

PreCalc 11 Chapter 5 Review Pack v1 Answer Section

MULTIPLE CHOICE

1. ANS: A PTS: 0 DIF: Easy
REF: 5.1 Solving Quadratic Inequalities in One Variable LOC: 11.RF8
TOP: Relations and Functions KEY: Procedural Knowledge
2. ANS: D PTS: 0 DIF: Easy
REF: 5.1 Solving Quadratic Inequalities in One Variable LOC: 11.RF8
TOP: Relations and Functions KEY: Procedural Knowledge
3. ANS: B PTS: 0 DIF: Moderate
REF: 5.1 Solving Quadratic Inequalities in One Variable LOC: 11.RF8
TOP: Relations and Functions KEY: Procedural Knowledge
4. ANS: B PTS: 0 DIF: Moderate
REF: 5.1 Solving Quadratic Inequalities in One Variable LOC: 11.RF8
TOP: Relations and Functions KEY: Procedural Knowledge
5. ANS: C PTS: 0 DIF: Easy
REF: 5.2 Graphing Linear Inequalities in Two Variables LOC: 11.RF7
TOP: Relations and Functions KEY: Procedural Knowledge
6. ANS: D PTS: 0 DIF: Easy
REF: 5.2 Graphing Linear Inequalities in Two Variables LOC: 11.RF7
TOP: Relations and Functions KEY: Procedural Knowledge
7. ANS: D PTS: 0 DIF: Easy
REF: 5.2 Graphing Linear Inequalities in Two Variables LOC: 11.RF7
TOP: Relations and Functions KEY: Conceptual Understanding
8. ANS: B PTS: 0 DIF: Moderate
REF: 5.2 Graphing Linear Inequalities in Two Variables LOC: 11.RF7
TOP: Relations and Functions KEY: Conceptual Understanding | Procedural Knowledge
9. ANS: B PTS: 0 DIF: Easy
REF: 5.3 Graphing Quadratic Inequalities in Two Variables LOC: 11.RF7
TOP: Relations and Functions KEY: Procedural Knowledge
10. ANS: B PTS: 0 DIF: Easy
REF: 5.3 Graphing Quadratic Inequalities in Two Variables LOC: 11.RF7
TOP: Relations and Functions KEY: Procedural Knowledge
11. ANS: D PTS: 0 DIF: Easy
REF: 5.3 Graphing Quadratic Inequalities in Two Variables LOC: 11.RF7
TOP: Relations and Functions KEY: Conceptual Understanding
12. ANS: D PTS: 0 DIF: Easy
REF: 5.4 Solving Systems of Equations Graphically LOC: 11.RF6
TOP: Relations and Functions KEY: Procedural Knowledge
13. ANS: A PTS: 0 DIF: Moderate
REF: 5.4 Solving Systems of Equations Graphically LOC: 11.RF6
TOP: Relations and Functions KEY: Procedural Knowledge
14. ANS: B PTS: 0 DIF: Easy
REF: 5.5 Solving Systems of Equations Algebraically LOC: 11.RF6
TOP: Relations and Functions KEY: Conceptual Understanding

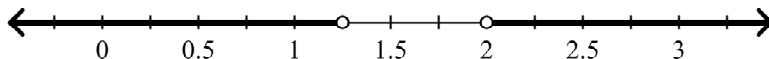
15. ANS: B PTS: 0 DIF: Moderate
 REF: 5.3 Graphing Quadratic Inequalities in Two Variables LOC: 11.RF7
 TOP: Relations and Functions KEY: Conceptual Understanding | Procedural Knowledge
16. ANS: B PTS: 0 DIF: Moderate
 REF: 5.5 Solving Systems of Equations Algebraically LOC: 11.RF6
 TOP: Relations and Functions KEY: Procedural Knowledge
17. ANS: A PTS: 0 DIF: Easy
 REF: 5.5 Solving Systems of Equations Algebraically LOC: 11.RF6
 TOP: Relations and Functions KEY: Procedural Knowledge

SHORT ANSWER

18. ANS:
 The solution is: $-1 < x < 1, x \in \mathbb{R}$
- PTS: 0 DIF: Easy REF: 5.1 Solving Quadratic Inequalities in One Variable
 LOC: 11.RF8 TOP: Relations and Functions
 KEY: Conceptual Understanding | Procedural Knowledge

