practice1150.tex

instructions here

1. Write the following complex numbers in $a + bi$ form
   (a) $(5 + 2i)^2$
   (b) $\frac{2}{1+2i}$
   (c) $(3 + \sqrt{-4})(2 - \sqrt{-1})$
   (d) $\frac{2-\sqrt{-1}}{1+\sqrt{-2}}$
2. Find an equation for the set of all points distance 3 from the point $(3, -1)$.
3. Find the distance between $(1, 2)$ and $(3, -1)$.
4. Find equation for the set of all points equidistant from the points $(-3, 2)$ and $(5, -4)$
5. Find the center and radius of the circle $x^2 + y^2 + 4x + 6y + 16 = 0$
6. Find the general form for the line through the point $P = (1, 2)$ and satisfying the given condition
   (a) with slope $-\frac{1}{2}$
   (b) parallel to the line $2x + 3y = 6$
   (c) passes through the point $(3, -4)$
7. Find the slope-intercept form of the line $2x - 3y = 5$
8. Find the domain of the functions
   (a) $f(x) = \sqrt{(x-2)(6-x)}$
   (b) $f(x) = \frac{1}{1+x^2}$
   (c) $f(x) = \frac{1}{1-x^2}$
   (d) $f(x) = \frac{1}{\sqrt{1-x^2}}$
9. If $f(x)$ is a linear function satisfying $f(1) = 2$ and $f(3) = -1$, find formula for $f(x)$.
10. Determine which of the following are even, odd or neither.
    (a) $f(x) = x^2 + 1$
    (b) $f(x) = \sqrt{x^4 + 2}$
    (c) $f(x) = |x| + 1$
    (d) $f(x) = |x + 1|$

11. For $f(x) = 3x^2 + 4$ and $g(x) = \sqrt{x-2}$, find
    (a) $f \circ g$
    (b) $g \circ f$
    (c) the domain of $f \circ g$
    (d) the domain of $g \circ f$
12. Determine which functions are one to one; those that are find the inverse.
    (a) $f(x) = x^3 - 4$
    (b) $f(x) = x^2 + 2x + 1$
    (c) $f(x) = \frac{x+1}{x-1}$
13. Use substitution to solve the system of equations
    (a) $2x + y = -1, x^2 + y^2 = 16$
    (b) $3x - 4y = 20, 3x + 2y = 8$
14. Sketch the graph of the system of inequalities
    (a) $x + 2y \leq 4, x \geq 0, y \geq 0$
    (b) $x^2 + y^2 \leq 4, x \leq y$
15. Find all values x where the polynomial is positive and all values of x where the polynmial is negative
    (a) $f(x) = x(x-1)(x-2)$
    (b) $f(x) = x^2 + 3x - 4$
    (c) $f(x) = x^4 - 6x^2 + 8$
16. Find the quotient and remainder for $f(x)$ divided by $p(x)$
    (a) $f(x) = 3x^4 + 2x - 3, p(x) = x^2 + x + 1$
    (b) $f(x) = x^2 + 2x - 3, p(x) = x^3$
    (c) $f(x) = x^3 - 1, p(x) = x - 1$
17. Determine which of $(x-1), (x-2), (x+1)$ are factors of $x^4 - +x^3 + 2x^2 + x + 1$
18. Find a degree 4 polynomial with leading coefficient 1 having roots $1, -1, -2, 2$
19. Find the zeros, with their multiplicities of:
    (a) $f(x) = 2x^4 + 7x^3 - 2x^2$
    (b) $f(x) = (x^2 - 1)^2$

(c) $f(x) = (x-1)(x-2)(x+3)$

20. Show that 4 is a zero of $f(x) = x^4 - 9x^3 + 22x^2 - 32$ of multiplicity 2, and express $f(x)$ as a product of linear factors.

21. Solve the exponential equations

    (a) $(\frac{1}{2})^{1-x} = 2$
    (b) $e^{2x+1} = 1$
    (c) $8^2 = 2^x$

22. Find the zeros of $f(x) = x^2e^x + xe^x$

23. (5.2) Sketch the graph of

    (a) $y = \ln(x)$
    (b) $y = e^x$
    (c) $y = e^{2x}$
    (d) $y = \ln(x-1)$
    (e) $y = -e^x$
    (f) $y = \ln(x) + 1$

24. (5.3,5.4) Find solution x:

    (a) $e^x + xe^x = 0$
    (b) $\ln(x) = 1$
    (c) $\ln(3) + \ln(x) = 0$
    (d) $e^x = 1$
    (e) $\log_2(x) = 4$

25. (6.1) Convert the radian measure given to degrees:

    (a) $\frac{2\pi}{3}$
    (b) $\frac{\pi}{4}$
    (c) $\frac{\pi}{6}$

26. (6.2) The top of a building 200 feet away appears to form an angle of $60°$ with the ground. How tall is the building?

27. (6.3,6.4) Find x in $[0, 2\pi]$ such that

    (a) $\sin(x) = 1$
    (b) $\cos(x) = \frac{1}{2}$

(c) $\tan(x) = -1$

28. (6.3,6.4) Find exact values

    (a) $\sin(\frac{2\pi}{3})$
    (b) $\cos(\frac{\pi}{4})$
    (c) $\tan(\frac{\pi}{6})$

29. (6.5, 6.6) Sketch the graph

    (a) $y = 4\sin(\frac{x}{\pi})$
    (b) $y = \cos(x - \frac{\pi}{2})$
    (c) $y = \tan(2x)$

30. (7.2) Find all solutions to the following

    (a) $\cos(x) = \frac{1}{2}$
    (b) $4\sin^2(x) - 3 = 0$

31. (7.3) Use cofunction relations to solve for x:

    (a) $\cos(\frac{\pi}{6}) = \sin(x)$
    (b) $\sin(0) = \cos(x)$

32. (7.3) Complete the angle addition formulas

    (a) $\sin(u)\cos(v) + \cos(u)\sin(v) =$
    (b) $\cos(u)\cos(v) - \sin(u)\sin(v) =$

33. (7.4) Complete the half angle identities

    (a) $\frac{1+\cos(2u)}{2} =$
    (b) $\frac{1-\cos(2u)}{2} =$

34. (7.4) Use half angle formula to find the exact value of $\cos(\frac{\pi}{8})$

35. (7.6) find the exact value

    (a) $\arcsin(\frac{\sqrt{3}}{2})$
    (b) $\arctan(1)$
    (c) $\sin(\arctan(\frac{\sqrt{3}}{3})$

36. (8.1 and 8.2)

    (a) State the law of sines

(b) State the law of cosines

37. (8.1 and 8.2) Use the law of sines or cosines to find the remaining sides and angles of triangle ABC

    (a) $\alpha = 48°, \beta = 57°, c = 15$

    (b) $\alpha = 70°, b = 10, c = 15$

38. (8.3) Find the magnitude of the given vector and the angle it makes with the positive x axis

    (a) $< 3, 3 >$

    (b) $< 0, 1 >$

39. (8.5) Express the complex number in trigonometric form:

    (a) $-2 + 2i$

    (b) $3 + 4i$

40. (8.6) Find all solutions of the equations:

    (a) $x^6 = 1$

    (b) $x^2 = 1 + \sqrt{-3}$

41. (11.5) Find an equation in polar form with the same graph as

    (a) $(x - 1)^2 + y = 1$

    (b) $y = x$

    (c) $x^2 + y^2 = 5$