Semester Review

Multiple Choice
Identify the choice that best completes the statement or answers the question.

_____ 1. Write the standard form of the equation of the circle with the given characteristics.
center: $(-4, 4)$; solution point: $(-2, -6)$

a. $(x-4)^2 + (y+4)^2 = 80$

b. $(x-4)^2 + (y+4)^2 = 104$

c. $(x+4)^2 + (y-4)^2 = 104$

d. $(x-4)^2 + (y-4)^2 = 8$

e. $(x+4)^2 + (y+4)^2 = 80$

_____ 2. Write the standard form of the equation of the circle with the given characteristics.
endpoints of a diameter: $(-5, -8)$, $(1, -2)$

a. $(x-2)^2 + (y-5)^2 = 18$

b. $(x-2)^2 + (y+5)^2 = 50$

c. $(x+2)^2 + (y-5)^2 = 50$

d. $(x+5)^2 + (y+2)^2 = 18$

e. $(x+2)^2 + (y+5)^2 = 18$

_____ 3. Find the center and radius of the circle $(x-4)^2 + (y-9)^2 = 49$.

a. center: $(4, 9)$, radius 49

b. center: $(9, 4)$, radius 7

c. center: $(4, 9)$, radius 7

d. center: $(-4, -9)$, radius 7

e. center: $(-4, -9)$, radius 49

_____ 4. Evaluate the function at the specified value of the independent variable and simplify.

$$g(w) = \begin{cases} 2w, & w \le -1 \\ 2w^2 + 2w, & -1 \le w \le 1 \\ 2w^3 + 2w^2, & w > 1 \end{cases}$$
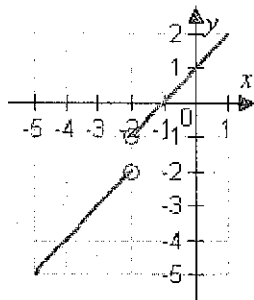
$g\left(\dfrac{1}{4}\right)$

a. $\dfrac{1}{5}$

b. $\dfrac{1}{16}$

c. $\dfrac{5}{8}$

d. $\dfrac{5}{32}$

e. $\dfrac{1}{2}$

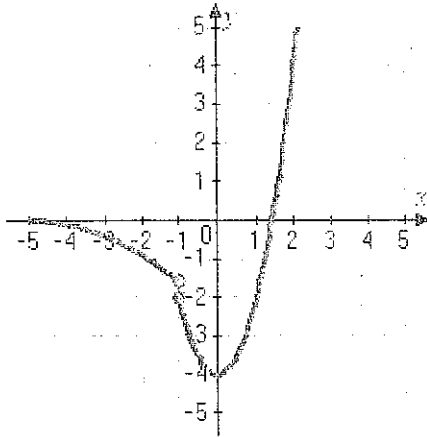_____ 5. Find the domain of the function.

$$q(s) = \dfrac{8s}{s-6}$$

a. $s = 6$
b. all real numbers $s \ne 6, s \ne 0$
c. $s = 6, s = 0$
d. all real numbers
e. all real numbers $s \ne 6$

_____ 6. Use the graph of the function to find the domain and range of f.

a. domain: all real numbers
    range: $(-\infty, -2) \cup (-1, \infty)$
b. domain: $(-\infty, -2) \cup (-1, \infty)$
    range: $(-\infty, -2) \cup (-2, \infty)$
c. domain: $(-\infty, -2) \cup (-2, \infty)$
    range: $(-\infty, -2) \cup (-1, \infty)$
d. domain: all real numbers
    range: all real numbers
e. domain: all real numbers
    range: $(-\infty, -2] \cup [-1, \infty)$

_____ 7. Which function does the graph represent?

a. $f(x) = \begin{cases} \dfrac{(x+5)^2}{10}, & x < -1 \\ -2x^2 + 4, & x \geq -1 \end{cases}$

b. $f(x) = \begin{cases} \dfrac{(x+5)^2}{10}, & x \leq -1 \\ -2x^2 - 4, & x > -1 \end{cases}$

c. $f(x) = \begin{cases} -\dfrac{(x+5)^2}{10}, & x < -1 \\ -2x^2 - 4, & x \geq -1 \end{cases}$

d. $f(x) = \begin{cases} -\dfrac{(x+5)^2}{10}, & x < -1 \\ 2x^2 - 4, & x \geq -1 \end{cases}$

e. $f(x) = \begin{cases} -\dfrac{(x+5)^2}{10}, & x < -1 \\ 2x^2 + 4, & x \geq -1 \end{cases}$