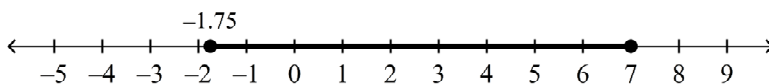
19. ANS:
 The solution is: $x \leq -5$ or $x \geq -1, x \in \mathbb{R}$
- PTS: 0 DIF: Easy REF: 5.1 Solving Quadratic Inequalities in One Variable
 LOC: 11.RF8 TOP: Relations and Functions KEY: Conceptual Understanding

20. ANS:
 The solution is: $x < 1.25$ or $x > 2$



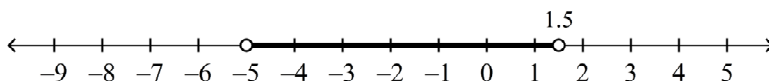
- PTS: 0 DIF: Moderate REF: 5.1 Solving Quadratic Inequalities in One Variable
 LOC: 11.RF8 TOP: Relations and Functions KEY: Procedural Knowledge

21. ANS:
 The solution is: $-1.75 \leq x \leq 7, x \in \mathbb{R}$



- PTS: 0 DIF: Moderate REF: 5.1 Solving Quadratic Inequalities in One Variable
 LOC: 11.RF8 TOP: Relations and Functions KEY: Procedural Knowledge

22. ANS:
 The solution is: $-5 < x < 1.5, x \in \mathbb{R}$



- PTS: 0 DIF: Moderate REF: 5.1 Solving Quadratic Inequalities in One Variable
 LOC: 11.RF8 TOP: Relations and Functions KEY: Procedural Knowledge

23. ANS:

The solution is: $x < 1.5$ or $x > 8$, $x \in \mathbb{R}$

PTS: 0

DIF: Moderate

REF: 5.1 Solving Quadratic Inequalities in One Variable

LOC: 11.RF8

TOP: Relations and Functions

KEY: Procedural Knowledge

24. ANS:

a) $h > 0$ and $k > 0$

b) Sample response:

Two points are: (3, 13) and (6, 22)

PTS: 0

DIF: Moderate

REF: 5.2 Graphing Linear Inequalities in Two Variables

LOC: 11.RF7

TOP: Relations and Functions

KEY: Conceptual Understanding | Procedural Knowledge

25. ANS:

a) The critical values are $x = -\frac{5}{2}$ and $x = 6$.

b)

Interval	Value of x	$(2x + 5)(x - 6)$	Sign of $(2x + 5)(x - 6)$
$x < -\frac{5}{2}$	$x = -3$	$(2(-3) + 5)(-3 - 6)$ $= (-1)(-9)$	positive
$-\frac{5}{2} < x < 6$	$x = 2$	$(2(2) + 5)(2 - 6)$ $= (9)(-4)$	negative
$x > 6$	$x = 8$	$(2(8) + 5)(8 - 6)$ $= (21)(2)$	positive

c) The solution is: $x < -\frac{5}{2}$ or $x > 6$, $x \in \mathbb{R}$

PTS: 0

DIF: Moderate

REF: 5.1 Solving Quadratic Inequalities in One Variable

LOC: 11.RF8

TOP: Relations and Functions

KEY: Conceptual Understanding | Procedural Knowledge

26. ANS:

The solution is: $(-1, 0)$

PTS: 0

DIF: Moderate

REF: 5.5 Solving Systems of Equations Algebraically

LOC: 11.RF6

TOP: Relations and Functions

KEY: Procedural Knowledge

27. ANS:

There are no real solutions.

PTS: 0

DIF: Moderate

REF: 5.5 Solving Systems of Equations Algebraically

LOC: 11.RF6

TOP: Relations and Functions

KEY: Conceptual Understanding | Procedural Knowledge

28. ANS:

The solutions are: (0.8, 4.9) and $(-0.4, 0.9)$

PTS: 0

DIF: Moderate

REF: 5.5 Solving Systems of Equations Algebraically

LOC: 11.RF6

TOP: Relations and Functions

KEY: Procedural Knowledge

29. ANS:

a) The critical values are $x = 6$ and $x = \frac{5}{2}$.

b)

