

PREPARING FOR MATH 122A

Functions for Calculus, Math 122A, is meant to further develop what students with a strong background in PreCalculus can do with the tools that they have already learned. The problems below are those we feel students should be able to solve before entering Math 122A. Additional problems can be found at <http://prep.math.lsa.umich.edu/pmc>.

1. Find the equation of the line with x -intercept $(4,0)$ that is perpendicular to the line $3x - 8y = 5$.

2. Solve for p : $\frac{10p^3 - 5}{p+1} = 0$.

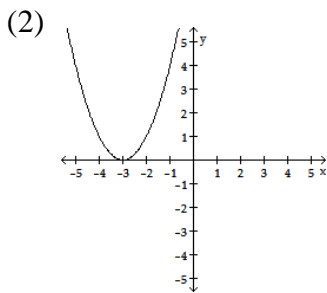
3. If $f(t) = 3t^2 - 2$, find $f(k-2)$.

4. Factor completely: $7(2x+1)^3 - (2x+1)^4$

5. If $g(x) = \begin{cases} -x+4 & x \leq 1 \\ \sqrt{x+3} & x > 1 \end{cases}$, what is $g(2)$?

6. Which of the following represent(s) y as a function of x ?

(1) $3y^2 = 5x$



(3)

x	y
1	5
2	4
3	5
4	4

7. Find exact solutions to the equation $x(x+3) = 5$.

8. If $(-4,7)$ is a point on the graph of $y = h(x)$, which of the following must be a point on the graph of $y = h(-x) - 2$?

- (A) $(-4,-9)$ (B) $(-4,-5)$ (C) $(4,5)$ (D) $(4,9)$

9. Given $f(x) = 6x^3 + 3$ and $g(x) = \sqrt{x}$, find $(f \circ g)(x)$.

10. Which of the statements is/are equivalent to " $x + 5$ is a factor of the polynomial $p(x)$ "?

- (1) $x = 5$ is a solution to $f(x) = 0$.
(2) $x = -5$ is a zero of $f(x)$.
(3) $(-5,0)$ is an x -intercept of $f(x)$.

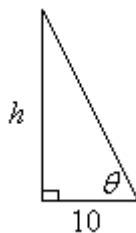
11. Simplify completely: $\frac{A(x+h)^2 - Ax^2}{h}$.

12. Find the vertical intercept of $f(t) = 3e^{4t+1}$.

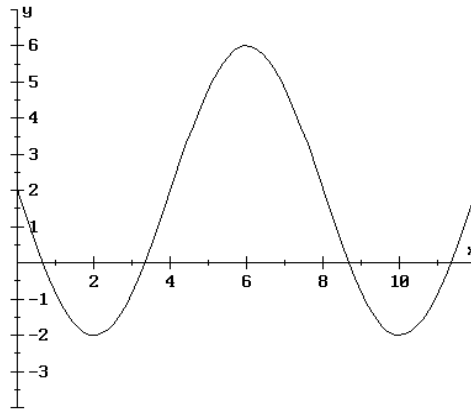
13. Find the domain of $y = \ln(4+3x)$.

14. Express as a single logarithm: $\frac{1}{3}\log x + 4\log y - 2\log z$

15. Express h in terms of the angle θ .



16. Find the period and amplitude of the periodic function shown:



17. Simplify completely: $\frac{\sec x}{\csc x}$

18. Find the exact value of $\cos\left(\frac{7\pi}{6}\right)$.

19. If the volume of a right circular cone is 50 cm^3 , express the radius as a function of height.

20. How many solutions does the equation $\sin(3x) = \frac{1}{2}$ on the interval $[0, 2\pi)$?

Answers:

1. $y = -\frac{8}{3}(x-4)$

2. $p = \sqrt[3]{\frac{1}{2}}$

3. $f(k-2) = 3k^2 - 12k + 10$

4. $2(2x+1)^3(3-x)$

5. $g(2) = \sqrt{5}$

6. (2) and (3)

7. $x = \frac{-3 \pm \sqrt{29}}{2}$

8. (4, 5)

9. $(f \circ g)(x) = 6x^{3/2} + 3$

10. (2) and (3)

11. $2Ax + Ah$

12. $(0, 3e)$

13. $x > -\frac{4}{3}$

14. $\log\left(\frac{x^{1/3}y^4}{z^2}\right)$

15. $h = 10 \tan \theta$

16. period: 8 amplitude: 4

17. $\tan x$

18. $-\frac{\sqrt{3}}{2}$

19. $r(h) = \sqrt{\frac{150}{\pi h}}$

20. 6