Hansen ~Name~ Key

Algebra IIC Review for Final 2014

Date 2014 ___ Period___

Solve each equation. Remember to check for extraneous solutions.

1) $\dfrac{1}{x^2} = \dfrac{1}{4x} + \dfrac{1}{4x^2}$

$\{3\}$

2) $1 = \dfrac{1}{2} - \dfrac{1}{2n}$

$\{-1\}$

3) $1 + \dfrac{3}{k} = \dfrac{1}{k}$

$\{-2\}$

4) $\dfrac{1}{3m} = \dfrac{1}{m} - 2 \quad \left\{\dfrac{1}{3}\right\}$

5) $\dfrac{5}{n-2} = \dfrac{2}{n-2} - 1$

$\{-1\}$

6) $1 - \dfrac{1}{n} = \dfrac{6}{n}$

$\{7\}$

7) $\dfrac{a-2}{4a} + \dfrac{3a-3}{2a} = 1 \quad \left\{\dfrac{8}{3}\right\}$

8) $\dfrac{5}{n^2 - n} = \dfrac{1}{n^2 - n} + \dfrac{1}{n}$

$\{5\}$

9) $\dfrac{6}{b^2 - 1} = \dfrac{2}{b-1} - \dfrac{1}{b+1}$

$\{4\}$

10) $\dfrac{2}{m^2 - 16} - \dfrac{6}{m+4} = \dfrac{2}{m-4}$

$\{2\}$

Describe the pattern and find the next three terms in each sequence.

11) $\dfrac{3}{2}, \dfrac{13}{6}, \dfrac{17}{6}, \dfrac{7}{2}, \dfrac{25}{6}, \dots \quad \dfrac{29}{6}, \dfrac{11}{2}, \dfrac{37}{6}$

12) $18, 14, 10, 6, 2, \dots \quad -2, -6, -10$

13) $-9, 91, 191, 291, 391, \dots \quad 491, 591, 691$

14) $-1, \dfrac{1}{2}, 2, \dfrac{7}{2}, 5, \dots \quad \dfrac{13}{2}, 8, \dfrac{19}{2}$

For each sequence, state if it is arithmetic, geometric, or neither. If arithmetic or geometric, state the common difference (d) or common ratio (r).

15) $0.6, -3, 15, -75, 375, \dots$

Geometric

16) $33, 38, 43, 48, 53, \dots$ Arithmetic

17) $-2, \dfrac{1}{2}, -\dfrac{1}{8}, \dfrac{1}{32}, -\dfrac{1}{128}, \dots$

Geometric

18) $-\dfrac{5}{4}, -\dfrac{11}{4}, -\dfrac{17}{4}, -\dfrac{23}{4}, -\dfrac{29}{4}, \dots$ Arithmetic

Find the common difference and the 52nd term.

19) $25, 35, 45, 55, \dots$ Common Difference: $d = 10$

$a_{52} = 535$

20) $-31, -34, -37, -40, \dots$ Common Difference: $d = -3$

$a_{52} = -184$

Find the common difference and the term named in the problem.

21) $0, 30, 60, 90, ...$ Common Difference: $d = 30$
Find a_{31} $a_{31} = 900$

22) $13, 3, -7, -17, ...$ Common Difference: $d = -10$
Find a_{31} $a_{31} = -287$

Find the missing term or terms in each arithmetic sequence.

23) $..., -\dfrac{7}{6}, \underline{\quad}, -\dfrac{25}{6}, ...$

$-\dfrac{8}{3}$

24) $..., -1, \underline{\quad}, 2, ...$

$\dfrac{1}{2}$

25) $..., -\dfrac{5}{3}, \underline{\quad}, \dfrac{4}{3}, ...$

$-\dfrac{1}{6}$

26) $..., -17, \underline{\quad}, -23, ...$

-20

Evaluate each arithmetic series described.

27) $a_1 = 13, \ a_n = 43, \ n = 11$

308

28) $a_1 = 11, \ a_n = 141, \ n = 14$ 1064

29) $a_1 = 3, \ a_n = 75, \ n = 13$ 507

30) $\displaystyle\sum_{i=1}^{5} (5i + 5)$

100

31) $\displaystyle\sum_{i=1}^{8} (5i - 14)$

68

Evaluate each arithmetic series described. use summation notation to write the series.