Interval	Value of x	$(x - 6)(2x - 5)$	Sign of $(x - 6)(2x - 5)$
$x < \frac{5}{2}$	$x = 1$	$(1 - 6)(2(1) - 5)$ $= (-5)(-3)$	positive
$\frac{5}{2} < x < 6$	$x = 4$	$(4 - 6)(2(4) - 5)$ $= (-2)(3)$	negative
$x > 6$	$x = 8$	$(8 - 6)(2(8) - 5)$ $= (2)(11)$	positive

c) The solution is: $\frac{5}{2} < x < 6, x \in \mathbb{R}$

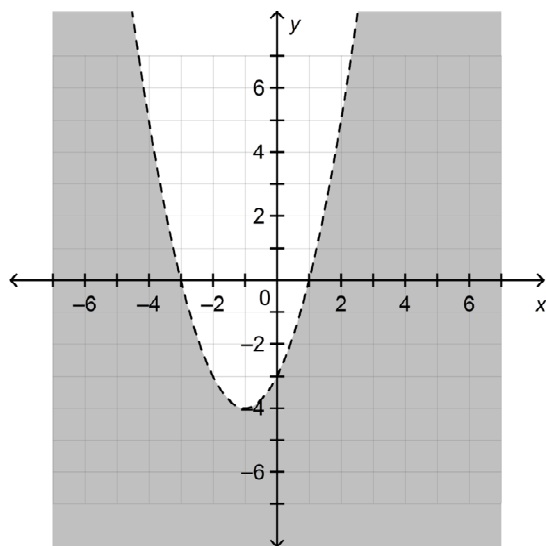
PTS: 0 DIF: Moderate REF: 5.1 Solving Quadratic Inequalities in One Variable

LOC: 11.RF8 TOP: Relations and Functions

KEY: Conceptual Understanding | Procedural Knowledge

30. ANS:

a)



b) Sample response:

Three points that satisfy the inequality have coordinates: $(-1, -5)$, $(1, -1)$, $(2, 4)$

PTS: 0 DIF: Moderate REF: 5.3 Graphing Quadratic Inequalities in Two Variables

LOC: 11.RF7 TOP: Relations and Functions

KEY: Conceptual Understanding | Procedural Knowledge

PROBLEM

31. ANS:

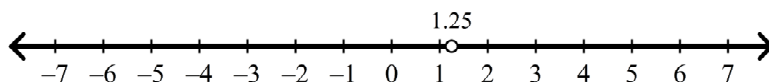
a) Solve: $16x^2 - 40x^2 + 25 = 0$

$$(4x - 5)(4x - 5) = 0$$

$$x = 1.25$$

When $x > 1.25$, such as $x = 2$, L.S. = 9 and R.S. = 0; so $x = 2$ satisfies the inequality.When $x < 1.25$, such as $x = 1$, L.S. = 1 and R.S. = 0; so $x = 1$ satisfies the inequality.The solution is: $x \in \mathbb{R}, x \neq 1.25$

b)



c) There is only one number that does not satisfy the inequality.

Since the square of any non-zero number is positive, any real number but 1.25 satisfies the inequality.

PTS: 0

DIF: Moderate

REF: 5.1 Solving Quadratic Inequalities in One Variable

LOC: 11.RF8

TOP: Relations and Functions

KEY: Communication | Problem-Solving Skills

32. ANS:

Substitute the coordinates of B in the inequality.

$$2x + 3y < 6$$

$$2(9) + 3(b) < 6 \quad \text{Solve for } b.$$

$$18 + 3b < 6$$

$$3b < -12$$

$$b < -4$$

PTS: 0

DIF: Moderate

REF: 5.2 Graphing Linear Inequalities in Two Variables

LOC: 11.RF7

TOP: Relations and Functions

KEY: Communication | Procedural Knowledge

33. ANS:

In $y < -3x^2 + 21$, substitute: $x = a, y = 3$

$$3 < -3a^2 + 21$$

Solve for a .

$$-3a^2 > -18$$

Divide both sides by -3 .

$$a^2 < 6$$

Square both sides.

