

Answer Sheet

1	6	✓	11	28	✓
2	2	✓	12	∅	✓
3	27	✓	13	42	✓
4	4	✓	14	11	✓
5	81	✓	15	0, $\frac{1}{25}$	✓
6	$\frac{1}{7}$	✓	16	∅	✓
7	x	✓	17	$\frac{2}{5}$ $-\frac{1}{3}$	✓ ✓
8	$x^{1/6}$	✓	18	25	✓
9	$x^{11/6}$	✓	19	5, 1	✓ ✓
10	$\frac{1}{x^{2/5}}$	✓	20		✓

24 ✓

East Los Angeles College
Department of Mathematics
Math 125
Test 3

Show all work for credit.

Evaluate the following rational exponents.

1. $36^{\frac{1}{2}}$

2. $16^{\frac{1}{4}}$

3. $9^{\frac{3}{2}}$

4. $8^{\frac{2}{3}}$

5. $(-27)^{\frac{4}{3}}$

6. $49^{-\frac{1}{2}}$

Use properties of exponents to write as positive powers.

7. $x^{\frac{3}{4}} \cdot x^{\frac{1}{4}}$

8. $x^{-\frac{1}{2}} \cdot x^{\frac{2}{3}}$

9. $\frac{x^{4/3}}{x^{-1/2}}$

10. $(x^{-4/5})^{1/2}$

Solve the following quadratic in form equations for x and write your answers in **set notation**.

11. $\sqrt{x-3} = 5$

12. $\sqrt{x+2} = -2$

13. $2\sqrt{x+7} - 4 = 10$

14. $\sqrt{2x-8} = \sqrt{x+3}$

15. $\sqrt{x} = 5x$

16. $x^4 + 6x^2 + 8 = 0$

17. $2x^{-2} + x^{-1} - 15 = 0$

18. $x + \sqrt{x} - 30 = 0$

Solve for x by completing the square and write your answers in **Set Notation**.

19. $x^2 - 6x + 5 = 0$

Solve and **graph** the following inequalities.

20. $x^2 - 3x - 10 \geq 0$

Math 125 Test 3

$$(1) 36^{1/2} = \sqrt{36} = \underline{6}$$

$$(2) 16^{1/4} = \sqrt[4]{16} = \underline{2}$$

$$(3) 9^{3/2} = (9^{1/2})^3 = (\sqrt{9})^3 = 3^3 = \underline{27}$$

$$(4) 8^{2/3} = (8^{1/3})^2 = (\sqrt[3]{8})^2 = 2^2 = \underline{4}$$

$$(5) (-27)^{4/3} = [(-27)^{1/3}]^4 \\ = [\sqrt[3]{-27}]^4 = (-3)^4 \\ = \underline{81}$$

$$(6) 49^{-1/2} = \frac{1}{49^{1/2}} = \frac{1}{\sqrt{49}} = \underline{\frac{1}{7}}$$

$$(7) x^{3/4} \cdot x^{1/4} = x^{3/4 + 1/4} = x^{4/4} \\ = x^1 = \underline{x}$$

$$(8) x^{-1/2} \cdot x^{2/3} = x^{-1/2 + 2/3} \\ = x^{-1/2 + 4/6} = x^{-3/6 + 4/6} \\ = x^{1/6} = \underline{\sqrt[6]{x}}$$

$$(9) \frac{x^{4/3}}{x^{-1/2}} = x^{4/3 - (-1/2)} = x^{4/3 + 1/2} \\ = x^{8/6 + 3/6} = x^{11/6} = \underline{\sqrt[6]{x^{11}}}$$