32) $13 + 19 + 25 + 31..., \ n = 14$ $728, \displaystyle\sum_{n=1}^{14} (7 + 6n)$

33) $47 + 57 + 67 + 77..., \ n = 10$ $920, \displaystyle\sum_{n=1}^{10} (37 + 10n)$

34) $15 + 18 + 21 + 24..., \ n = 16$ $600, \displaystyle\sum_{n=1}^{16} (12 + 3n)$

35) $16 + 23 + 30 + 37..., \ n = 18$ $1359, \displaystyle\sum_{n=1}^{18} (9 + 7n)$

Given the first term and the common ratio of a geometric sequence find the 8th term and the explicit formula.

36) $a_1 = -3, \ r = 2$

$a_8 = -384$

Explicit: $a_n = -3 \cdot 2^{n-1}$

37) $a_1 = 1, \ r = 5$ $a_8 = 78125$

Explicit: $a_n = 5^{n-1}$

38) $a_1 = -4, \ r = 3$

$a_8 = -8748$

Explicit: $a_n = -4 \cdot 3^{n-1}$

39) $a_1 = -2, \ r = 5$ $a_8 = -156250$

Explicit: $a_n = -2 \cdot 5^{n-1}$

Find the missing term or terms in each geometric sequence.

40) ..., 2, ___, 18, ...

6

41) ..., −3, ___, ___, −648, ...

−18, −108

42) ..., −3, ___, −108, ...

−18

43) ..., 4, ___, ___, 108, ...

12, 36

Use summation notation to write the series and/or find the sum.

44) $\sum_{m=1}^{9} 5^{m-1}$ 488281

45) $\sum_{i=1}^{8} 4 \cdot 4^{i-1}$ 87380

46) $\sum_{i=1}^{7} -2 \cdot (-4)^{i-1}$ −6554

47) $3 - 12 + 48 - 192..., \ n = 9$ $157287, \ \sum_{n=1}^{9} 3 \cdot (-4)^{n-1}$

48) $3 - 15 + 75 - 375..., \ n = 7$

$39063, \ \sum_{n=1}^{7} 3 \cdot (-5)^{n-1}$

49) $3 + 12 + 48 + 192..., \ n = 6$ $4095, \ \sum_{n=1}^{6} 3 \cdot 4^{n-1}$

50) $4 - 16 + 64 - 256...$

No sum

51) $48 + 24 + 12 + 6...$ $96, \ \sum_{n=1}^{\infty} 48 \cdot \left(\frac{1}{2}\right)^{n-1}$

52) $4 + 2 + 1 + \dfrac{1}{2}...$ $8, \ \sum_{n=1}^{\infty} 4 \cdot \left(\frac{1}{2}\right)^{n-1}$

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

53) Center: $(-8, 11)$ $(x+8)^2 + (y-11)^2 = 36$
Radius: 6

54) Center: $(16, -11)$ $(x-16)^2 + (y+11)^2 = 9$
Radius: 3

55) Center: $(6, 2)$ $(x-6)^2 + (y-2)^2 = 64$
Radius: 8

Identify the center and radius of each.

56) $(x+8)^2 + (y+2)^2 = 25$ Center: $(-8, -2)$
Radius: 5

57) $(x-13)^2 + (y+9)^2 = 1$ Center: $(13, -9)$
Radius: 1

58) $(x-3)^2 + (y-5)^2 = 142$
Center: $(3, 5)$
Radius: $\sqrt{142}$

59) $x^2 + y^2 - 12x + 14y + 80 = 0$ Center: $(6, -7)$
Radius: $\sqrt{5}$

60) $x^2 + y^2 + 12x + 28y + 216 = 0$
Center: $(-6, -14)$
Radius: 4

61) $x^2 + y^2 - 30x - 24y + 353 = 0$ Center: $(15, 12)$
Radius: 4

Find the lengths of the major and minor axis and write the equation.

