

Chapter 3A Exam Review

Solve each equation. Remember to check for extraneous solutions.

1)  $-4 + \sqrt{-10 - 2m} = -2$

$\sqrt{-10 - 2m} = 2$   
 $-10 - 2m = 4$   
 $-2m = 14$   
 $m = -7$

2)  $(\sqrt{8 - 2x})^2 = (\sqrt{5 - x})^2$

$8 - 2x = 5 - x$   
 $3 = x$

3)  $x = 2 + \sqrt{4x - 11}$

$(x - 2)^2 = (\sqrt{4x - 11})^2$   
 $x^2 - 4x + 4 = 4x - 11$   
 $x^2 - 8x + 15 = 0$   
 $(x - 3)(x - 5) = 0$   
 $x = 3, 5$

4)  $(\sqrt{3r - 15})^2 = (r - 5)^2$

$3r - 15 = (r - 5)(r - 5)$   
 $3r - 15 = r^2 - 10r + 25$   
 $0 = r^2 - 13r + 40$   
 $0 = (r - 8)(r - 5) \Rightarrow r = 8, 5$

Solve each equation by factoring.

5)  $8x^2 + 64x + 4 = 4$

$8x^2 + 64x = 0$   
 $8x(x + 8) = 0$   
 $x = 0, -8$

6)  $m^2 - 6m - 19 = -3$

$m^2 - 6m - 16 = 0$   
 $(m - 8)(m + 2) = 0$   
 $m = 8, -2$

Solve each equation.

7)  $\left| \frac{k}{9} \right| = 3$

$\frac{k}{9} = 3$  or  $\frac{k}{9} = -3$   
 $k = 27, -27$

8)  $\left| \frac{x}{5} \right| = 5$

$\frac{x}{5} = 5$  or  $\frac{x}{5} = -5$   
 $x = 25, -25$

9)  $|-4 + n| = 3$

$-4 + n = 3$  or  $-4 + n = -3$   
 $n = 7$  or  $n = 1$

10)  $|2 - 5x| + 3 = 15$

$|2 - 5x| = 12$   
 $2 - 5x = 12$  or  $2 - 5x = -12$   
 $x = -2$  or  $x = \frac{14}{5}$

11)  $|7v - 3| - 2 = 29$

$|7v - 3| = 31$   
 $7v - 3 = 31$  or  $7v - 3 = -31$   
 $v = \frac{34}{7}$  or  $v = -4$

12)  $-5 + 7|3x - 4| = 107$

$7|3x - 4| = 112$   
 $|3x - 4| = 16$   
 $3x - 4 = 16$  or  $3x - 4 = -16$   
 $x = \frac{20}{3}$  or  $x = -4$

13)  $10|-6 + 10m| - 4 = 56$

$10|-6 + 10m| = 60$   
 $|-6 + 10m| = 6$   
 $-6 + 10m = 6$  or  $-6 + 10m = -6$   
 $10m = 12$  or  $10m = 0$   
 $m = \frac{6}{5}$  or  $m = 0$

14)  $6(-4n - 1) - 4 = 18 + 4n$

$-24n - 6 - 4 = 18 + 4n$   
 $-28 = 22n + 18$   
 $-46 = 22n$   
 $n = -\frac{23}{11}$

Solve each inequality.

15)  $-5n + 2n \geq -12$

$$\begin{aligned} -3n &\geq -12 \\ \frac{-3n}{-3} &\geq \frac{-12}{-3} \\ n &\leq 4 \end{aligned}$$

17)  $-10 - v \leq v - 5 - 3v$

$$\begin{aligned} -10 - v &\leq v - 5 - 3v \\ +10 + v &\quad +2v + 10 \\ v &\leq 5 \end{aligned}$$

19)  $8 + 7(5 - 7b) > 435$

$$\begin{aligned} 8 + 7(5 - 7b) &> 435 \\ 7(5 - 7b) &> 427 \\ 5 - 7b &> 61 \\ -5 &\quad -5 \\ -7b &> 56 \\ b &< -8 \end{aligned}$$

21)  $-5 + 3n < 3(n + 1)$

$$\begin{aligned} -5 + 3n &< 3n + 3 \\ -3n &\quad -3n \\ -5 &< 3 \end{aligned}$$

True

All real #

23)  $-6(n - 1) - (5 - 4n) \leq 5$

$$\begin{aligned} -6n + 6 - 5 + 4n &\leq 5 \\ -2n + 1 &\leq 5 \\ -1 &\quad -1 \\ -2n &\leq 4 \\ \frac{-2n}{-2} &\leq \frac{4}{-2} \\ n &\geq -2 \end{aligned}$$

25)  $3(1 - 2n) \leq -(5 + 6n)$

$$\begin{aligned} 3 - 6n &\leq -5 - 6n \\ +6n &\quad +6n \\ 3 &\leq -5 \end{aligned}$$

false

No solution

27)  $|x| > 4$

$$x > 4, x < -4$$

16)  $0 > 3b + 8b$

$$\begin{aligned} 0 &> 11b \\ \frac{0}{11} &> \frac{11b}{11} \\ b &< 0 \end{aligned}$$

