

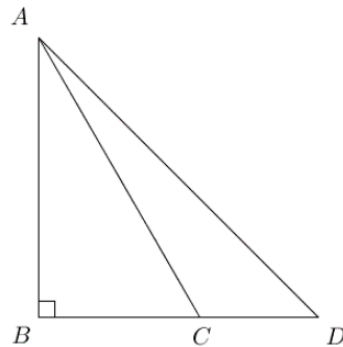
Review Final Exam Math 1330:

1. The graph of the function: $f(x) = \frac{4x^2 + x - 2}{x^2 + x - 3}$ has a horizontal asymptote. If the graph crosses this asymptote, give the x -coordinate of the intersection. Otherwise, state that the graph does not cross the asymptote.

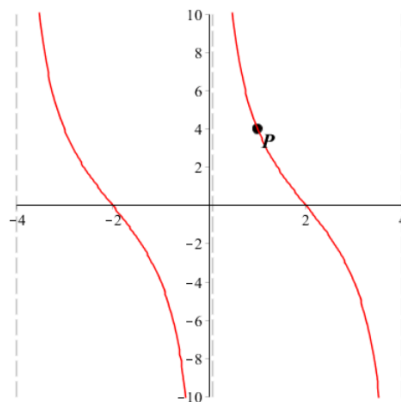
2. Let $f(x) = 5 \ln(x)$ and $g(x) = e^{3x}$. Find $(f \circ g)(4)$.

3. Given $f(x) = -x^2 + 2x - 1$: find the difference quotient $\frac{f(x+h)-f(x)}{h}$ and simplify it when $x=1$.

4. In the figure below, angle B is a right angle, $m(D) = 45^\circ$ and $m(\angle ACB) = 60^\circ$. If $AC = 16$, find the length of AD.



5. Simplify the following expression: $(1 - \cos \theta)(\csc \theta + \cos \theta)$.
6. Let $P(x,y)$ denote the point where the terminal side of an angle θ meets the unit circle. If P is in Quadrant II and $y = \frac{3}{4}$ find $\sec \theta$ and $\cot \theta$.
7. Given $f(x) = 2 \cot\left(5x - \frac{\pi}{6}\right)$. Find the vertical asymptotes for $f(x)$.
8. Find a sine function with positive vertical displacement satisfying : The amplitude is 8, the horizontal shift is $\frac{\pi}{6}$ units to the right, the vertical shift is 3 units up and the period $\frac{\pi}{10}$.
9. Point P has the coordinates $(1,4)$. Find the function. One asymptote is the y -axis.



10. Simplify: $\frac{8 \cos(-t) \sin(-t)}{\tan(-t) \cot(t+3\pi)}$

11. Evaluate the following expression: $\frac{\sin\left(-\frac{35\pi}{6}\right) \cos\left(\frac{32\pi}{3}\right)}{\tan\left(\frac{43\pi}{4}\right)}$

12. Find the exact value of the expression: $\cos\left(\tan^{-1}\left(\frac{12}{5}\right)\right)$

13. Evaluate the following expression: $\sin^{-1}(1) + \cos^{-1}(-1) + \tan^{-1}(-\sqrt{3})$

14. Give $\tan(x) = 4$ and $0 < x < \pi$: find the value for $\sin(2x)$.

15. Solve the following equation on the interval $[0, 2\pi)$.

$$2 \sin^2(x) - 3 \sin(x) - 5 = 0$$

16. Given the following:

$$0 < x < \frac{\pi}{2}, \quad 0 < y < \pi, \quad \sin(x) = \frac{1}{5}, \quad \sin y = \frac{1}{4}$$

Evaluate:

a. $\cos(x - y)$

b. $\cos(2x)$

17. Solve the following equation over the interval $[0, \frac{2\pi}{3}]$: $4 \sin(3x) - 2 = 4$

18. Classify $16x^2 - 4y^2 + 32x - 48y - 192 = 0$

19. Find the area of $\triangle XYZ$ if $\angle 45^\circ$, $z = 7$ and $x = 4$.

20. Given $\triangle ABC$ with $AB = 5$ and $BC = \frac{5\sqrt{3}}{3}$. The measure of $\angle A$ is 30° . How many choices are there for the measure of $\angle C$?

21. Given $\triangle ABC$ with $\angle A = 60^\circ$, $\angle B = 45^\circ$, and $BC = 32$ cm. Find AC . (All answers are in cm.)

22. Given the conic system: $3x^2 + 2y^2 = 17$
 $x^2 - y^2 = -1$

- Identify the conic section represented by the first equation.
- Identify the conic section represented by the second equation.
- Find the point of intersection.

23. Write in standard form: $25x^2 + 4y^2 - 100x + 8y + 4 = 0$

24. Find the magnitude: $\mathbf{v} = 4\mathbf{i} - 4\mathbf{j}$

25. Given the vector: $\mathbf{v} = \langle -2\sqrt{3}, 2 \rangle$ Find the direction angle of this vector.

26. Give all possible polar coordinates for the point $(3\sqrt{3}, -3)$ given in rectangular coordinates. (In the choices below, n represents any integer.)