HONORS PRECALCULUS PREREQUISITE SKILLS TEST Name Answers

NO Calculator!!! Recommended Time: 1 – 1.5 hours! Date

1. Solve the inequality: $-3 \le \frac{2x-5}{3} < 5$

1. $-2 \le x < 10$ or $[-2, 10)$

2. Solve for x: $\frac{5}{x-1} - \frac{2x}{x+1} = 1$

2. $\{3, \frac{-2}{3}\}$

3. Find the domain of x in the expression: $\sqrt{7x+12}$

3. $\frac{-12}{7} \le x$ or $[\frac{-12}{7}, \infty)$

4. $f(x) = 5x - x^2$, find $\frac{f(5+h) - f(5)}{h}$

4. $-10 - h$

5. Perform the operation and write the result in standard form: $\frac{i}{3-2i} + \frac{2i}{3+8i}$

5. $\frac{62}{949} + \frac{297}{949}i$

6. Find all solutions of the equation: $|x^2 - 3| = 2x$

6. $\{3, 1\}$

7. Find all solutions of the equation: $x^4 - 5x^2 + 6 = 0$

7. $\{\pm\sqrt{3}, \pm\sqrt{2}\}$

8. You have 100 feet of fencing to use for three sides of a rectangular fence, with your house enclosing the fourth side. The area of the enclosure is given by $A = -2x^2 + 100x$. Graph the equation to find the maximum area possible, and how long each side needs to be to obtain that area.

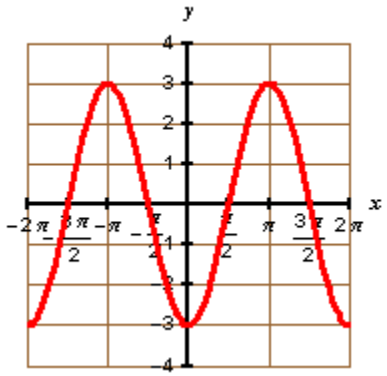
8. 25 by 50 ft

9. Write equations of the lines through (3, -2) (a) parallel and (b) perpendicular to $5x-4y=8$.

9a. $y_{\parallel} = \frac{5}{4}x - \frac{23}{4}$

9b. $y_{\perp} = \frac{-4}{5}x + \frac{2}{5}$

10. Graph the function: $g(t)=3\cos(t+\pi)$



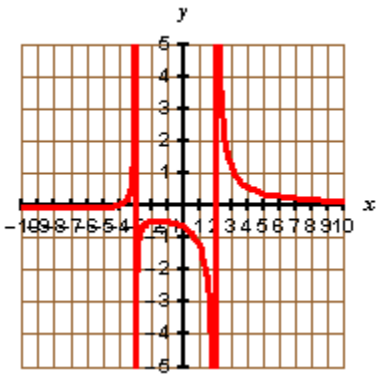
11. Use long division to divide: $\dfrac{x^4+3x^2+1}{x^2-2x+3}$

11. $x^2+2x+4+\dfrac{2x-11}{x^2-2x+3}$

12. Solve for x: $x^3-12x^2+40x-24=0$

12. $\{6, 3\pm\sqrt{5}\}$

13. Sketch the graph of the function by finding vertical and horizontal asymptotes, x- and y-intercepts, domain and range, and symmetry: $f(x)=\dfrac{x+4}{x^2+x-6}$.



14. Find the exponential function $y=ae^{bx}$ that passes through (0, 2) and (4, 3). Exact answer is required.

14. $y = 2e^{\left(\ln\frac{3}{2}-4\right)x}$

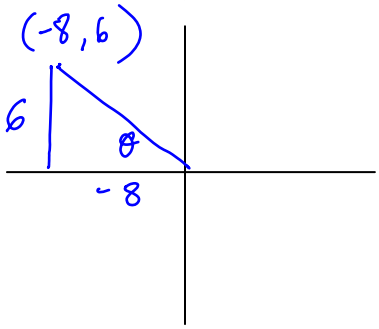
15. Solve for x: $3^{1-x} = 5^{x}$. Exact answer is required.

15. $x = \dfrac{\log 3}{\log 15}$

16. The angle of depression from the top of a building to the base of a statue 40 feet from the base of the building is $60°$. Determine the height of the building.

16. $40\sqrt{3}$ ft

17. You are given a point (-8, 6) on the terminal side of an angle θ. Sketch the angle and find its six trigonometric functions.



17. $\sin\theta = 3/5$

$\cos\theta = -4/5$

$\tan\theta = -3/4$

$\csc\theta = 5/3$

$\sec\theta = -5/4$

$\cot\theta = -4/3$

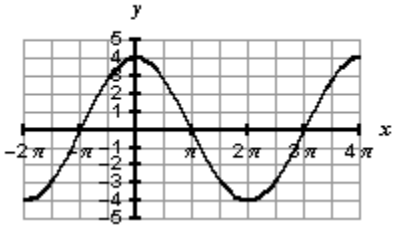
18. Find all solutions of $2\sin 2x - \sqrt{2} = 0$ in the interval $[0, 2\pi)$.

18. $\left\{\frac{\pi}{8}, \frac{3\pi}{8}, \frac{9\pi}{8}, \frac{11\pi}{8}\right\}$

19. Use inverse functions where needed to find all solutions of $\tan^2 x + \tan x - 12 = 0$ in the interval $[0, 2\pi)$. Exact answers are required.

19. $\{\tan^{-1}(-4) + \pi,$ $\tan^{-1}(-4) + 2\pi,$ $\tan^{-1}(3),$ $\tan^{-1}(3) + \pi\}$

20. Write an equation for the graph.



20. $y = 4\cos\left(\frac{1}{2}x\right)$

Answer varies

21. Find $\arcsin\left[\sin\left(\dfrac{2\pi}{3}\right)\right]$.

21. $\pi/3$

22. Write the equation of the conic in standard form:
$-16x^2 + 36y^2 + 96x - 144y - 16 = 0$

22. $\dfrac{(y-2)^2}{4} - \dfrac{(x-3)^2}{9} = 1$

23. Find the points of intersection:
$x^2 + y^2 - 18x + 24y + 200 = 0$ and $4x + 3y = 0$

23. $\{(12, -16), (6, -8)\}$

24. Condense the expression: $3\ln 5 - (\ln 15 - \ln 3)$

24. $\ln 5^2 = \ln 25$

25. Evaluate the expression: $\log_3 \frac{1}{9}$

25. -2