

# SI Review

AAT

1. rational, real

$$2. \quad 3x-5=12 \quad 3x-5=-12$$

$$3x=17 \quad 3x=-7$$

$$\boxed{x=17/3} \quad \boxed{x=-7/3}$$

$$3. \quad (\sqrt{2x+7} = 2+x)^2$$

$$2x+7 = 4+4x+x^2$$

$$0 = x^2+2x-3$$

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

$$x = -3, x = 1$$

$$\sqrt{2(-3)+7} - (-3) = 2$$

$$1+3 = 2x$$

$$\sqrt{2+7} - 1 = 2$$

$$3-1 = 2 \checkmark$$

$$\boxed{x=1}$$

$$4. \quad \frac{15}{9}a + \frac{1}{9}a = \boxed{\frac{16}{9}a}$$

$$5. \quad a) \quad \frac{1}{3^4} = 1/81$$

$$b) \quad 4(2)^2(-3)^3$$

$$= 4 \cdot 4 \cdot -27$$

$$= \boxed{-432}$$

$$c) \quad \left(\frac{6b}{5a^3}\right)^3 = \boxed{\frac{216b^3}{125a^9}}$$

$$d) \quad 486 \quad \boxed{3 \cdot 1st \sqrt{2st^2}}$$

$$\begin{array}{c} \wedge \\ 2 \quad 243 \\ \wedge \\ 3 \quad 81 \\ \wedge \\ 9 \quad 9 \\ \wedge \quad \wedge \\ 3 \quad 3 \quad 3 \end{array}$$

$$5. \quad e) \quad \frac{11m^9}{12t^3}$$

$$f) \quad \frac{-8q^3r^3}{-5r^4p^5} = \boxed{\frac{8r^3}{5p^2}}$$

$$6. \quad -8t-12z-6t+12z = \boxed{-14t}$$

$$7. \quad -24t^2-56ut-27ut-63u^2$$

$$= -24t^2-83ut-63u^2$$

$$8. \quad \frac{-5x-1}{x+13}$$

$$9. \quad \frac{1}{(x-7)(x-9)} \left(\frac{x+7}{x+7}\right) \frac{1}{(x-7)(x+7)} \left(\frac{x-9}{x-9}\right)$$

