

Answer Key 4

1.6: 15, 20, 29, 43, 46, 48, 55, 61, 66, 72

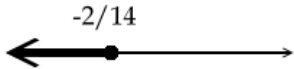
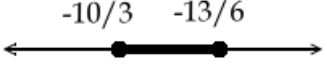
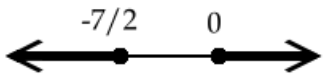
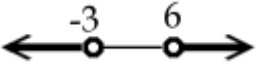
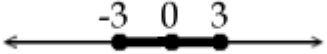
1.8: 3, 21, 34, 39, 47, 56, 79, 84


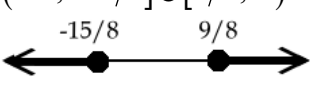
1.9: 18, 25, 36, 45, 59, 72, 87, 97, 99, 107

1.6

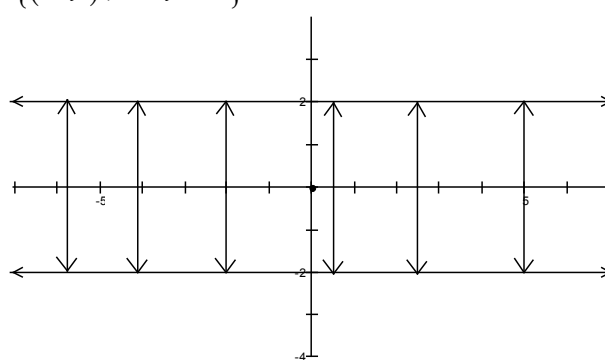
<p>15)  <math>\sqrt{3} + \sqrt{-4}</math>  <math>R = \sqrt{3}</math>  <math>I = 2</math></p>	<p>20)  <math>(-3 + 4i) - (2 - 5i)</math>  <math>-3 + 4i - 2 + 5i</math>  <math>-5 + 9i</math></p>
<p>29)  <math>(7 - i)(4 + 2i)</math>  <math>28 + 14i - 4i + 2</math>  <math>30 - 10i</math></p>	<p>43)  <math>\frac{4 + 6i}{3i} \cdot \frac{i}{i} = \frac{4i - 6}{-3} = 2 - \frac{4}{3}i</math></p>
<p>46)  <math>\frac{(1 + 2i)(3 - i)}{2 + i} = \frac{3 - i + 6i + 2}{2 + i} = \frac{5 + 5i}{2 + i} =</math>  <math>5 \left( \frac{1 + i}{2 + i} \right) \cdot \frac{2 - i}{2 - i} = 5 \cdot \frac{2 + 2i - i + 1}{5} = 3 + i</math></p>	<p>48)  <math>i^{10} = (i^2)^5 = (-1)^5 = -1</math></p>
<p>55)  <math>\sqrt{-3} \cdot \sqrt{-12} \sqrt{3i} \cdot \sqrt{12i} = \sqrt{36i^2} = -6</math></p>	<p>61)  <math>x^2 + 49 = 0</math>  <math>(x + 7i)(x - 7i) = 0</math>  <math>x = \pm 7i</math></p>
<p>66)  <math>x^2 - 6x + 10 = 0</math>  <math>x = \frac{6 \pm \sqrt{36 - 40}}{2} = \frac{6 \pm \sqrt{-4}}{2} = 3 \pm i</math></p>	<p>72)  <math>x^2 + \frac{1}{2}x + 1 = 0</math>  <math>2x^2 + x + 2 = 0</math>  <math>x = \frac{-1 \pm \sqrt{1 - 16}}{4} = -\frac{1}{4} \pm \frac{\sqrt{15}}{4}i</math></p>

