

Name Answer key

Date _____

Ms. Schmidt

Pre-Calculus

Test 10 Review Answer Sheet

1a) ① $-x + 5y + z = -9$
 ② $-6x - 3y + 4z = -21$
 ③ $-2x + 2y - 4z = -10$

① $(-x + 5y + z = -9) \rightarrow 4x - 20y - 4z = 36$
 ② $-6x - 3y + 4z = -21 \rightarrow -6x - 3y + 4z = -21$

$$\begin{array}{r} \textcircled{A} -2x - 23y = 15 \end{array}$$

② $-6x - 3y + 4z = -21$
 ③ $-2x + 2y - 4z = -10$

$$\textcircled{B} -8x - y = -31$$

$$\begin{array}{r} (-2x - 23y = 15) \rightarrow 8x + 92y = -60 \\ -8x - y = -31 \rightarrow -8x - y = -31 \\ \hline 91y = -91 \\ 91 \quad 91 \\ \hline y = -1 \end{array}$$

② $-8x - (-1) = -31$

$$\begin{array}{r} -8x + 1 = -31 \\ -1 \quad -1 \\ \hline -8x = -32 \\ -8 \quad -8 \\ \hline x = 4 \end{array}$$

① $-(4) + 5(-1) + z = -9$

$$\begin{array}{r} -4 - 5 + z = -9 \\ -9 + z = -9 \\ z = 0 \end{array}$$

$(4, -1, 0)$

1b) ① $3x + 4y + 3z = 1$
 ② $-3x + 3y + 5z = 30$
 ③ $-2x - y - 4z = -5$

① $3x + 4y + 3z = 1$
 ② $-3x + 3y + 5z = 30$

$$\textcircled{A} 7y + 8z = 31$$

② $(-3x + 3y + 5z = 30) \rightarrow 6x - 6y - 10z = -60$
 ③ $(-2x - y - 4z = -5) \rightarrow 70x - 3y - 12z = -15$

$$\textcircled{B} -9y - 22z = -75$$

② $(7y + 8z = 31) \rightarrow 63y + 72z = 279$
 ③ $(-9y - 22z = -75) \rightarrow -63y - 154z = -525$

$$\begin{array}{r} -82z = -246 \\ -82 \quad -82 \\ \hline z = 3 \end{array}$$

② $7y + 8(3) = 31$

$$\begin{array}{r} 7y + 24 = 31 \\ 7y = 7 \\ y = 1 \end{array}$$

① $3x + 4(1) + 3(3) = 1$

$$\begin{array}{r} 3x + 4 + 9 = 1 \\ 3x + 13 = 1 \\ 3x = -12 \\ x = -4 \end{array}$$

$(-4, 1, 3)$

2a)

$$\frac{7x+7}{x^2-3x-10} = \frac{7x+7}{(x-5)(x+2)} = \frac{A}{x-5} + \frac{B}{x+2}$$

$$\frac{7x+7}{(x-5)(x+2)} = \frac{A(x+2)}{(x-5)(x+2)} + \frac{B(x-5)}{(x+2)(x-5)}$$

$$7x+7 = Ax+2A+Bx-5B$$

$$7x = Ax+Bx \rightarrow (7=A+B) \cdot 5$$

$$7 = 2A - 5B$$

$$\begin{array}{r} 35 = 5A + 5B \\ 7 = 2A - 5B \end{array}$$

$$42 = 7A$$

$$6 = A$$

$$7 = 6 + B$$

$$B = 1$$

$$\frac{6}{x-5} + \frac{1}{x+2}$$

2b)

$$\frac{8x+7}{x^2+x-2} = \frac{8x+7}{(x+2)(x-1)} = \frac{A}{x+2} + \frac{B}{x-1}$$

$$\frac{8x+7}{(x+2)(x-1)} = \frac{A(x-1)}{(x+2)(x-1)} + \frac{B(x+2)}{(x+2)(x-1)}$$

$$8x+7 = Ax+A+Bx+2B$$

$$8x = Ax+Bx \rightarrow 8 = A+B$$

$$-1(7 = A+2B)$$

$$8 = A+B$$

$$-7 = -A-2B$$

$$1 = -B$$

$$B = -1$$

$$8 = A-1$$

$$9 = A$$

$$\frac{9}{x+2} + \frac{-1}{x-1}$$

3a)

$$\frac{7x^2+27x+16}{x(x+2)^2} = \frac{A}{x} + \frac{B}{x+2} + \frac{C}{(x+2)^2}$$

$$7x^2+27x+16 = A(x+2)(x+2) + Bx(x+2) + Cx$$

$$7x^2+27x+16 = Ax^2+4Ax+4A+Bx^2+2Bx+C$$

$$7x^2 = Ax^2+Bx^2 \rightarrow 7 = A+B$$

$$27x = 4Ax+2Bx+C \rightarrow 27 = 4A+2B+C$$

$$16 = 4A \rightarrow 4 = A$$

$$7 = 4+B \quad 27 = 4(4)+2(3)+C$$

$$B = 3 \quad 27 = 16+6+C$$

$$27 = 22+C$$

$$C = 5$$

$$\frac{4}{x} + \frac{3}{x+2} + \frac{5}{(x+2)^2}$$

3b)

$$\frac{7x^2-2x-2}{x^2(x-1)} = \frac{Ax+B}{x^2} + \frac{C}{x-1}$$

$$7x^2-2x-2 = (Ax+B)(x-1) + Cx^2$$

$$7x^2-2x-2 = Ax^2-Ax+Bx-B+Cx^2$$

$$7x^2 = Ax^2+Cx^2 \rightarrow 7 = A+C$$

$$-2x = -Ax+Bx \rightarrow -2 = -A+B$$

$$-2 = -B \rightarrow 2 = B$$

$$-2 = -A+2 \quad 7 = 4+C$$

$$-4 = -A \quad 3 = C$$

$$4 = A$$

$$\frac{4x+2}{x^2} + \frac{3}{x-1}$$

4a)