$$\frac{x+7+x-9}{(x-7)(x+7)(x-9)} = \boxed{\frac{2x-2}{(x-7)(x+7)(x-9)}}$$

$$10. \quad a) \quad 3x^2(3x^2+x+4)$$

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

$$\boxed{x=0}, \quad x = \frac{-1 \pm \sqrt{1-4(3)(4)}}{2}$$

$$x = \frac{-1 \pm \sqrt{-47}}{2}$$

$$\boxed{x = \frac{-1 \pm i\sqrt{47}}{2}}$$

$$b) \quad (x-11)(x+11)$$

$$x = \pm 11$$

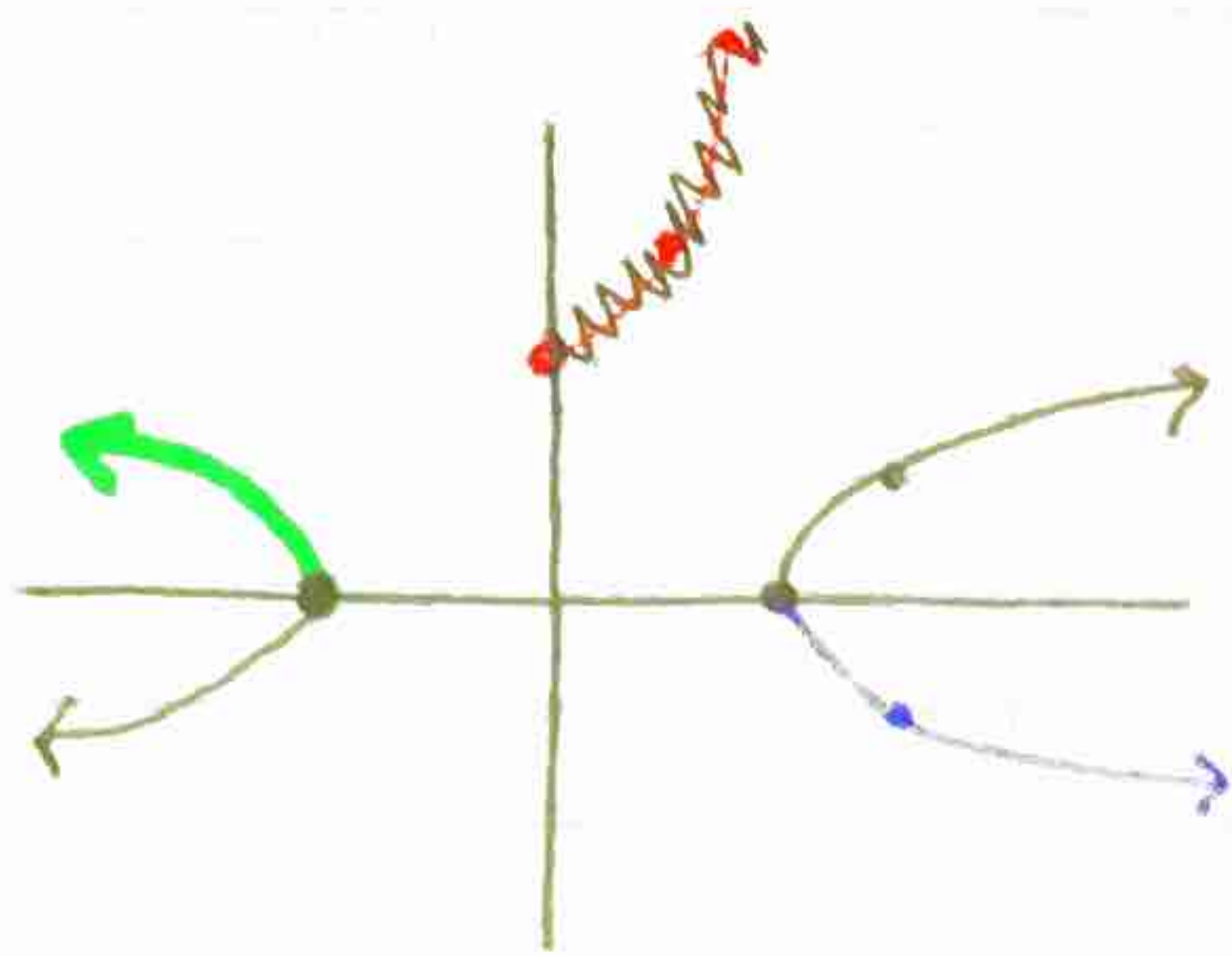
$$c) \quad (x-10)(x-1)$$

$$x = 10, x = 1$$

$$d) \quad (3x+4)(x-3)$$

$$x = 3, -4/3$$

11.

a  
b  
c

12. x-int:  $0 = \sqrt{7x-6}$   
 $0 = 7x-6$   
 $6 = 7x$   
 $6/7 = x$

$(6/7, 0)$

y-int:  $y = \sqrt{7(0)-6}$   
 $y = \sqrt{-6}$

$(0, i\sqrt{6})$

13.  $(x-1)^2 + (y-4)^2 = 81$

14. C:  $(-6, 7)$   
 $r = 3$

15.  $-3 + y - 8 + y = -5y$   
 $-11 = -7y$   
 $11/7 = y$

16.  $-8 = x+8 - 7(x+7)$   
 $-8 = x+8 - 7x - 49$   
 $-8 = -6x - 41$   
 $33 = -6x$   
 $-33/6 = x$

$-11/2 = x$

17.  $x^2 + 8x = x - 10$   
 $x^2 + 7x + 10 = 0$

~~18.  $x^2 + 7x + 10 = 0$~~

18.  $(x+6)(-4x+7)$   
 $x = -6, x = 7/4$

19.  $8x+5 = \pm\sqrt{7}$   
 $8x = \pm\sqrt{7} - 5$   
 $x = \frac{-5 \pm \sqrt{7}}{8}$

20.  $x = \frac{70 \pm \sqrt{(-70)^2 - 4(49)(23)}}{2(49)}$

$x = \frac{70 \pm \sqrt{392}}{98}$

$x = \frac{70 \pm 2\sqrt{98}}{98}$

$x = \frac{70 \pm 14\sqrt{2}}{98}$

$x = 5 \pm \sqrt{2}$

21.  $x = \frac{4 \pm \sqrt{16 - 4(1)(53)}}{2(1)}$

$x = \frac{4 \pm \sqrt{-196}}{2} = \frac{4 \pm 14i}{2}$   
 $= 2 \pm 7i$

22.  $\sqrt[3]{1-6x} - 4 = 0$   
 $(\sqrt[3]{1-6x} = 4)^3$   
 $1-6x = 64$   
 $-6x = 63$   
 $x = -10.5$