18)  $-8 - 5v < -6v - 2$

$$\begin{aligned} -8 - 5v &< -6v - 2 \\ +8 + 6v &\quad +6v + 8 \\ v &< 6 \end{aligned}$$

20)  $-6 + 8(6m - 6) < -294$

$$\begin{aligned} -6 + 48m - 48 &< -294 \\ +6 &\quad +6 \quad +48 \\ 48m &< -240 \\ \frac{48m}{48} &\quad \frac{-240}{48} \\ m &< -5 \end{aligned}$$

22)  $6(-4 - 8k) \geq -24 + 4k$

$$\begin{aligned} -24 - 48k &\geq -24 + 4k \\ +24 &\quad +24 \\ -48k &\geq 4k \\ +48k &\quad +48k \\ 0 &\geq 52k \\ \frac{0}{52} &\quad \frac{52k}{52} \\ k &\leq 0 \end{aligned}$$

24)  $7(1 + 4k) + 8(k + 1) > 15$

$$\begin{aligned} 7 + 28k + 8k + 8 &> 15 \\ 15 + 36k &> 15 \\ -15 &\quad -15 \\ 36k &> 0 \\ \frac{36k}{36} &\quad \frac{0}{36} \\ k &> 0 \end{aligned}$$

26)  $8(1 + 7v) < 4(2v + 2)$

$$\begin{aligned} 8 + 56v &< 8v + 8 \\ +8 - 8v &\quad +8 - 8v \\ 48v &< 0 \\ \frac{48v}{48} &\quad \frac{0}{48} \\ v &< 0 \end{aligned}$$

28)  $|m| < 7$

$$m < 7, m > -7$$

29)  $|r| + 9 > -2$   
 $-9 -9$   
*always positive*  $\rightarrow |r| > -11$   
 All real #.

~~$|r| > -11$~~

31)  $-6 + |n| < 1$   
 $+6 +6$   
 $|n| < 7$

$n < 7, n > -7$

33)  $|6n| > -30$

~~$6n > -30$~~   
 ~~$6n < 30$~~   
 ~~$n > -5$~~   
 ~~$n < 5$~~

All real #.

35)  $\frac{a}{2} \leq -1$   
*never negative*  $\rightarrow$   ~~$a \leq -2$~~

No solution.

~~$a \leq -2$~~   
 ~~$a \geq 2$~~

37)  $|x-4| + 2 < 6$   
 $-2 -2$

$|x-4| < 4$

$x-4 < 4$        $x-4 > -4$

$x < 8$

$x > 0$

39)  $|n+10| - 5 < -4$   
 $+5 +5$

$|n+10| < 1$

$n+10 < 1$   
 $-10 -10$

$n < -9$

$n+10 > -1$   
 $-10 -10$

$n > -11$

30)  $|k| - 10 \leq 0$   
 $+10 +10$

$|k| \leq 10$

$k \leq 10, k \geq -10$

32)  $3 - 8|v| < -77$   
 $-3 -3$

~~$-8|v| < -80$~~   
 ~~$-8 -8$~~

$|v| > 10$

$v > 10, v < -10$

34)  $|5+b| > 8$

$5+b > 8$

$b > 3$

$5+b < -8$

$b < -13$

36)  $\frac{-6+x}{5} \leq 2$  (5)