62)
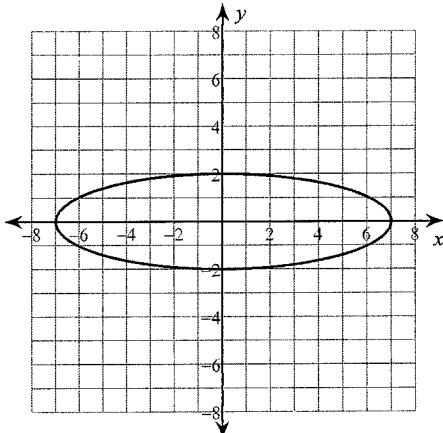
$$\frac{x^2}{49} + \frac{y^2}{4} = 1$$

63)
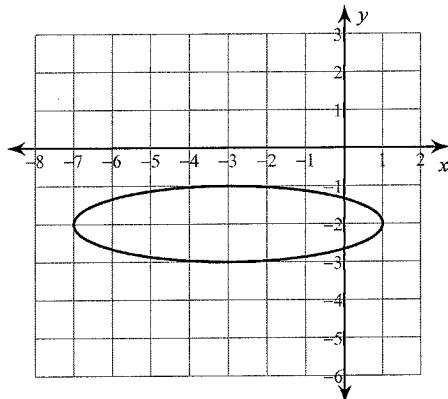
$$\frac{(x+3)^2}{16} + (y+2)^2 = 1$$

64) Center: $(-3, -1)$
Vertical Major Axis: 12
Minor Axis: 10

$$\frac{(x+3)^2}{25} + \frac{(y+1)^2}{36} = 1$$

65) Center: $(9, 7)$
Minor Axis: 20
Horizontal Major Axis: 30

$$\frac{(x-9)^2}{225} + \frac{(y-7)^2}{100} = 1$$

66) Center: $\left(-\frac{5}{2}, 10\right)$
Minor Axis: 18
Horizontal Major Axis: 22

$$\frac{\left(x+\frac{5}{2}\right)^2}{121} + \frac{(y-10)^2}{81} = 1$$

Identify the foci of each. Then sketch the graph.

67) $x^2 + \frac{y^2}{16} = 1$
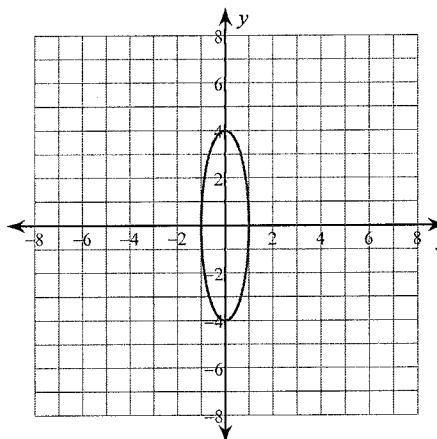
Foci: $\left(0, \sqrt{15}\right)$
$\left(0, -\sqrt{15}\right)$

68) $\frac{x^2}{9} + \frac{y^2}{25} = 1$
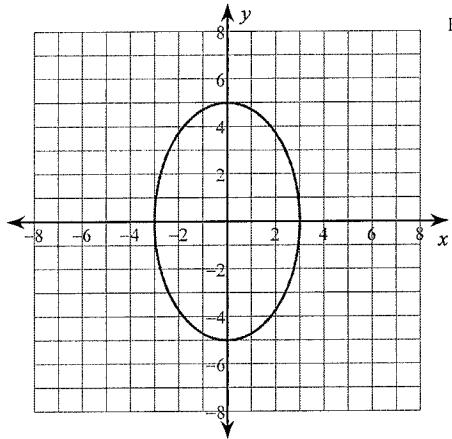
Foci: $(0, 4)$
$(0, -4)$

69) $\dfrac{x^2}{36} + \dfrac{y^2}{9} = 1$
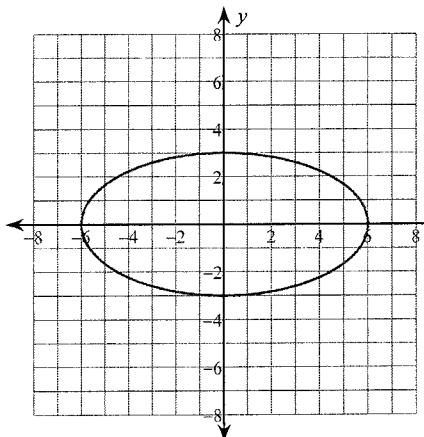
Foci: $(3\sqrt{3}, 0)$
$(-3\sqrt{3}, 0)$

