Name ANSWERS /40

Math Pre-Calculus 20
Chapter 9 Review

x, y

#1. Is the pt (4, -2) a part of the solution for the inequality $2x + 3y < 6$? (2 marks)

$2(4) + 3(-2) < 6$
$8 + (-6) < 6$
$2 < 6$
True

Yes it is a solution!

#2. Is the pt (-2, 3) a part of the solution for the inequality $x^2 + 2x < y$? (2 marks)

$(-2)^2 + 2(-2) < 3$
$4 + (-4) < 3$
$0 < 3$

Yes! It is a solution.

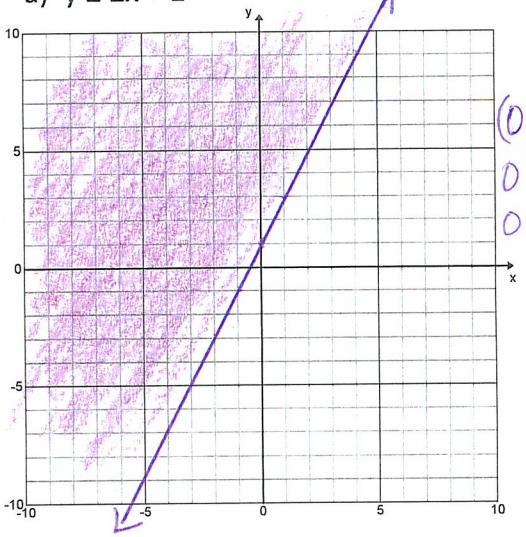
#3. Solve the inequalities below by graphing: (3 marks each = 6 marks)

Be sure to show your work with the test point.

a) $y \geq 2x + 1$

0

Solid line



(0,0)
$0 \geq 2(0) + 1$
$0 \geq 1$
FALSE

$2y \leq -3x + 6$

b) $3x + 2y < 6$ $\quad y \leq -\frac{3}{2}x + 3$

(0,0)

* two variable ∴ shaded region *

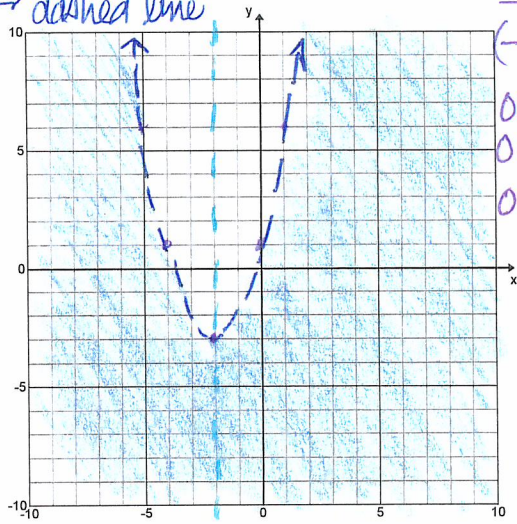
#4. Solve by graphing: (4 marks each = 8 marks)

a) $y \leq (x + 2)^2 - 3$ → dashed line

vertex
$(-2, -3)$

y-int
$(0+2)^2 - 3$
$4 - 3$
1
$(0, 1)$

test point
$(-2, 0)$
$0 \leq (-2+2)^2 - 3$
$0 \leq (0)^2 - 3$
$0 \leq -3$
FALSE!

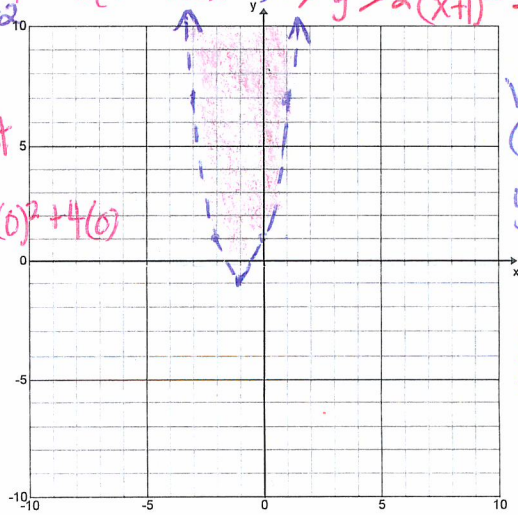


b) $y - 1 > 2x^2 + 4x$

$y > 2x^2 + 4x + 1$ Can't factor so complete the square

$y - 1 > 2(x^2 + 2x + 1) \Rightarrow y > 2(x+1)^2 - 1$

+2



vertex
$(-1, -1)$
y int @ 1

test point
$0 - 1 > 2(0)^2 + 4(0)$
$-1 > 0$
FALSE

$1a = 2$
$3a = 6$
$5a = 10$

5. Jane sells her artwork for different prices depending on the type of work. Pen and ink sketches sell for $50, and watercolours sell for $80.