$-6+x \leq 10$

$-6+x \leq 10$

$x \leq 16$

$-6+x \geq -10$

$x \geq -4$

38)  $-7|-6v| - 4 \leq -88$   
 $+4 +4$

~~$-7|-6v| \leq -84$~~   
 ~~$-7 -7$~~

$|-6v| \geq 12$

$-6v \geq 12$

$-6v \leq -12$

$v \leq -2$

$v \geq 2$

40)  $3|6x| + 2 \leq 20$   
 $-2 -2$

~~$|6x| \leq 18$~~   
 ~~$3$~~

$|6x| \leq 6$

$6x \leq 6$

$x \leq 1$

$6x \geq -6$

$x \geq -1$

$$41) |-7-8m| < 87$$

$$-7-8m < 87 \quad -7-8m > -87$$

$$-8m < 94 \quad -8m > -80$$

$$m < \frac{94}{-8} \quad m > \frac{-80}{-8}$$

$$m > \frac{-47}{4}$$

$$43) \frac{|5+4n|}{7} \leq 5(7)$$

$$|5+4n| \leq 35$$

$$5+4n \leq 35$$

$$4n \leq 30$$

$$n \leq \frac{30}{4} = \frac{15}{2}$$

$$5+4n \geq -35$$

$$4n \geq -40$$

$$n \geq -10$$

$$n \geq -10$$

$$45) \frac{10-7|2x+8|}{7} > 52$$

$$|2x+8| < \frac{49}{7}$$

NO solution

$$47) (x+1)(2x-5) \leq 0$$

Test:  $(0+1)(2(0)-5) \leq 0$   
 $+ \cdot - = - \leq 0$  true

$$-1 \leq x \leq \frac{5}{2}$$

$$-1 \leq x \leq \frac{5}{2}$$

$$49) 3x^2 + 8x - 3 < 0$$

$$(x-3)(3x+1) < 0$$

$$-\frac{1}{3} < x < 3$$

Test:  $(0-3)(3(0)+1) < 0$   
 $- \cdot + = - < 0$  true

$$51) -x^2 + 15x + 42 \geq 13x + 7$$

$$-x^2 + 2x + 35 \geq 0$$

$$-5 \leq x \leq 7$$

$$0 \geq x^2 - 2x - 35$$

$$(x-7)(x+5) \leq 0$$

Test:  $(0-7)(0+5) \leq 0$   
 $- \cdot + = - \leq 0$  true

$$42) |-8a+4| > -76$$

$$-8a+4 > -76 \quad -8a+4 < 76$$

$$-8a > -80 \quad -8a < 72$$

$$a < 10 \quad a > -9$$

all real #

$$44) \frac{-4+3a}{3} > 5(3)$$

$$-4+3a > 15$$

$$-4+3a > 15$$

$$3a > 19$$

$$a > \frac{19}{3}$$

$$-4+3a < -15$$

$$3a < -11$$

$$a < -\frac{11}{3}$$

$$46) 2+7|-3x-7| \geq -47$$

$$7|-3x-7| \geq -49$$

$$|-3x-7| \geq -7$$

all real #

$$48) (x-6)(x-4) > 0$$

$$(x-6)(x-4) > 0$$

Test:  $(5-6)(5-4) > 0$   
 $- \cdot + = - > 0$  false

$$x < 4 \text{ or } x > 6$$

$$50) 3x^2 + 2x - 8 \leq 0$$

$$(3x-4)(x+2) \leq 0$$

Test:  $(3(0)-4)(0+2) \leq 0$   
 $- \cdot + = - \leq 0$  true

$$-2 \leq x \leq \frac{4}{3}$$

$$52) 2x^2 - 15x + 54 \leq 26$$

$$2x^2 - 15x + 28 \leq 0$$

$$(2x-7)(x-4) \leq 0$$

Test:  $(2(0)-7)(0-4) \leq 0$   
 $- \cdot - = + \leq 0$  false

$$\frac{7}{2} \leq x \leq 4$$

## Answers to Chapter 3A Exam Review (ID: 1)

- |                                     |                                       |   |                                       |
|-------------------------------------|---------------------------------------|---|---------------------------------------|
| 1) $\{-7\}$                         | 2) $\{3\}$                            | 3) $\{5, 3\}$                                 | 4) $\{8, 5\}$                         |
| 5) $\{-8, 0\}$                      | 6) $\{-2, 8\}$                        | 7) $\{27, -27\}$                              | 8) $\{25, -25\}$                      |
| 9) $\{7, 1\}$                       | 10) $\left\{-2, \frac{14}{5}\right\}$ | 11) $\left\{\frac{34}{7}, -4\right\}$         | 12) $\left\{\frac{20}{3}, -4\right\}$ |
| 13) $\left\{\frac{6}{5}, 0\right\}$ | 14) $\{-1\}$                          | 15) $n \leq 4$                                | 16) $b < 0$                           |
| 17) $v \leq 5$                      | 18) $v < 6$                           | 19) $b < -8$                                  | 20) $m < -5$                          |
| 21) $\{\text{All real numbers.}\}$  | 22) $k \leq 0$                        | 23) $n \geq -2$                               |                                       |
| 24) $k > 0$                         | 25) No solution.                      | 26) $v < 0$                                   | 27) $x > 4$ or $x < -4$               |
| 28) $-7 < m < 7$                    | 29) $\{\text{All real numbers.}\}$    | 30) $-10 \leq k \leq 10$                      |                                       |
| 31) $-7 < n < 7$                    | 32) $v > 10$ or $v < -10$             | 33) $\{\text{All real numbers.}\}$            |                                       |
| 34) $b > 3$ or $b < -13$            | 35) No solution.                      | 36) $-4 \leq x \leq 16$                       | 37) $0 < x < 8$                       |
| 38) $v \leq -2$ or $v \geq 2$       | 39) $-11 < n < -9$                    | 40) $-1 \leq x \leq 1$                        | 41) $-\frac{47}{4} < m < 10$          |
| 42) $\{\text{All real numbers.}\}$  | 43) $-10 \leq n \leq \frac{15}{2}$    | 44) $a > \frac{19}{3}$ or $a < -\frac{11}{3}$ |                                       |
| 45) No solution.                    | 46) $\{\text{All real numbers.}\}$    | 47) $\left[-1, \frac{5}{2}\right]$            |                                       |
| 48) $(-\infty, 4) \cup (6, \infty)$ | 49) $\left(-3, \frac{1}{3}\right)$    | 50) $\left[-2, \frac{4}{3}\right]$            | 51) $[-5, 7]$                         |
| 52) $\left[\frac{7}{2}, 4\right]$   |                                       |   |                                       |