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

70)
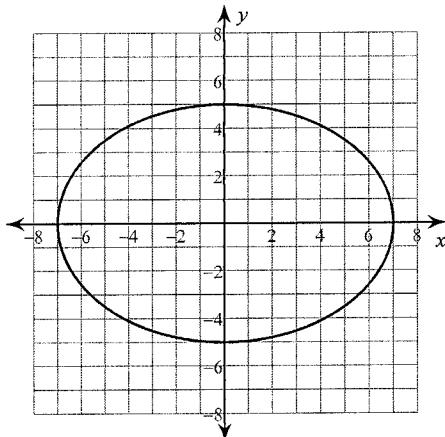
$\dfrac{x^2}{49} + \dfrac{y^2}{25} = 1$

71)

$(x+5)^2 + \dfrac{(y-1)^2}{25} =$
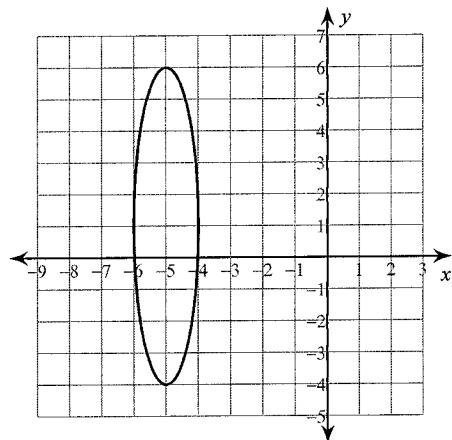
72)
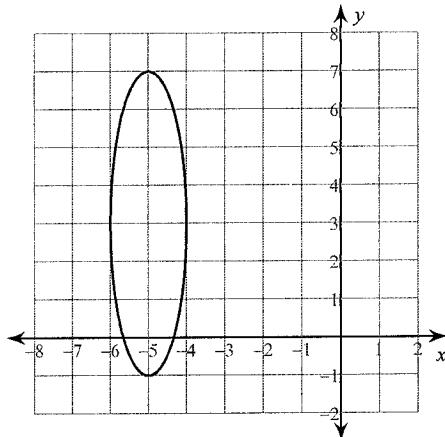
$(x+5)^2 + \dfrac{(y-3)^2}{16} = 1$

**Write the equation in standard form and graph each equation.**

73) $-25x^2 + y^2 - 25 = 0$
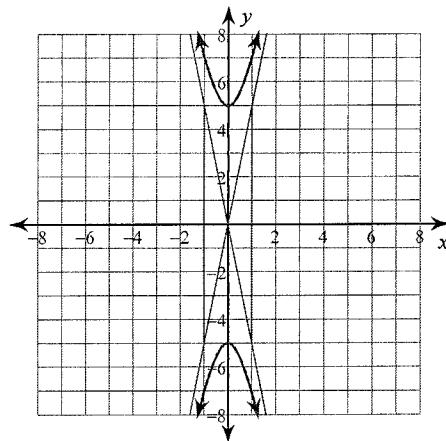
74) $x^2 - 16y^2 - 16 = 0$
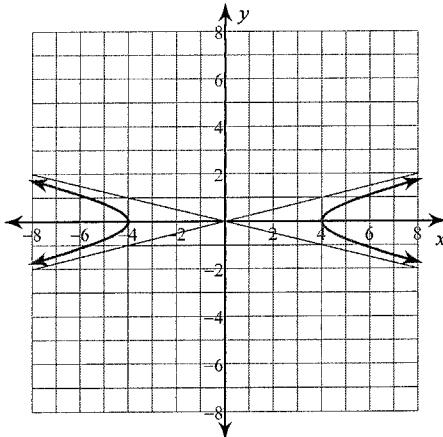
75) $-9x^2 + 4y^2 - 36 = 0$
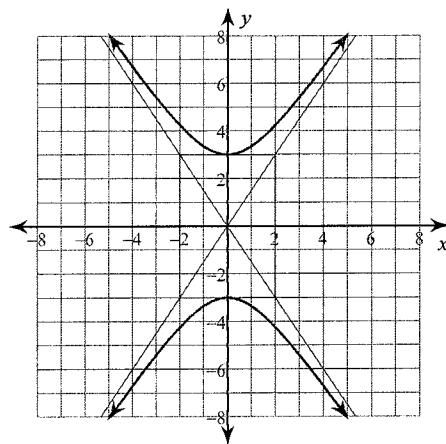
Identify the vertices of each. Then sketch the graph.

