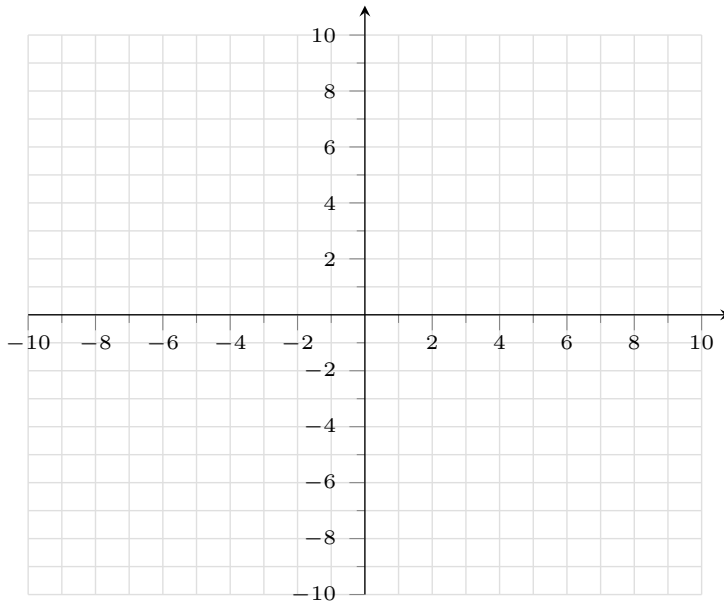
(e) $f(8)$

(f) $f(9)$



2. State the domain of the function $g(x) = \begin{cases} 5x + 7 & \text{if } x < -4, \\ \frac{1}{3x + 7} & \text{if } -3 \leq x < 3, \\ -5\sqrt{x - 2} & \text{if } x \geq 3. \end{cases}$

3. Sketch the graph of $h(x) = \begin{cases} -2x - 3 & \text{if } x \leq -3, \\ -x^2 - 4x + 5 & \text{if } -3 < x < 1, \\ 6 & \text{if } x \geq 2. \end{cases}$





4. Rewrite the function $f(x) = |18 - 3x|$ as a piecewise-defined function.

5. A truck rental agency charges a flat fee of \$20. If the distance traveled is less than 100 miles, the cost is \$0.95 per mile. For any distance greater than 100 miles, the cost reduces to \$0.85 per each additional mile. Write a function $C(m)$ representing the cost, C , for m miles driven.



6. Rewrite each exponential expression as a single equivalent expression in the given base.

(a) $7 \cdot 49^{x+2}$ base 7.

(b) $\left(\frac{1}{3}\right)^x \cdot \frac{27}{9^x}$ base 3.

7. Determine if the given function is an exponential function. If it is an exponential function, state whether it represents exponential growth or decay.

(a) 5^{x+3}

(b) $-4x^{15}$

(c) $7 \cdot \left(\frac{1}{3}\right)^{-2x}$



8. State the domain, range, end behavior, x and y -intercepts (if any) of each function below.

(a) $f(x) = \left(\frac{3}{4}\right)^{x+2}$

(b) $g(x) = 4^{x-2}$



9. For each function below, state the domain using interval notation

(a) $f(x) = 3^{\frac{2x}{x+4}}$

(b) $h(x) = e^{\sqrt{3-5x}}$

(c) $g(x) = \frac{\sqrt[5]{2x-7}}{2x+3}$



10. Algebraically solve each equation for x

(a) $\left(\frac{1}{8}\right)^{2x} = 16^{x-5}$

(b) $3^{x+2} = 27^{x-1}$

(c) $\left(\frac{1}{32}\right) \cdot 2^{x^2} \cdot 16^x = 1$



11. If you invest \$4000 in an account that earns interest at a rate of 3.5% per year, compounded monthly

(a) how much will be in the account after 10 years?

(b) If the annual interest is compounded continuously instead of monthly, how much more will be in the account after 10 years compared to your previous answer?



12. If $g(x) = -\frac{3}{5}f(x+5) - 9$, write the transformations that would be applied to the graph of $f(x)$ (in the correct order), to produce the graph of $g(x)$.

13. If the graph of $f(x) = |x|$ is shifted right 2 units, vertically expanded by a factor of 6, reflected over the x -axis, and then shifted 9 units up, what is the equation of the resulting graph?