$$a < \sqrt{6}, \text{ or } a > -\sqrt{6}$$

$$\text{That is, } -\sqrt{6} < a < \sqrt{6}$$

PTS: 0

DIF: Moderate

REF: 5.3 Graphing Quadratic Inequalities in Two Variables

LOC: 11.RF7

TOP: Relations and Functions

KEY: Communication | Procedural Knowledge

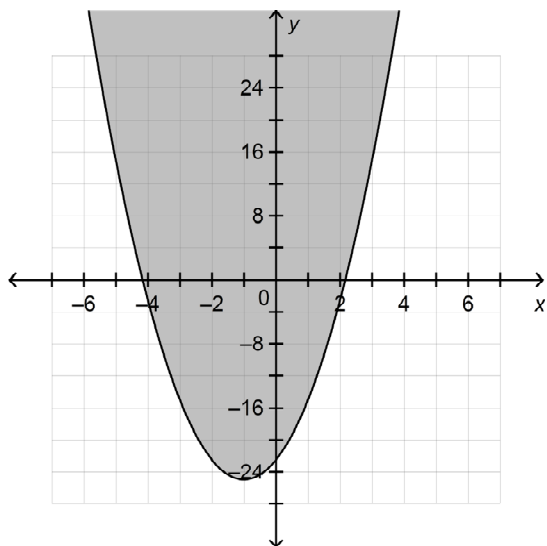
34. ANS:

$$\frac{(x+1)^2}{2} - 5 \leq \frac{y}{5} \quad \text{Multiply by 5.}$$

$$\frac{5(x+1)^2}{2} - 5(5) \leq y \quad \text{Solve for } y.$$

$$y \geq 2.5(x+1)^2 - 25$$

The graph of the related function is congruent to $y = 2.5x^2$ and its vertex is $(-1, -25)$.
The curve is solid, with the region above it shaded.



PTS: 0 DIF: Difficult REF: 5.3 Graphing Quadratic Inequalities in Two Variables
 LOC: 11.RF7 TOP: Relations and Functions
 KEY: Communication | Procedural Knowledge

35. ANS:

a) Let x represent the first number and let y represent the second number.The statement that the sum of 5 times the first number and 6 times the second number is 0 can be modelled with the equation: $5x + 6y = 0$ The statement that when twice the second number is subtracted from the square of the first number, the result is equal to 20 minus the first number can be modelled with the equation: $x^2 - 2y = 20 - x$ Solve each equation for y to get a system:

$$y = -\frac{5}{6}x \quad \textcircled{1}$$

$$y = \frac{1}{2}x^2 + \frac{1}{2}x - 10 \quad \textcircled{2}$$

b) Solve the system. Since the left sides of the equations are equal, the right sides must also be equal.

$$-\frac{5}{6}x = \frac{1}{2}x^2 + \frac{1}{2}x - 10$$

$$-\frac{1}{2}x^2 - \frac{1}{2}x - \frac{5}{6}x + 10 = 0$$

$$-\frac{1}{2}x^2 - \frac{3}{6}x - \frac{5}{6}x + 10 = 0$$

$$x^2 + \frac{8}{3}x - 20 = 0$$

Use the quadratic formula.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad \text{Substitute: } a = 1, b = \frac{8}{3}, c = -20$$

$$x = \frac{-\frac{8}{3} \pm \sqrt{\left(\frac{8}{3}\right)^2 - 4(1)(-20)}}{2(1)}$$

$$x = \frac{-\frac{8}{3} \pm \sqrt{\frac{784}{9}}}{2}$$

$$\text{So, } x = -6 \text{ or } x = \frac{10}{3}$$

Substitute each value of x in equation $\textcircled{1}$.When $x = -6$:

$$y = -\frac{5}{6}(-6)$$

$$y = 5$$

When $x = \frac{10}{3}$:

$$y = \left(-\frac{5}{6}\right)\left(\frac{10}{3}\right)$$

$$y = -\frac{25}{9}$$

The solutions are: -6 and 5 ; $\frac{10}{3}$ and $-\frac{25}{9}$

Verify the solutions using the statement of the problem.

For $x = -6$ and $y = 5$:

The sum of 5 times -6 and 6 times 5 is 0 .

When 2 times 5 is subtracted from $(-6)^2$, the result is equal to 20 minus -6 .

These numbers satisfy the problem statement.

For $x = \frac{10}{3}$ and $y = -\frac{25}{9}$:

The sum of 5 times $\frac{10}{3}$ and 6 times $-\frac{25}{9}$ is 0 .

When 2 times $-\frac{25}{9}$ is subtracted from $\left(\frac{10}{3}\right)^2$, the result is equal to 20 minus $\frac{10}{3}$.

These numbers satisfy the problem statement.