$$23. \begin{aligned} x-10 &= 30^{3/2} \\ x-10 &= 210 \\ \boxed{x=220} \end{aligned}$$

$$24. \quad x = \frac{-4 \pm \sqrt{16 - 4(1)(5)}}{2(1)}$$

$$x = \frac{-4 \pm \sqrt{-4}}{2}$$

$$x = \frac{-4 \pm 2i}{2}$$

$$\boxed{x = -2 \pm i}$$

$$25. a) \quad 18 - 7i$$

$$b) \quad \begin{aligned} &6 - 10i - 4i^2 \\ &= \boxed{10 - 10i} \end{aligned}$$

$$c) \quad \frac{2+i}{1-i} \left( \frac{1+i}{1+i} \right)$$

$$= \frac{2+3i+i^2}{1-i^2}$$

$$= \boxed{\frac{1+3i}{2}}$$

$$26. \quad \begin{aligned} 49x^2 &= -25 \\ x^2 &= -25/49 \end{aligned}$$

$$\boxed{x = \pm 5i/7}$$

$$27. \quad \begin{aligned} u &= x^2 \\ 2u^2 + 9u - 5 \\ (2u-1)(u+5) \\ \boxed{(2x^2-1)(x^2+5)} \end{aligned}$$

$$28. \quad \begin{aligned} (\sqrt{5-x} = 9)^2 \\ 5-x &= 81 \\ -x &= 76 \\ \boxed{x = -76} \end{aligned}$$

$$29. \quad \frac{x^2(x-5) + 1(x-5)}{(x^2+1)(x-5)}$$

$$30. \quad \begin{aligned} -9x + 45y &= 1 \\ 45y &= 1 + 9x \\ y &= 1/45 + 1/5x \rightarrow \perp : -5 \end{aligned}$$

$$\begin{aligned} y &= -5x + b \\ -3 &= -5(8) + b \\ -3 &= -40 + b \\ -37 &= b \end{aligned}$$

$$\boxed{y = -5x - 37}$$

$$31. \quad m = \frac{5-6}{2-4} = \frac{-1}{-2}$$

$$\begin{aligned} y &= -1/2x + b \\ 5 &= -1/2(2) + b \\ 5 &= -1 + b \\ 6 &= b \end{aligned}$$

$$\boxed{y = -1/2x + 6}$$

$$32. \quad \text{yes}$$

$$33. \quad \begin{aligned} 8x - 6 &= 0 \\ 8x &= 6 \\ \boxed{x = 3/4} \end{aligned}$$

$$34. \quad \begin{aligned} x^2 - 4x - 1 &= -7x - 3 \\ x^2 + 3x + 2 &= 0 \\ (x+2)(x+1) &= 0 \\ \boxed{x = -2, x = -1} \end{aligned}$$

$$35. \sqrt{2x} - 9 = 0$$

$$(\sqrt{2x} = 9)^2$$

$$2x = 81$$

$$\boxed{x = 81/2}$$

$$43. x = y^9 - 8$$

$$(x+8 = y^9)^{1/9}$$

$$\boxed{(x+8)^{1/9} = y}$$

$$36. I: (0, 1)$$

$$D: (1, \infty)$$

$$C: (-\infty, 0)$$

$$\text{Domain: } (-\infty, \infty)$$

$$\text{Range: } (-\infty, 1]$$

$$44. f(g(x)) = 4\left(\frac{x-4}{4}\right) + 4 = x\sqrt{\quad}$$

$$g(f(x)) = \frac{4x+4}{4} = x\sqrt{\quad}$$

$$37. f(x) + g(x)$$

$$= -2x^2 + 3x - 5 + -9x^2 - 4x + 8$$

$$= \boxed{-11x^2 - x - 3}$$

yes!