_____ 8. Find $f \circ g$.

$$f(x) = \left| x^2 + 4 \right| \qquad g(x) = 4 - x$$
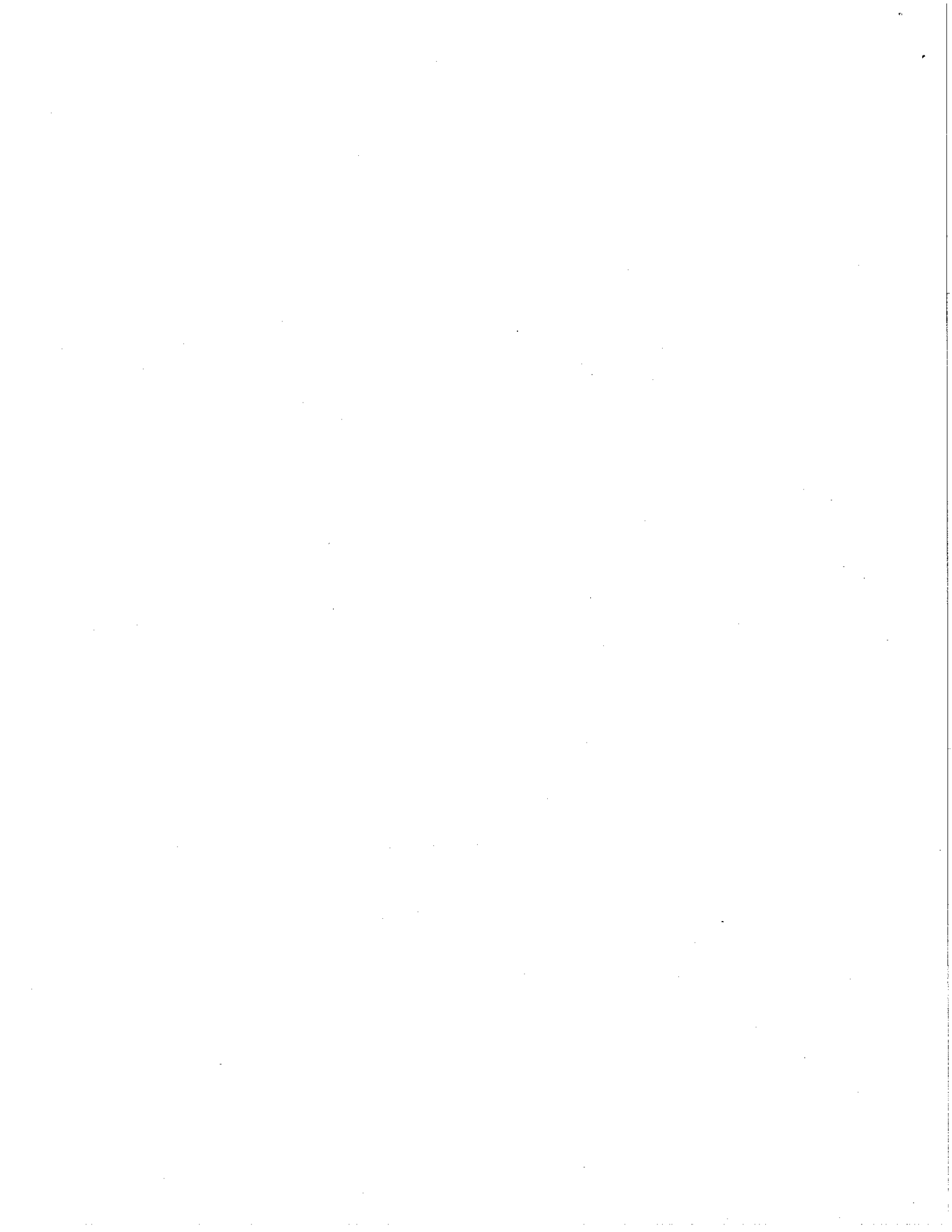
a. $(f \circ g)(x) = 4 - \left| x^2 + 4 \right|$

b. $(f \circ g)(x) = \left| 8 - x^2 \right|$

c. $(f \circ g)(x) = \left| x^2 - 8x + 20 \right|$

d. $(f \circ g)(x) = \left| -x^2 \right|$

e. $(f \circ g)(x) = \left| x^2 + 20 \right|$

Semester Review

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_____ 1. Determine the equations of the vertical and horizontal asymptotes of the graph of the function
$f(x) = \dfrac{4}{x-5}$.

    a.   horizontal: $y = 4$; vertical: $x = 5$
    b.   horizontal: $x = 0$; vertical: $y = 5$
    c.   horizontal: $y = -5$; vertical: $x = 0$
    d.   horizontal: $x = 5$; vertical: $y = -4$
    e.   horizontal: $y = 0$; vertical: $x = 5$