$$(11) \sqrt{x-3} = 5$$

$$x-3 = 5^2$$

$$\begin{array}{rcl} x-3 & = & 25 \\ +3 & +3 & \end{array}$$

$$\boxed{x=28}$$

$$(10) (x^{-4/5})^{1/2}$$

$$x^{-4/10}$$

$$x^{-2/5}$$

$$\boxed{\frac{1}{x^{2/5}}}$$

$$(12) \sqrt{x+2} = -2$$

No solution $\emptyset$

$$(13) \begin{array}{rcl} 2\sqrt{x+7} & -4 & = 10 \\ +4 & +4 & \end{array}$$

$$\frac{2\sqrt{x+7}}{2} = \frac{14}{2}$$

$$\sqrt{x+7} = 7$$

$$x+7 = 7^2$$

$$\begin{array}{rcl} x+7 & = & 49 \\ -7 & -7 & \end{array}$$

$$\boxed{x=42}$$

$$(14) (\sqrt{2x-6})^2 = (\sqrt{x+3})^2$$

$$\begin{array}{rcl} 2x-6 & = & x+3 \\ -x & -x & \\ x-6 & = & 3 \end{array}$$

$$x \neq -3$$

$$\boxed{x=11}$$

$$(15) \quad \sqrt{x} = 5x$$

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

$$x = 25x^2; \quad 25x^2 - x = 0$$

$$x(25x - 1) = 0$$

$$(x = 0)$$

$$25x - 1 = 0$$

$$25x = 1$$

$$x = 1/25$$

$$(16) \quad x^4 + 6x^2 + 8 = 0$$

$$\text{let } t = x^2$$

$$t^2 + 6t + 8 = 0$$

factor

$$(t + 4)(t + 2) = 0$$

$$t + 4 = 0$$

$$t = -4$$

$$x^2 = -4$$

$$t + 2 = 0$$

$$t = -2$$

$$x^2 = -2$$

No Solution!

$$(17) \quad 2x^{-2} + x^{-1} - 15 = 0$$

$$\text{let } t = x^{-1} = \frac{1}{x}$$

$$2t^2 + t - 15 = 0$$

factor

$$(2t - 5)(t + 3) = 0$$

$$2t - 5 = 0$$

$$2t = 5$$

$$t = 5/2$$

$$t + 3 = 0$$

$$t = -3$$

$$\text{But } t = \frac{1}{x}$$

$$\frac{1}{x} = \frac{5}{2}$$

$$; \quad \frac{1}{x} = -\frac{3}{1}$$

cross mult

$$5x = 2$$

$$| x = 2/5 |$$

$$-3x = 1$$

$$| x = -1/3 |$$

$$(18) \quad x + \sqrt{x} - 30 = 0$$

$$t = \sqrt{x}$$

$$t^2 + t - 30 = 0$$

$$(t + 6)(t - 5) = 0$$

$$t + 6 = 0$$

$$-6 \quad -6$$

$$t = -6$$

$$t - 5 = 0$$

$$+5 \quad +5$$

$$t = 5$$

But $t = \sqrt{x}$

$$\sqrt{x} = -6 \quad ; \quad \sqrt{x} = 5$$

no sol

$$x = 5^2 \quad ; \quad \boxed{x \geq 25}$$

$$(19) \quad x^2 - 6x + 5$$

$$(1) \quad \frac{-b}{2} = (-3) \quad (2) \quad (-3)^2 = 9$$

$$\frac{x^2 - 6x + 9 - 9 + 5}{f} = 0$$

$$(x-3)^2 - 4 = 0 \quad \sqrt{(x-3)^2} = 4$$

$$x-3 = \pm \sqrt{4} \cdot 2$$

$$x-3 = \pm 2$$

+3 +3

$$x = 3 \pm 2$$

$$x = 3+2, \quad x = 3-2$$

$$x = 5$$

$$x = 1$$

(20) $x^2 - 3x - 10 \geq 0$

$$(x-5)(x+2) \geq 0$$

$$(x-5)(x+2) = 0$$

$$x-5=0$$

+5 +5

$$x = 5$$

$$x+2=0$$

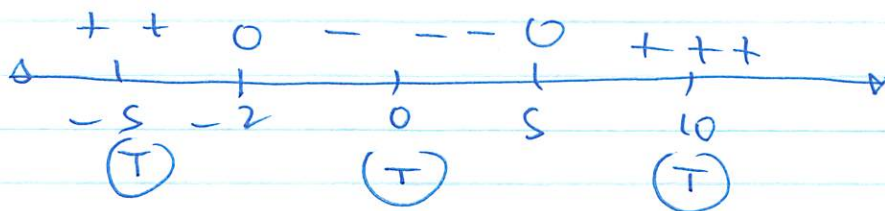
$$-2 \quad -2$$

$$x = -2$$

$$x-5 \quad x+2$$

-2 5

I II III IV



$$(x-5)(x+2)$$