So, the numbers are: -6 and 5 ; or $\frac{10}{3}$ and $-\frac{25}{9}$

PTS: 0 DIF: Difficult REF: 5.5 Solving Systems of Equations Algebraically
LOC: 11.RF6 TOP: Relations and Functions
KEY: Communication | Problem-Solving Skills

36. ANS:

a) Let x represent the first number and let y represent the second number.The statement that twice the square of the first number minus the second number is -3 can be modelled with the equation: $2x^2 - y = -3$ The statement that the square of the first number and 5 is equal to the second number minus 2 can be modelled with the equation: $(x + 5)^2 = y - 2$

So, the system of equations that represents this relationship is:

$$2x^2 - y = -3 \quad \textcircled{1}$$

$$(x + 5)^2 = y - 2 \quad \textcircled{2}$$

b) From equation $\textcircled{1}$, substitute $y = 2x^2 + 3$ in equation $\textcircled{2}$.

$$(x + 5)^2 = (2x^2 + 3) - 2$$

$$x^2 + 10x + 25 = 2x^2 + 3 - 2$$

$$x^2 - 2x^2 + 10x + 25 - 1 = 0$$

$$-x^2 + 10x + 24 = 0$$

$$x^2 - 10x - 24 = 0$$

$$(x + 2)(x - 12) = 0$$

So, $x = -2$ or $x = 12$ Substitute each value of x in equation $\textcircled{1}$.When $x = -2$:

$$2(-2)^2 - y = -3$$

$$8 - y = -3$$

$$-y = -11$$

$$y = 11$$

When $x = 12$:

$$2(12)^2 - y = -3$$

$$288 - y = -3$$

$$-y = 291$$

$$y = 291$$

The numbers are: -2 and 11 ; 12 and 291

Verify the solutions using the statement of the problem.

For $x = -2$ and $y = 11$:Two times $(-2)^2$ minus 11 is -3 .The square of $-2 + 5$ is equal to $11 - 2$.

These numbers satisfy the problem statement.

For $x = 12$ and $y = 291$:Two times $(12)^2$ minus 291 is -3 . $(12 + 5)^2$ is equal to $291 - 2$.

These numbers satisfy the problem statement.

So, the numbers are: -2 and 11 ; 12 and 291

PTS: 0

DIF: Difficult

REF: 5.5 Solving Systems of Equations Algebraically

LOC: 11.RF6

TOP: Relations and Functions

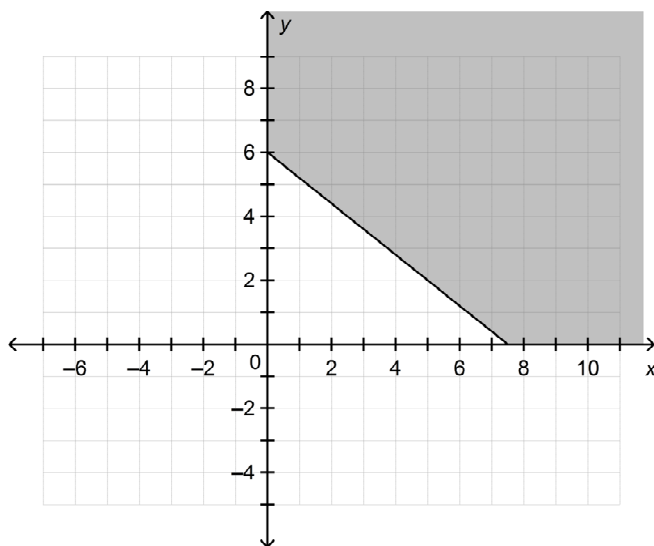
KEY: Communication | Problem-Solving Skills

37. ANS:

- a) Let x represent the number of cordless phones sold and y represent the number of cordless phones with answering machines sold.

An inequality is: $24x + 30y \geq 180$

- b) The solution of the inequality is the points, with whole-number coordinates, in the region above the line and the points, with whole-number coordinates, on the line.



- c) Day 1: the point $(2, 5)$ is in the shaded region, so the manager's profit target was met.
 Day 2: the point $(3, 3)$ is not in the shaded region, nor is it on the line, so the manager's profit target was not met.
 Day 3: the point $(5, 2)$ is on the line, so the manager's profit target was met.

PTS: 0 DIF: Difficult REF: 5.2 Graphing Linear Inequalities in Two Variables
 LOC: 11.RF7 TOP: Relations and Functions
 KEY: Communication | Problem-Solving Skills