Math 150 - Week-In-Review 12

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Final Exam review

1. Determine whether the Law of Sines or the Law of Cosines is needed to solve the triangle, then (if possible), solve the triangle.

   $\angle B = 17°$, $\angle C = 150°$ and $c = 65$.

2. Determine whether the Law of Sines or Law of Cosines is needed to solve the triangle, then (if possible), solve the triangle.

   $\angle A = 32°$, $a = 4.2$, $b = 12.4$

3. Determine whether the Law of Sines or Law of Cosines is needed to solve the triangle, then (if possible), solve the triangle.

   $a = 10$, $b = 12$, $c = 16$

4. Determine whether the Law of Sines or Law of Cosines is needed to solve the triangle, then (if possible), solve the triangle.

   $a = 13$, $b = 15$, $\angle A = 53°$

5. Find the component form, magnitude and directional angle of $\overrightarrow{v} = -\overrightarrow{u} - \sqrt{3}\overrightarrow{w}$, where $\overrightarrow{u} = 8\overrightarrow{i} + \sqrt{3}\overrightarrow{j}$, and $\overrightarrow{w} = -\frac{2}{\sqrt{3}}\overrightarrow{i} + \overrightarrow{j}$.

6. Find the component form of $\overrightarrow{v}$ given its magnitude and the angle it makes with the positive x-axis.
   $\|\overrightarrow{v}\| = 3$, $\theta = 225°$

7. Find $\vec{u} \bullet \vec{v}$ and $(\vec{u} \bullet \vec{v})\vec{v}$ for $\vec{u} = \langle 2, 4 \rangle$ and $\vec{v} = \langle -6, 2 \rangle$.

8. Find the angle between $\vec{u}$ and $\vec{v}$ for $\vec{u} = \langle 2, 4 \rangle$ and $\vec{v} = \langle -6, 2 \rangle$.

9. Compute the difference quotient for $f(x) = \dfrac{-x}{2x+1}$.

10. Solve the following.

(a) $|9 + 2x| = 5x - 3$

(b) $\dfrac{x^2 + x - 6}{2x^2 - 6x - 8} < 0$

11. Write the equation of the line perpendicular to $3x - 4y = 8$ and having the same y-intercept as $y = 5x - 1$.

12. Given the equation $g(x) = -2x^2 + 4x + 9$, Identify the vertex, axis of symmetry, write the equation in vertex form and find the x-intercepts.

13. Consider the function $g(x) = -(2x-4)^3 + 5$. Describe the transformations from $f(x) = x^3$ to $g(x)$.

14. Find domain of the function $f(x) = e^{\frac{x^2-4}{\sqrt{3x}-1}}$

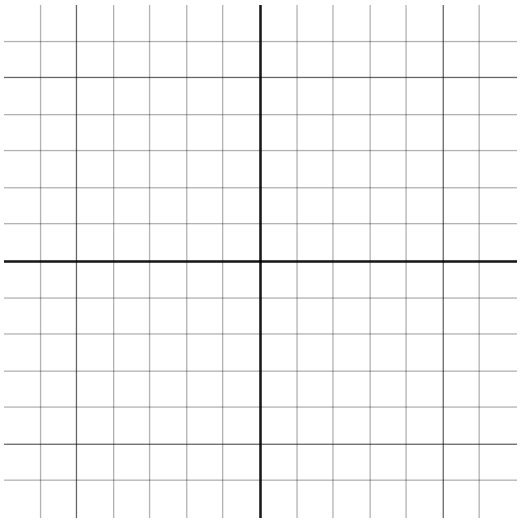
15. Solve the following equation $\log_6(x-12) - \log_6(x) = \log_6(x-6)$.

16. Solve the equation $7^{2x+5} = 4^{1-x}$.

17. Expand the logarithmic expression $\log_8\left(\dfrac{(x^2+1)^4}{64(x^3-x)}\right)$

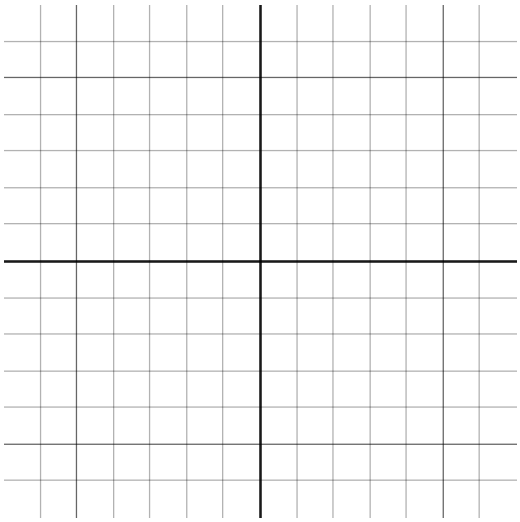
18. Determine the quotient and remainder of the $(14x^3 - 2x^2 - \frac{1}{2}) \div (2x+1)$.

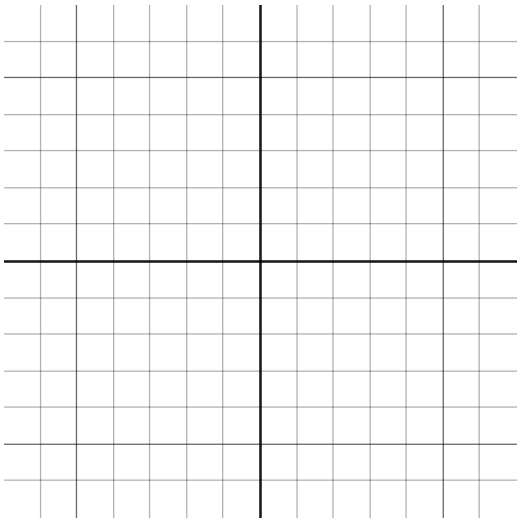
19. Determine the domain, vertical asymptote(s), horizontal asymptote(s), hole(s) and intercepts of the equation $g(x) = \dfrac{8x^2 - 12x + 4}{(x-1)(x+3)}$. State the end behavior, then sketch the graph.

