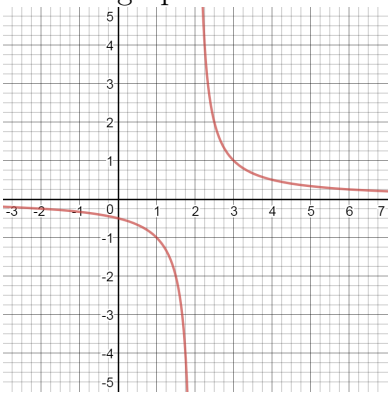
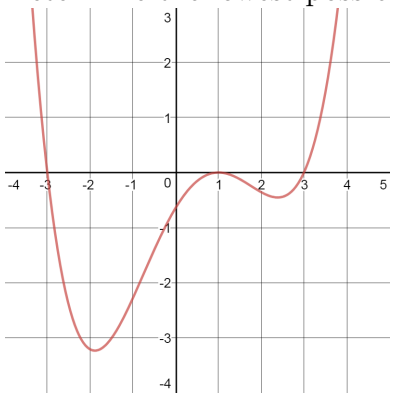
MATH 1513 Final Review

1. Solve $x^2 - 7x + 10 \geq 0$. Write your answer using interval notation.
2. Find the distance between (3,4) and (2,10), and the midpoint coordinates of the line segment joining the points.
3. Find the equation of a circle with center at (-3,5) and radius 3.
4. Find the center and radius of the circle given by $x^2 - 4x + y^2 - 2y + 1 = 0$
5. Let $f(x) = 3x^2 - 1$. Find the following.
   (a) $f(2)$
   (b) $f(\sqrt{5})$
   (c) $f(3) - f(\sqrt{2})$
   (d) $f(x + h)$
   (e) $f(x + h) - f(x)$
6. Use the graph to find the domain and range of the function.



7. Find the equation of the line through (4,5) with a slope of 3.
8. Graph $y = (x - 2)^2 + 1$
9. Graph $y = \sqrt{x + 1} - 2$
10. Find the domain and range of $f(x) = |x - 4| + 3$
11. Let $f(x) = 2x - 2$ and $g(x) = x^2 - 1$. Find $g(f(4))$.
12. Let $f(x) = \frac{1}{3x-2}$ and $g(x) = x^2 - x$. Find $(f \circ g)(x)$.
13. Let $f(x) = x^2 - x + 2$. Write a relationship for a function, g, that is f shifted right 2 units and vertically compressed by a factor of 3.
14. Find $f^{-1}(5)$ if $f(x) = 4x - 3$.

15. Determine the lowest possible degree for the polynomial whose graph is shown.



16. Determine all the possibilities for rational zeros of $14x^5 - 12x^4 + 14x^2 + 4x - 4 = 0$

17. Let $h(x) = \dfrac{3}{x+2} - 4$. Find any x-intercepts, y-intercepts, horizontal asymptotes, vertical asymptotes, and the domain of h.

18. Find the domain of $f(x) = \sqrt{x^2 + 5x - 14}$

19. Find $|3 - 4i|$

20. Find $(2 - i)(-3 + 4i)$

21. Find a third degree polynomial with a zero of 2 and another zero of $3 - 2i$.

22. Convert $140°$ to radian measure.

23. Find the reference angle for $-120°$

24. Find all values of t in $[0, 2\pi]$ that satisfy $\cos(t) = \dfrac{\sqrt{3}}{2}$

25. If $\sin(t) < 0$ and $\cos(t) > 0$, then t is in which quadrant?

26. Sketch the graph of $y = 2\cos(x) - 1$

27. Find $\log_3(21)$

28. Solve $2^{x-2} = 3$

29. Solve $2\ln(x) = \ln(3) + \ln(x + 6)$

30. Find the half-life of a radioactive substance that decays by 6% in 7 years.

31. Which investment is better, one at 6.1% compounded quarterly for 8 years, or one at 5.8% compounded continuously for 8 years?

32. Find the vertices, foci, and lengths of the transverse and conjugate axes for the given hyperbola. Find the equations of the asymptotes. $\dfrac{y^2}{100} - \dfrac{x^2}{81} = 1$

33. Find the equation for the hyperbola with foci at $(\pm 12, 0)$ and vertices $(\pm 9, 0)$

34. The 5^{th} term of an arithmetic sequence is 5.4 and the 12^{th} term is 11 Find the n^{th} term of the sequence.

35. The second term of a geometric sequence is 28 and the sixth term is 7168. Find the n^{th} term of the sequence.

36. Find the sum of the following.

    (a) $\sum_{n=1}^{9}(12n - 7)$

    (b) $\sum_{i=1}^{\infty} 4(\frac{1}{2})^i$

37. Let $\vec{u} = \langle 2, -5 \rangle$ and $\vec{v} = \langle 3, 2 \rangle$. Find the following.

    (a) $\vec{u} \cdot \vec{v}$

    (b) $\|\vec{u}\| \cdot \|\vec{v}\|$

    (c) The angle between $\vec{u}$ and $\vec{v}$

    (d) Are $\vec{u}$ and $\vec{v}$ orthogonal?