1.8

<p>3) a) <math>[-3,3]</math> b) <math>(-\infty, -3] \cup [3, \infty)</math></p>	<p>21) <math>5 - 3x \geq 8x - 7</math> <math>-11x \geq 2</math> <math>x \leq -\frac{2}{11}</math> <math>(-\infty, -\frac{2}{11})</math></p> 																								
<p>34) <math>-3 \leq 3x + 7 \leq \frac{1}{2}</math> <math>-10 \leq 3x \leq -\frac{13}{2}</math> <math>-\frac{10}{3} \leq x \leq -\frac{13}{6}</math> <math>[-\frac{10}{3}, -\frac{13}{6}]</math></p> 	<p>39) <math>x(2x + 7) \geq 0</math> Critical points <math>-7/2, 0</math></p> <table border="1" data-bbox="824 760 1383 953"> <tbody> <tr> <td><math>x &lt; -7/2</math> eg. -4</td> <td>True</td> </tr> <tr> <td><math>-7/2</math></td> <td>True</td> </tr> <tr> <td><math>-7/2 &lt; x &lt; 0</math> eg. -1</td> <td>False</td> </tr> <tr> <td>0</td> <td>True</td> </tr> <tr> <td><math>x &gt; 0</math> eg. 1</td> <td>True</td> </tr> </tbody> </table> <p><math>(-\infty, -7/2] \cup [0, \infty)</math></p> 	$x < -7/2$ eg. -4	True	$-7/2$	True	$-7/2 < x < 0$ eg. -1	False	0	True	$x > 0$ eg. 1	True														
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<p>47) <math>x^2 &gt; 3(x + 6)</math> Critical points at <math>x^2 - 3x - 18 &gt; 0</math> <math>\frac{-3 \pm \sqrt{9 + 72}}{2} = \frac{3 \pm \sqrt{81}}{2} = \frac{3 \pm 9}{2} = 6, -3</math></p> <table border="1" data-bbox="240 1411 799 1642"> <tbody> <tr> <td><math>x &lt; -3</math> eg. -4</td> <td>True</td> </tr> <tr> <td>-3</td> <td>False</td> </tr> <tr> <td><math>-3 &lt; x &lt; 6</math> eg. 0</td> <td>False</td> </tr> <tr> <td>6</td> <td>False</td> </tr> <tr> <td><math>x &gt; 6</math> eg. 5</td> <td>True</td> </tr> </tbody> </table> <p><math>(-\infty, -3) \cup (6, \infty)</math></p> 	$x < -3$ eg. -4	True	-3	False	$-3 < x < 6$ eg. 0	False	6	False	$x > 6$ eg. 5	True	<p>56) <math>4x^2(x^2 - 9) \leq 0</math> <math>4x^2(x + 3)(x - 3) \leq 0</math> Critical points at 3, 0, -3</p> <table border="1" data-bbox="824 1381 1383 1650"> <tbody> <tr> <td><math>x &lt; -3</math> eg. -4</td> <td>False</td> </tr> <tr> <td><math>x = -3</math></td> <td>True</td> </tr> <tr> <td><math>-3 &lt; x &lt; 0</math> eg. -1</td> <td>True</td> </tr> <tr> <td><math>x = 0</math></td> <td>True</td> </tr> <tr> <td><math>0 &lt; x &lt; 3</math> eg. 1</td> <td>True</td> </tr> <tr> <td><math>x = 3</math></td> <td>True</td> </tr> <tr> <td><math>x &gt; 3</math> eg. 4</td> <td>False</td> </tr> </tbody> </table> <p><math>[-3, 3]</math></p> 	$x < -3$ eg. -4	False	$x = -3$	True	$-3 < x < 0$ eg. -1	True	$x = 0$	True	$0 < x < 3$ eg. 1	True	$x = 3$	True	$x > 3$ eg. 4	False
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<p>79)</p> $ x-5  \leq 3$ $-3 \leq x-5 \leq 3$ $2 \leq x \leq 8$ $[2, 8]$ 	<p>84)</p> $ 8x+3  > 12$ $8x+3 > 12 \quad 8x+3 < -12$ $8x > 9 \quad 8x < -15$ $x > 9/8 \quad x < -15/8$ $(-\infty, -15/8] \cup [9/8, \infty)$ 
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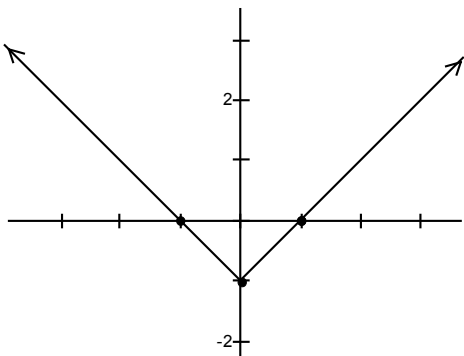
1.9

<p>10)</p> $\{(x, y)   0 \leq y \leq 2\}$ 	<p>25)</p> $(0, 8), (6, 16)$ $D = \sqrt{6^2 + 8^2} = \sqrt{36 + 64} = \sqrt{100} = 10$ $MP = \left( \frac{0+6}{2}, \frac{8+16}{2} \right) = (3, 2)$
<p>36)</p> $CE = \sqrt{(-6 - -2)^2 + (3 - 1)^2} = \sqrt{16 + 4} = \sqrt{20}$ $DE = \sqrt{(3 - -2)^2 + (0 - 1)^2} = \sqrt{25 + 1} = \sqrt{26}$ $\sqrt{20} < \sqrt{26}$ so C is closer	<p>45)</p> $(1, 1) \quad (0, y) \quad (5, 5)$ $\sqrt{1 + (y-1)^2} = \sqrt{25 + (y-5)^2}$ $1 + (y-1)^2 = 25 + (y-5)^2$ $y^2 - 2y + 1 + 1 = y^2 - 10y + 25 + 25$ $8y = 48$ $y = 6$ $(0, 6)$

59)

$$y = |x| - 1$$

$x$	$y$
-1	0
0	-1
1	0



72)

$$4x^2 + 25y^2 = 100$$

if $x=0$ $25y^2 = 100$ $y^2 = 4$ $y = \pm 2$	if $y=0$ $4x^2 = 100$ $x^2 = 25$ $x = \pm 5$
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Intercepts are at:

$$(0, 2)$$

$$(0, -2)$$

$$(5, 0)$$

$$(-5, 0)$$

87)

$$(x+3)^2 + (y-4)^2 = 25 = 5^2$$

$$\text{Center} = (-3, 4)$$

$$\text{Radius} = 5$$

97)

$$\text{Center} = (-2, 2)$$

$$\text{Radius} = 2$$

$$(x+2)^2 + (y-2)^2 = 2^2 = 4$$

99)

$$x^2 + y^2 + 4x - 6y + 12$$

Complete the square twice

$$(x^2 + 4x + 4) + (y^2 - 6y + 9) = -12 + 4 + 9$$

$$(x+2)^2 + (y-3)^2 = 1^2$$

$$\text{Center} = (-2, 3)$$

$$\text{Radius} = 1$$

107)

$$x^2y^2 + xy = 1$$

Test for Vertical Symmetry

$$(-x)^2y^2 + (-x)y = 1$$

$$x^2y^2 - xy = 1$$

No!

Test for Horizontal Symmetry

$$x^2(-y)^2 + x(-y) = 1$$

$$x^2y^2 - xy = 1$$

No!

Test for Symmetry around the Origin

$$(-x)^2(-y)^2 + (-x)(-y) = 1$$

$$x^2y^2 + xy = 1$$

Yes!