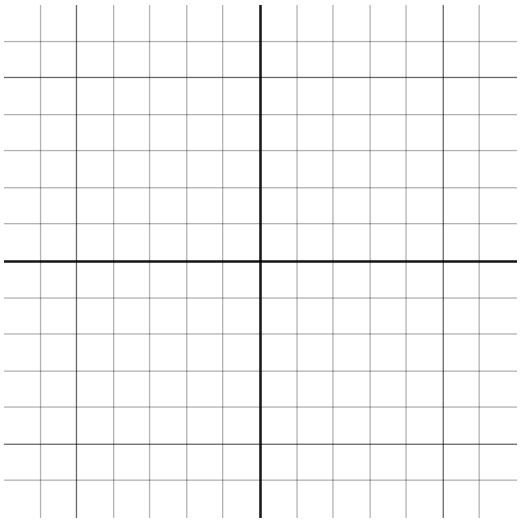


20. Given $f(x) = \dfrac{2x}{x+3}$, $g(x) = \dfrac{1}{x}$, find $(f \circ g)(x)$ its domains.

21. Given three equations $f(x) = \sqrt{5-x} + 1$, $g(x) = e^{3x} - 1$ and $h(x) = \log_3(x+2)$. Find domain of the function $S(x) = \dfrac{f(x) + g(x)}{h(x)}$. Then sketch f, g and h separately.







22. Solve the following system of equations. $\begin{cases} x^2 - y^2 = -4 \\ 2\sqrt{x} - y = 0 \end{cases}$

23. Simplify the expression $\dfrac{4\sin(x)\cos(x)}{2\cos(x)\cos(2x) - 2\sin(x)\sin(2x)}$.

24. Complete the identity

$$\frac{2}{\sec(x)+1} - \frac{2}{\sec(x)-1}$$

25. Given t corresponds to the point $\left(-\frac{3}{4}, \frac{\sqrt{7}}{4}\right)$ on a circle, find the value of $\sin(t) - \sec(t)$.

26. Find all solutions to $\csc(3x) - \sin(3x) = 0$ then list the answers on the interval $[0, 2\pi)$.

27. Find solutions to $\sin(2x) + \frac{1}{13}\sin(x) = 0$ on the interval $[0, 2\pi)$.

28. Evaluate each of the following:

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

(b) $4\arctan\left(\cot\left(-\frac{\pi}{3}\right)\right)$

(c) $\tan\left(\arcsin\left(\frac{-\sqrt{2}}{2}\right)\right) + 2$

29. Simplify the following composition, then state its domain.

$\tan(\arccos(2x)) =$ _____

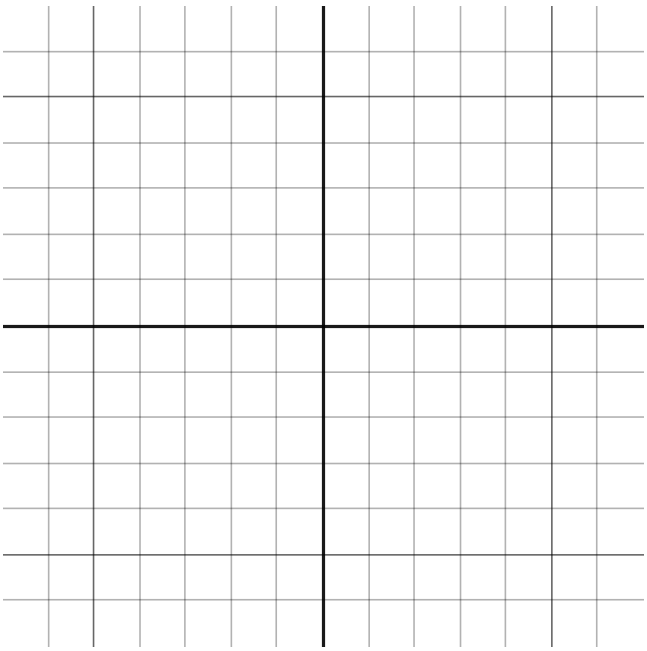
30. Find all vertical asymptotes of $y = 2\tan\left(\frac{x}{4} + \frac{\pi}{6}\right) - 5$ on the interval $\left[0, \frac{\pi}{2}\right)$

31. Emmy chooses a horse that is 10 feet from the center of a merry-go-round. The merry-go-round makes $\frac{9}{2}$ rotations per minute. Determine Emmy's angular and linear velocity in radians per second.

32. If you deposit \$2000 in an account with an annual interest rate of 3%, compounded continuously. Find the time it takes for the investment of \$2000 to grow to \$2500.

33. Find domain and range of $5\csc(2x - \frac{\pi}{3}) + 3$.

34. Given $y = 5\sin\left(\frac{1}{3}x - \frac{2\pi}{5}\right) - 4$, state the period and give an interval including the fundamental cycle of your function. Sketch the graph.



35. For $z_1 = 2 + 3i$ and $z_2 = 4 - i$, find $z_1 + z_2, z_1 - z_2, z_1 \cdot z_2$.

Note: These problems are just a sample and should not be your sole source of studying. For additional practice, refer to your lecture notes, homework and previous Week-in-Reviews. You can also find other problems in your textbook.