 $A = \pm \frac{1}{2} \text{ determinant}$

$$A = \pm \frac{1}{2} \begin{vmatrix} -2 & 2 & 1 \\ 1 & 3 & 1 \\ 3 & 0 & 1 \end{vmatrix}$$

$$A = \pm \frac{1}{2} (-11)$$

$$A = \frac{11}{2}$$

4b)

 $A = \pm \frac{1}{2} \text{ determinant}$

$$A = \pm \frac{1}{2} \begin{vmatrix} 3 & 8 & 1 \\ -4 & 2 & 1 \\ 5 & 1 & 1 \end{vmatrix}$$

$$A = \pm \frac{1}{2} (61)$$

$$A = \frac{61}{2}$$

5a)

$$4x^2 + 9y^2 + 8x + 36y - 104 = 0$$

$$4x^2 + 8x + 9y^2 + 36y = 104$$

$$4(x^2 + 2x) + 9(y^2 + 4y) = 104$$

$$4(x+1)^2 + 9(y+2)^2 = 144$$

$$\frac{(x+1)^2}{36} + \frac{(y+2)^2}{16} = 1$$

Horizontal
Center $(-1, 2)$

$$a = 6$$

$$b = 4$$

$$c = 2\sqrt{5}$$

Vertices
 $(5, 2)$
 $(-7, 2)$
 $(-1, 6)$
 $(-1, -2)$



Foci $(-1 + 2\sqrt{5}, 2)$
 $(-1 - 2\sqrt{5}, 2)$

$$a^2 = b^2 + c^2$$

$$36 = 16 + c^2$$

$$20 = c^2$$

$$2\sqrt{5} = c$$

5b)

$$9x^2 - 16y^2 - 18x - 32y - 151 = 0$$

$$9x^2 - 18x - 16y^2 - 32y = 151$$

$$9(x^2 - 2x) - 16(y^2 + 2y) = 151$$

$$9(x-1)^2 - 16(y+1)^2 = 144$$

$$\frac{(x-1)^2}{16} - \frac{(y+1)^2}{9} = 1$$

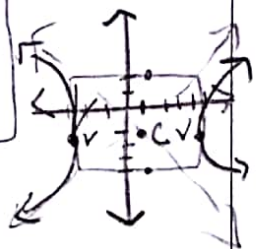
Horizontal
Center $(1, -1)$

$$a = 4$$

$$b = 3$$

Vertices
 $(5, -1)$
 $(-3, -1)$

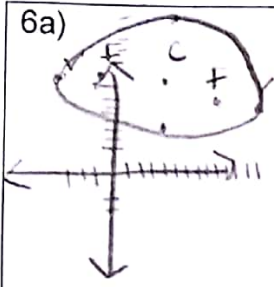
Foci
 $(6, -1)$
 $(-4, -1)$



$$a^2 + b^2 = c^2$$

$$16 + 9 = c^2$$

$$c = 5$$



horizontal
Center (5, 8)
a = 8
b = ? = 6
c = 2√7

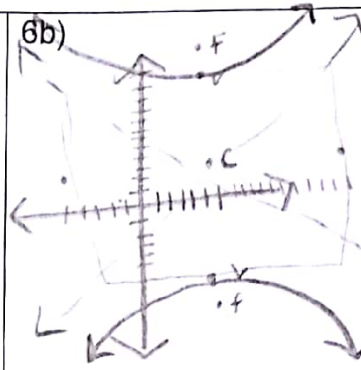
$$a^2 = b^2 + c^2$$

$$64 = b^2 + 28$$

$$36 = b^2$$

$$b = 6$$

$$\frac{(x-5)^2}{64} + \frac{(y-8)^2}{36} = 1$$



Vertical
Center (6, 3)

$$a = 9$$

$$b = ? = 11$$

$$c = \sqrt{202}$$

$$a^2 + b^2 = c^2$$

$$81 + b^2 = 202$$

$$b^2 = 121$$

$$b = 11$$

$$\frac{(y-3)^2}{81} - \frac{(x-6)^2}{121} = 1$$

7a)

$$\frac{f(x+h) - f(x)}{h}$$

$$f(x) = x^2 + 2x - 5$$

$$\frac{[(x+h)^2 + 2(x+h) - 5] - [x^2 + 2x - 5]}{h}$$

$$\frac{x^2 + 2xh + h^2 + 2x + 2h - 5 - x^2 - 2x + 5}{h}$$

$$\frac{2xh + h^2 + 2h}{h}$$

$$\frac{h(2x + h + 2)}{h}$$

$$2x + h + 2$$

7b)

$$\frac{f(x+h) - f(x)}{h}$$

$$f(x) = 3x^2 + 5x + 4$$

$$\frac{[3(x+h)^2 + 5(x+h) + 4] - [3x^2 + 5x + 4]}{h}$$

$$\frac{3x^2 + 6xh + 3h^2 + 5x + 5h + 4 - 3x^2 - 5x - 4}{h}$$

$$6xh + 3h^2 + 5h$$

$$\frac{h(6x + 3h + 5)}{h}$$

$$6x + 3h + 5$$