$$45. a) D: [-3, \infty)$$

$$R: (-\infty, \infty)$$

$$38. \frac{-9x^2 + 6x}{-5 - x} \quad x \neq -5$$

$$b) D: (-\infty, 1) \cup [0, \infty)$$

$$R: (-\infty, 4]$$

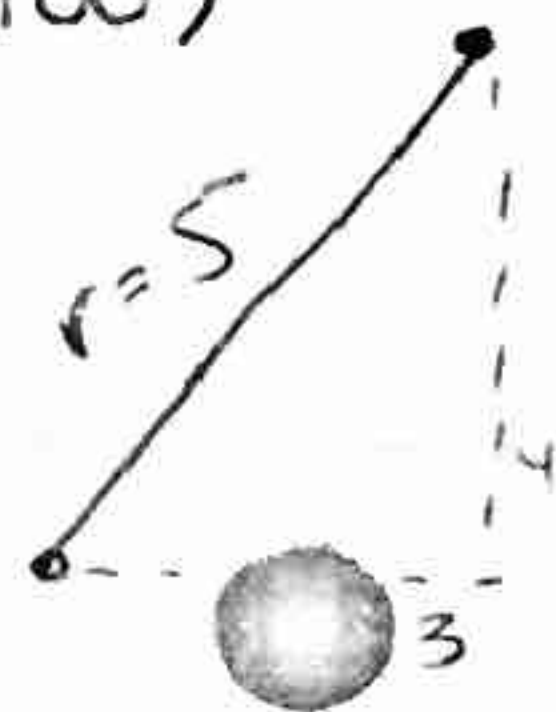
$$39. (\sqrt{-3x})(\sqrt{-5x+9})$$

$$= \boxed{\sqrt{15x^2 - 27x}}$$

46.

$$40. \frac{8x}{4x+3} \left(\frac{x}{x}\right) - \frac{8}{x} \left(\frac{4x+3}{4x+3}\right)$$

$$\boxed{\frac{8x^2 - 32x - 24}{(x)(4x+3)}}$$



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

$$41. f(1) = g(1)$$

$$f(1) = 1^2 - 5 = -4$$

$$g(1) = 9$$

$$\boxed{-30}$$

$$47. y = a(x+1)^2 - 2$$

$$0 = a(1+1)^2 - 2$$

$$2 = a(4)$$

$$1/2 = a$$

$$42. g(f(x)) = (x-3)^2$$

$$= \boxed{x^2 - 6x + 9}$$

$$\boxed{y = 1/2(x+1)^2 - 2}$$

$$48. y = -(x+4)^2 - 7$$

$$49. VD 5, R 5, U 8$$

$$50. x = 0$$

$$51. 0 = (x+7)(x+5)$$
$$\boxed{x = -7, x = -5}$$

$$CTS 52. f(x) = -(x^2 - 14x + 49) + 49 - 44$$
$$= \boxed{-(x-7)^2 + 5}$$

$$53. x = \frac{3}{2}(1) = \frac{3}{2}$$

$$\left(\frac{3}{2}\right)^2 - 3\left(\frac{3}{2}\right) + \frac{13}{4} = 1$$

$$\boxed{\left(\frac{3}{2}, 1\right)}$$

$$54. 4 = a(-9-5)^2 - 5$$
$$4 = a(196) - 5$$
$$9 = 196a$$
$$0.05 = a$$

$$\boxed{y = 0.05(x-5)^2 - 5}$$

$$55. D: 4 \quad \frac{\quad}{\quad}$$
$$LC: -7 \quad \frac{\quad}{\quad}$$

$$56. x^2(x^2 + 8x + 7)$$
$$x^2(x+7)(x+1)$$

$$\boxed{x = 0 (2)$$
$$x = -7 (1)$$
$$x = -1 (1)}$$

$$57. y = 3(x-1)^2$$

$$58. P.Z. = \pm \left( \frac{1, 3, 5, 15}{1, 2} \right)$$

$$= \boxed{\pm 1, \pm 3, \pm 5, \pm 15, \pm \frac{1}{2},$$
$$\pm \frac{3}{2}, \pm \frac{5}{2}, \pm \frac{15}{2}}$$

$$59. \begin{array}{r} 3 \overline{) 2 \ -4 \ 0 \ -29 \ 50} \\ \underline{\phantom{3} \ 4 \ 4 \ 18 \ -21} \\ 2 \ 2 \ 6 \ -9 \ \underline{23} \end{array}$$

$$\boxed{2x^3 + 2x^2 + 6x - 9 + \frac{23}{x-3}}$$

$$60. \begin{array}{r} -5 \overline{) 2 \ 5 \ -36 \ -41 \ 70} \\ \underline{\phantom{-5} -10 \ 25 \ 55 \ -70} \\ 2 \ -5 \ -11 \ 14 \ \underline{0} \end{array}$$

$$\begin{array}{r} 1 \overline{) 2 \ -5 \ -11 \ 14} \\ \underline{\phantom{1} \ 2 \ -3 \ -14} \\ 2 \ -3 \ -14 \ \underline{0} \end{array}$$

$$2x^2 - 3x - 14$$

$$\boxed{(2x-7)(x+2)(x+5)(x-1)}$$