_____ 2. Find the domain of the function.

$g(x) = \dfrac{-4x}{x+2}$

    a. $x = -2$
    b.   all real numbers $x \neq -2$, $x \neq 0$
    c. $x = -2$, $x = 0$
    d.   all real numbers $x \neq -2$
    e.   all real numbers

_____ 3. Determine the equations of the vertical and horizontal asymptotes of the graph of the function
$f(x) = \dfrac{2x^2}{x^2 - 9}$.

    a.   horizontal: $y = -3$; vertical: $x = 2$
    b.   horizontal: $x = 3$ and $x = -3$; vertical: $y = -2$
    c.   horizontal: $y = 2$; vertical: $x = 3$ and $x = -3$
    d.   horizontal: $x = -2$; vertical: $y = 3$ and $y = -3$
    e.   horizontal: $y = 2$; vertical: $x = 3$

_____ 4. Find the domain of $f(x) = \dfrac{x-4}{x^2 - 16}$.

    a.   all real numbers except $x = 4$
    b.   all real numbers
    c.   all real numbers except $x = 4$ and $x = -4$
    d.   all real numbers except $x = 16$
    e.   all real numbers except $x = -4$

_____ 5. Determine the equations of any horizontal and vertical asymptotes of $f(x) = \dfrac{x^2}{x^2 + 25}$.

    a.   horizontal: $y = 5$; vertical: $x = -5$

    b.   horizontal: $x = 1$; vertical: none

    c.   horizontal: none; vertical: none

    d.   horizontal: $y = 1$; vertical: none

    e.   horizontal: $y = -5$; vertical: $x = 1$

Semester Review

Multiple Choice
Identify the choice that best completes the statement or answers the question.

_____ 1. Use the One-to-One Property to solve the following equation for x.

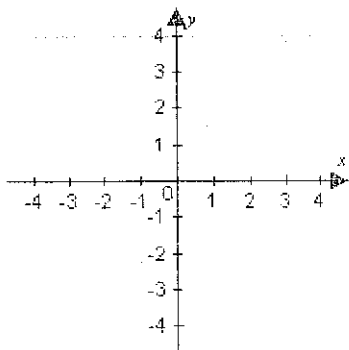$$\left(\frac{1}{3}\right)^{8x-1} = 27$$

     a. $\dfrac{1}{3}$

     b. $-\dfrac{1}{4}$

     c. $-\dfrac{3}{8}$

     d. $\dfrac{1}{8}$

     e. $\dfrac{1}{2}$

_____ 2. Identify the x-intercept of the function $f(x) = 2\ln(x-3)$.
     a.   The function has no x-intercept.
     b. $x = 2$
     c. $x = 4$
     d. $x = 0$
     e. $x = 3$

_____ 3. Solve the equation $\log(1-x) = \log(10)$ for x using the One-to-One Property.
     a.   0
     b.   −9
     c.   −11
     d.   11
     e.   The equation has no solution.

_____ 4. Condense the expression $\log_3 x + \log_3 4$ to the logarithm of a single term.
     a. $\log_3(x+4)$
     b. $\log_3 x^4$
     c. $\log_3 4x$
     d. $\log_3 4^x$
     e. $\log(4x)^3$

_____ 5. Condense the expression $\frac{1}{5}\left[\log_4 x + \log_4 7\right] - \left[\log_4 y\right]$ to the logarithm of a single term.

    a. $\log_4 \dfrac{7x}{5y}$

    b. $\log_4 \dfrac{\sqrt[5]{7x}}{y}$

    c. $\log_4 \sqrt[5]{7x} - \log_4 y$

    d. $\log_4 \sqrt[5]{\dfrac{7x}{y}}$

    e. $\log_4 \dfrac{(7x)^5}{y}$

_____ 6. Solve for x: $4^{-x/2} = 0.0052$. Round to 3 decimal places.
    a. 13.291
    b. 10.518
    c. −13.291
    d. 7.587
    e. −3.794

_____ 7. Solve for x: $9\left(10^{x-2}\right) = 23$. Round to 3 decimal places.

    a. 0.407
    b. 2.407
    c. 1.362
    d. −1.362
    e. no solution

Short Answer

8. Sketch the graph of the function

$f(x) = 1 - 2^x$

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Semester Review

Multiple Choice
Identify the choice that best completes the statement or answers the question.

