

Due: Submit via file upload to Canvas Wednesday, August 10, 2022 at 7:30am.

**ALL WORK MUST BE SHOWN NEATLY ON A SEPARATE DOCUMENT. CALCULATORS MAY BE USED ONLY ON THE EXERCISES THAT REQUIRE ROUNDING. CIRCLE ANSWERS. LATE PAPERS WILL BE PENALIZED.**

1. Find an equation in point-slope form of the line that passes through the points  $(-2, 9)$  and  $(1, 7)$ .
2. Describe the transformations that occur from  $y = |x|$  to  $y = -2|x - 1| + 3$ .
3. Find all x-intercepts and y-intercepts of  $x^2 + 8x + 3y^2 - 6y = 9$ .
4. Determine the symmetry of  $2xy + 3x^2 = 9$  with respect to each of the following. Write yes or no and justify your answer with work.
  - a. X-axis
  - b. Y-axis
  - c. Origin
5. Find and simplify  $\frac{f(a+h)-f(a)}{h}$  for  $f(x) = 3x^2 + 4x$ .
6. Given  $f(x) = \sqrt{x+4}$ , find  $f^{-1}$  and its domain.
7. For the functions  $f$  and  $g$  defined by  $f(x) = 3x^2 + 5$  and  $g(x) = 2x + 8$ , find  $g[f(x)]$ .
8. Find the domain of  $h(x) = \sqrt{6 - 5x}$ .
9. Solve  $9^{x-1} = 27^{x+2}$ .
10. Find all real solutions to  $x^4 - 13x^2 + 36 = 0$ .
11. Use algebra to find the minimum value of the function  $f(x) = 4x^2 - 3x - 5$ . Give an exact value. Do not approximate.
12. Solve  $\ln x = 1.935$  to the nearest thousandth.
13. Expand completely  $\log_a \frac{a}{x^2 \sqrt[3]{y^2}}$
14. Expand  $(2x - 3)^4$ .
15. Solve  $2300 = 4305e^{0.042t}$  for  $t$ . Round to the nearest thousandth.
16. Solve  $\log_3 x + \log_3(x + 2) = \log_3(x + 12)$ .

17. Let  $f(x) = \frac{3x^2+5x+2}{9x^2-1}$ . Find all asymptotes algebraically. Write "none" if the graph does not have that kind of asymptote.
- Vertical
  - Horizontal
  - Slant
  - Determine algebraically all points (if any) at which the graph crosses any asymptotes.
18. The graph of  $f(x) = k(x+c)^5(x-d)^4$
- Crosses the x-axis at
  - Touches the x-axis at
19. Solve  $2x^3 - 5x^2 + 3x > 0$ .
20. Use the change of base formula to find  $\log_5 21$  to the nearest thousandth.
21. Let  $g(x) = \begin{cases} x^2 + 4 & \text{for } x \leq -1 \\ x - 10 & \text{for } -1 < x < 3 \\ 2x + 5 & \text{for } x \geq 3 \end{cases}$ . Evaluate:
- $g(5)$
  - $g(-1)$
  - $g(2)$
22. Determine the equation of the slant asymptote of  $f(x) = \frac{x^3-2x^2}{x^2+1}$ .
23. Find the exact values of the five remaining trigonometric functions if  $\sin t = -\frac{3}{7}$  and  $t$  is in quadrant III.
24. Evaluate each of the following (credit will not be given for either a or b if the unit circle is used):
- $\sin \frac{3\pi}{4}$
  - $\sec(-\frac{5\pi}{6})$
  - $\tan \pi$
25. Solve for  $0 \leq x \leq 2\pi$  (credit will not be given if the unit circle is used).
- $2 \cos x - 1 = 0$
  - $\sin 2x - \cos x = 0$
26. Use trigonometric identities to rewrite each expression in terms of a single trigonometric function.
- $(1 + \sin x)(1 - \sin x)$
  - $\cos t (\sec t - \cos t)$
27. Find the equations for all asymptotes.
- $f(x) = \tan 3x$
  - $g(x) = \csc 2x$

28. Evaluate each of the following (credit will not be given if the unit circle is used):

a.  $\sin^{-1}\left(\frac{1}{2}\right)$

b.  $\cos^{-1}\left(-\frac{1}{2}\right)$

c.  $\tan^{-1}(-1)$