76) $\dfrac{y^2}{9} - \dfrac{x^2}{16} = 1$
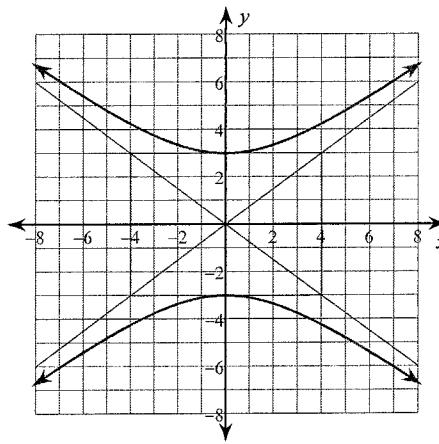
Vertices: $(0, 3)$
$(0, -3)$

77) $x^2 - \dfrac{y^2}{25} = 1$
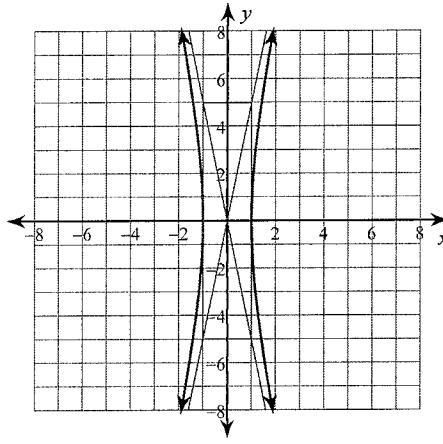
Vertices: $(1, 0)$
$(-1, 0)$

Identify the foci of each. Then sketch the graph.

78) $\dfrac{x^2}{16} - \dfrac{y^2}{4} = 1$

*A)
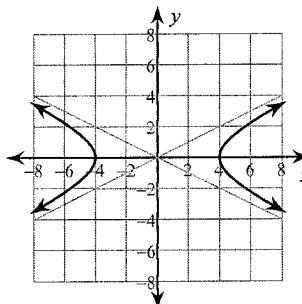
Foci: $\left(2\sqrt{5}, 0\right)$
$\left(-2\sqrt{5}, 0\right)$

B)
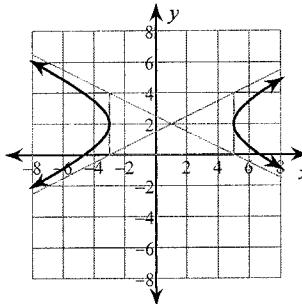
Foci: $\left(1 + 2\sqrt{5}, 2\right)$
$\left(1 - 2\sqrt{5}, 2\right)$

C)
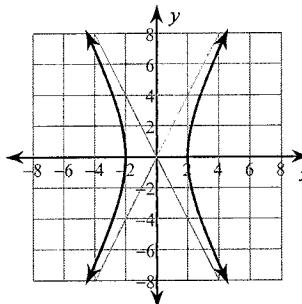
Foci: $\left(2\sqrt{5}, 0\right)$
$\left(-2\sqrt{5}, 0\right)$

D)
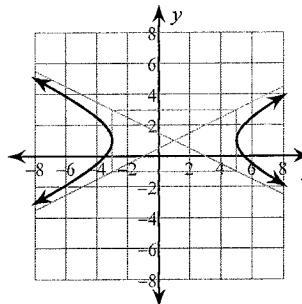
Foci: $\left(1 + 2\sqrt{5}, 1\right)$
$\left(1 - 2\sqrt{5}, 1\right)$

79) $\dfrac{x^2}{25} - \dfrac{y^2}{4} = 1$

*A)
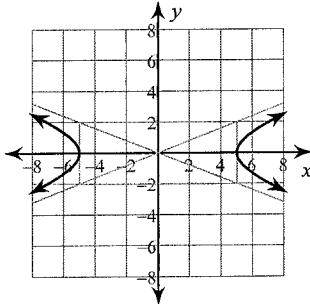
Foci: $\left(\sqrt{29}, 0\right)$
$\left(-\sqrt{29}, 0\right)$

