Precalculus

Name_____

CW36 - Semester 1 Exam Review

Period_____

For each problem, find the average rate of change of the function over the given interval.

1) $f(x) = x^2 + x + 2;\ \ [0, \frac{1}{4}]$

Perform the indicated operation.

2) $g(x) = x - 3$
   $f(x) = x^2 + 5$
   Find $(g + f)(x)$

3) $g(n) = n - 3$
   $f(n) = n^3 + 5n$
   Find $(g - f)(n)$

4) $g(x) = x - 3$
   $h(x) = 2x + 2$
   Find $(g \cdot h)(x)$

5) $g(n) = n^3 + 5n$
   $h(n) = 3n$
   Find $\left(\dfrac{g}{h}\right)(n)$

6) $f(a) = -a + 2$
   $g(a) = a^2 + 4$
   Find $(f \circ g)(a)$

7) $g(x) = x^2 - 2x$
   $h(x) = -2x + 5$
   Find $(5g - 5h)(x)$

Divide. Write your answer in fraction form.

8) $(3x^3 + 12x^2 - 16x - 17) \div (x + 5)$

Find the inverse of each function.

9) $g(x) = \sqrt[5]{\dfrac{-x - 3}{2}}$

10) $g(x) = (x - 3)^3$

Write a polynomial function of least degree with integral coefficients that has the given zeros.

11) $\dfrac{3}{2}$ mult. 2, -3

Find all zeros.

12) $f(x) = 27x^3 - 125$

13) $f(x) = 2x^4 + 11x^2 - 21$

Solve each equation. Remember to check for extraneous solutions.

14) $1 + \dfrac{6x + 18}{5x} = \dfrac{x + 3}{x}$

15) $\dfrac{1}{6n + 2} + 1 = \dfrac{5}{6n + 2}$

Solve each equation.

16) $9^{-3b} = 27^{2 - 2b}$

Rewrite each equation in exponential form.

17) $\log_{\frac{1}{11}} \frac{1}{121} = 2$

Rewrite each equation in logarithmic form.

18) $14^2 = 196$

Rewrite each equation in exponential form.

19) $\log_y x = -9$

Rewrite each equation in logarithmic form.

20) $10^{12} = v$

Use a calculator to approximate each to the nearest thousandth.

21) $\log_5 49$

22) $\log_3 69$

Expand each logarithm.

23) $\log_9 \left(uv^4\right)^3$

Condense each expression to a single logarithm.

24) $4\log_3 a + 2\log_3 b$

Solve each equation. Round your answers to the nearest ten-thousandth.

25) $-5 \cdot 3^{10n} = -60$

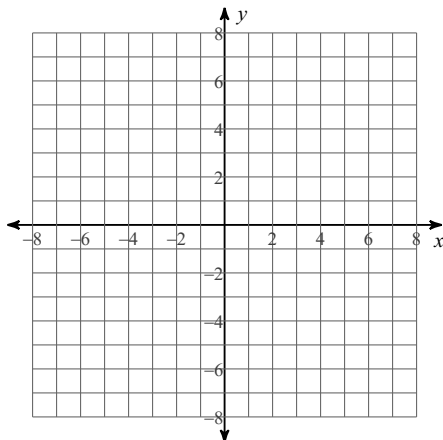26) $-7 \cdot 18^{m-1} + 4 = -47$

27) $-3 \cdot 10^{10-10x} - 6 = -98$

Solve each equation.

28) $\log_7 \left(-4x + 10\right) = \log_7 x$

29) $\log_8 -4x + \log_8 9 = \log_8 63$

Identify the vertex, focus, axis of symmetry, direction of opening, and min/max value of each. Then sketch the graph.

30) $y = -x^2 + 4x$

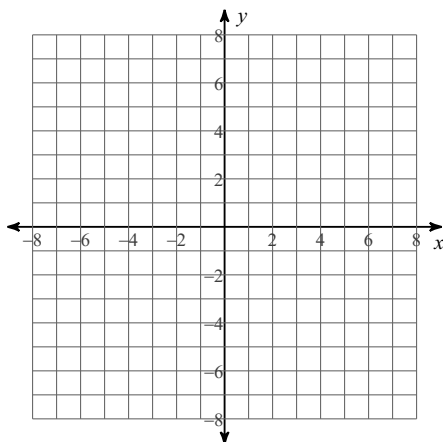**Use the information provided to write the vertex form equation of each parabola.**

31) Vertex: $(-5, -4)$, Focus: $\left(-5, -\dfrac{47}{12}\right)$

Use the information provided to write the general conic form equation of each parabola.

32) Vertex: $(3, -10)$, Focus: $\left(3, -\dfrac{39}{4}\right)$

Identify the center and radius of each. Then sketch the graph.

33) $\left(x - \dfrac{5}{2}\right)^2 + (y + 2)^2 = 13$

Use the information provided to write the standard form equation of each circle.
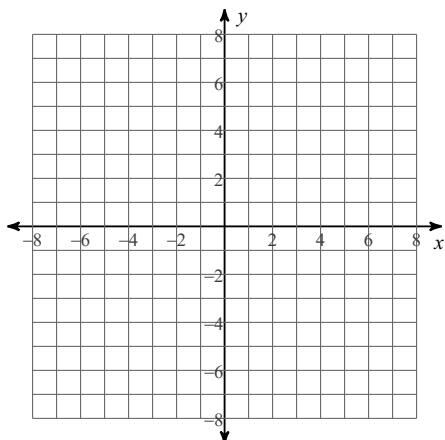
34) Center: $(2, 13)$
     Radius: 4

Use the information provided to write the general conic form equation of each circle.

35) Center: $(7, 4)$
     Radius: 6

Identify the center, vertices, foci, and eccentricity of each. Then sketch the graph.

36) $x^2 + 9y^2 - 90y + 189 = 0$

Use the information provided to write the standard form equation of each ellipse.
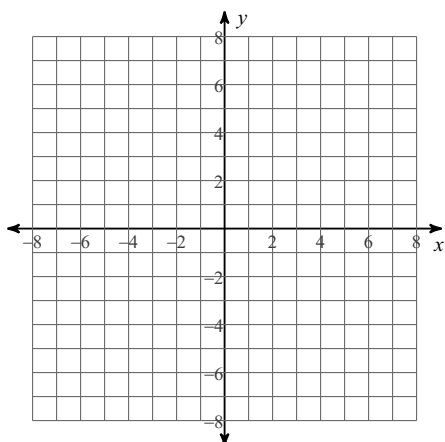
37) Vertices: $(3, 2), (3, -20)$
  Foci: $(3, -9 + \sqrt{21}), (3, -9 - \sqrt{21})$

Use the information provided to write the general conic form equation of each ellipse.

38) Vertices: $(11, 5), (-9, 5)$
  Foci: $(9, 5), (-7, 5)$

Identify the vertices, foci, asymptotes, and eccentricity of each. Then sketch the graph.

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

Use the information provided to write the standard form equation of each hyperbola.

40) Vertices: $(2, -8), (-22, -8)$
  Foci: $(-10 + 3\sqrt{17}, -8), (-10 - 3\sqrt{17}, -8)$

Use the information provided to write the general conic form equation of each hyperbola.

41) Vertices: $(-9, 6), (-9, -10)$
  Foci: $(-9, -2 + 4\sqrt{5}), (-9, -2 - 4\sqrt{5})$