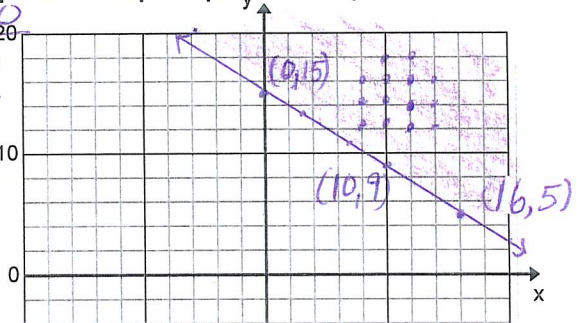
a) Jane needs an income of at least $1200 per month. Write an inequality to model this situation. (2 marks) let x = # of Pen/ink sketches, y = # of water colours

$50x + 80y \geq 1200$

$\frac{80y}{80} \geq \frac{-50x}{80} + \frac{1200}{80}$

$y \geq -\frac{5}{8}x + 15$

b) Graph the inequality. (2 marks)



(0,15)
(10,9)
(16,5)

#6. Solve using the method given:
(4 marks each = 12 marks)

x^2+2x-8
$(x+4)(x-2)$
$x=-4 \quad x=2$

or convert to vertex graphing

GRAPH 1st

$y+8=x^2+2x$
$+1$
$y+9=(x+1)^2$
$y=(x+1)^2-9$
vertex
$(-1,-9)$

a) $x^2 + 2x - 8 < 0$ NEGATIVE

Interval	$x<-4$	$-4<x<2$	$x>2$
TEST POINTS	-6	0	4
Substitution (Work Area)	$(-6)^2+2(-6)-8$ $36+(-12)-8$ $36-20=16$	$0+0-8$ -8	$4^2+4(2)-8$ $16+8-8$ 16
Result: (+ or −)	+	−	+

SOLUTION $-4<x<2$

FACTOR

b) $x^2 - 3x > 4$ positive

$x^2-3x-4>0$
$(x-4)(x+1)>0$
$x=4 \quad x=-1$

SIGN ANALYSIS

$x-4$: $-2-4$ (−), $0-4$ (−), $5-4$ (+)
$x+1$: $-2+1$ (−), $0+1$ (+), $5+1$ (+)
Product: + | 0 (−1) | − | 0 (4) | +
Zero, Zero

$x<-1$	$-1<x<4$	$x>4$
-2	0	5
$(-2)^2-3(-2)-4$ $4+6-4$ 6	$(0)^2-3(0)-4$ -4	$(5)^2-3(5)-4$ $25-15-4$ 6
+	−	+

SOLUTION $x<-1, x>4$

c) $-x^2 + x + 6 > 0$ opens down

$-1(x^2-x-6)>0$ positive
$-1(x-3)(x+2)>0$
$x=3 \quad x=-2$

ROOTS &TEST POINTS

opens down

−2 | 3

$x<-2$	$-2<x<3$	$x>3$
-4	0	5
$-(-4)^2+(-4)+6$ $-16+2$ -14	-0^2+0+6 6	$-(5)^2+(5)+6$ $-25+11$ -14
−	+	−

SOLUTION $-2<x<3$

#7. Two numbers are related in this way: 2 more than 3 times the square of one number is greater than or equal to 5 minus three times the other number.

$+2$, $3x^2$, $5-3y$

Let x = 1st #
y = 2nd #

$3x^2+2 \geq 5-3y$

$\frac{3y}{3} \geq \frac{-3x^2}{3}+\frac{3}{3}$

$y \geq -x^2+1$

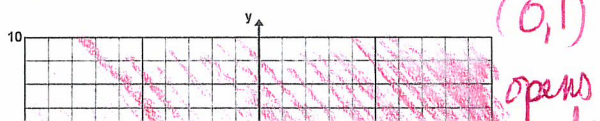
$3(2)^2+2 \geq 5-3($
$14 \geq -1$

a) Write the inequality. (2 marks)

$y \geq -x^2+1$

b) Graph the inequality. (2 marks)

$y \geq -(x+0)^2+1$ vertex $(0,1)$ opens



c) Use the graph to list a pair of integer values for the two numbers. (1 mark)