B)
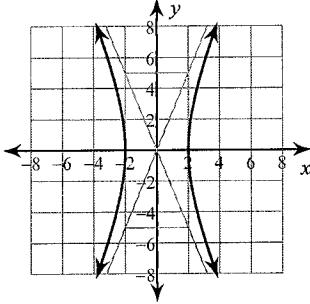
Foci: $\left(\sqrt{29}, 0\right)$
$\left(-\sqrt{29}, 0\right)$

C)
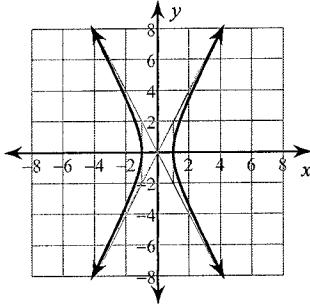
Foci: $\left(\sqrt{5}, 0\right)$
$\left(-\sqrt{5}, 0\right)$

D)
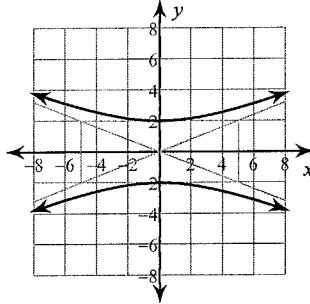
Foci: $\left(0, \sqrt{29}\right)$
$\left(0, -\sqrt{29}\right)$

Identify the vertex and axis of symmetry of each. Then sketch the graph.

80) $y = (x + 4)^2 - 1$
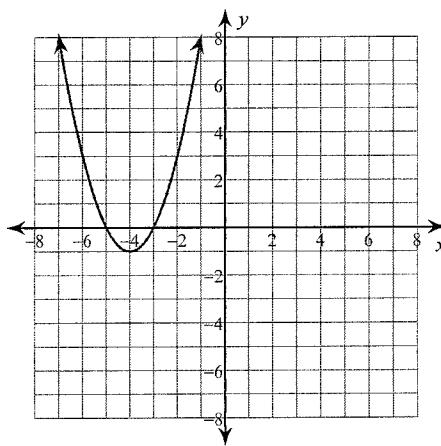
Vertex: $(-4, -1)$
Axis of Sym.: $x = -4$

81) $y = -\dfrac{1}{3}(x + 1)^2$

Vertex: $(-1, 0)$
Axis of Sym.: $x = -1$

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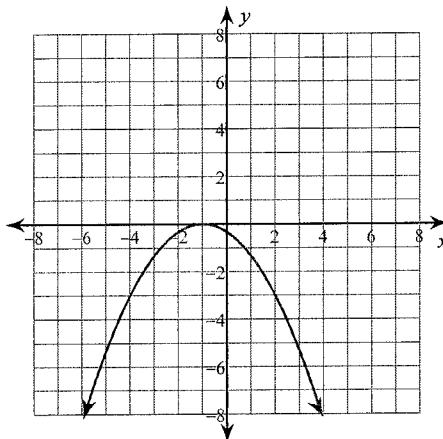
82) $y = x^2 - 3$
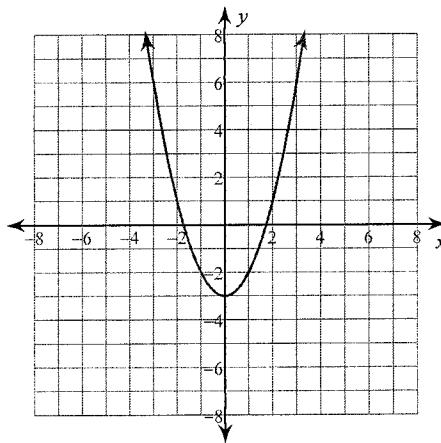
Vertex: $(0, -3)$
Axis of Sym.: $x = 0$

Classify each conic section.

83) $-x^2 + 4y^2 - 2x + 24y + 19 = 0$

Hyperbola

84) $y^2 + x - 6y + 5 = 0$ Parabola

85) $4x^2 + 4y^2 - 20x + 24y + 17 = 0$

Circle

86) $9x^2 + 25y^2 - 36x - 200y + 211 = 0$ Ellipse