_____ 1. Determine the order of the matrix.

$$\begin{bmatrix} -8 & 9 & 5 \\ -3 & 9 & 4 \end{bmatrix}$$

a. 3×1
b. 2×3
c. 2×2
d. 3×3
e. 3×2

_____ 2. If possible, find $2A - 5B$.

$$A = \begin{bmatrix} -1 & 9 & -4 \\ 3 & 6 & 4 \end{bmatrix}, B = \begin{bmatrix} -4 & 8 & -6 \\ 2 & 0 & 5 \end{bmatrix}$$

a. $\begin{bmatrix} -22 & 58 & -38 \\ 16 & 12 & 33 \end{bmatrix}$

b. $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$

c. $\begin{bmatrix} 18 & -22 & 22 \\ -4 & 12 & -17 \end{bmatrix}$

d. not possible

e. $\begin{bmatrix} -5 & 17 & -10 \\ 5 & 6 & 9 \end{bmatrix}$

_____ 3. Solve for X in the equation given.

$$10A - 2B = -2X, \quad A = \begin{bmatrix} 2 & -7 & -4 \\ -2 & -7 & 1 \end{bmatrix} \text{ and } B = \begin{bmatrix} 5 & 2 & -2 \\ -1 & 1 & 2 \end{bmatrix}$$

a. $\begin{bmatrix} -15 & 33 & 22 \\ 11 & 34 & -7 \end{bmatrix}$

b. $\begin{bmatrix} -5 & 37 & 18 \\ 9 & 36 & -3 \end{bmatrix}$

c. $\begin{bmatrix} 7 & -5 & -6 \\ -3 & -6 & 3 \end{bmatrix}$

d. not possible

e. $\begin{bmatrix} 10 & -74 & -36 \\ -18 & -72 & 6 \end{bmatrix}$

_____ 4. If possible, find AB.

$$A = \begin{bmatrix} 3 \\ 3 \end{bmatrix}, \quad B = \begin{bmatrix} -5 & -3 \\ -5 & 2 \\ 3 & -2 \end{bmatrix}$$

a. $\begin{bmatrix} -24 \\ -9 \\ 3 \end{bmatrix}$

b. $\begin{bmatrix} -15 & -9 \\ -15 & 6 \\ 9 & -6 \end{bmatrix}$

c. $\begin{bmatrix} -6 & -21 & 15 \end{bmatrix}$

d. not possible

e. $\begin{bmatrix} -6 \\ -21 \\ 15 \end{bmatrix}$

_____ 5. Of the products AB, BA, A^2, and B^2, which ones are possible for the given matrices?

$$A = \begin{bmatrix} 7 \\ 5 \\ -8 \end{bmatrix}, B = \begin{bmatrix} 9 & -3 & -8 \end{bmatrix}$$

a. B^2 only
b. AB only
c. BA only
d. A^2 only
e. AB and BA only

_____ 6. Evaluate the expression.

$$\begin{bmatrix} 0 & 3 \\ 1 & 5 \end{bmatrix} \begin{bmatrix} 4 & 2 \\ -1 & 4 \end{bmatrix} \begin{bmatrix} -3 & 2 \\ -2 & -1 \end{bmatrix}$$

a. $\begin{bmatrix} -15 & -18 \\ -41 & -24 \end{bmatrix}$

b. $\begin{bmatrix} 0 & 18 \\ 11 & -10 \end{bmatrix}$

c. $\begin{bmatrix} 0 & 12 \\ 2 & -20 \end{bmatrix}$

d. $\begin{bmatrix} -15 & -41 \\ -18 & -24 \end{bmatrix}$

e. not possible

_____ 7. Find the standard form of the equation of the parabola with the given characteristic and vertex at the origin.

focus: $(0, 7)$

a. $y^2 = 28x$
b. $x^2 = 28y$
c. $x^2 = 7y$
d. $y^2 = 7x$
e. $x^2 = -7y$

3

_____ 8. Find the vertex and focus of the parabola.

$$y^2 = -\frac{9}{8}x$$

a. vertex: $(0, 0)$ focus: $\left(-\frac{9}{32}, 0\right)$

b. vertex: $(0, 0)$ focus: $\left(0, -\frac{9}{8}\right)$

c. vertex: $\left(0, -\frac{5}{4}\right)$ focus: $\left(0, -\frac{9}{32}\right)$

d. vertex: $(0, 0)$ focus: $\left(-\frac{9}{8}, 0\right)$

e. vertex: $\left(0, -\frac{5}{4}\right)$ focus: $\left(-\frac{9}{8}, -\frac{9}{8}\right)$

_____ 9. Find the vertex and focus of the parabola.

$$(y-2)^2 + 16(x-3) = 0$$

a. vertex: $(-3, -2)$ focus: $(-3, 14)$
b. vertex: $(-3, -2)$ focus: $(-7, -2)$
c. vertex: $(-3, -2)$ focus: $(-3, -18)$
d. vertex: $(3, 2)$ focus: $(3, -2)$
e. vertex: $(3, 2)$ focus: $(-1, 2)$