

Unit 5 Practice TEST key

Thursday, November 16, 2023 10:38 AM

Name: _____ /46 **Unit 5 Test – Radical Expressions and Equations** PRACTICE

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

1. Convert each entire radical to a mixed radical. (2 marks each)

a) $\sqrt{18x^6}$

$$= 3x^3\sqrt{2}$$

b) $\sqrt[3]{216x^5}$

$$= 6x\sqrt[3]{x^2}$$

2. Convert each mixed radical to an entire radical. (2 marks each)

a) $-9xy^2\sqrt{x}$

$$= \sqrt[3]{81x^3y^4}$$

b) $-3xy^2\sqrt[3]{2y}$

$$= \sqrt[3]{54x^3y^7}$$

3. Simplify each radical expression. (2 marks each)

a) $7\sqrt[4]{32} + 4\sqrt{2}$

$$= 28\sqrt{2} + 4\sqrt{2}$$

$$= 32\sqrt{2}$$

b) $\sqrt[3]{4x^3} - 5x^2\sqrt{x^3} + 3x\sqrt{x^5}$

$$= 2x\sqrt{x} - 5x^3\sqrt{x} + 3x^3\sqrt{x}$$

$$= 0x^3\sqrt{x}$$

$$= 0$$

c) $6\sqrt[3]{8x^2} - 2\sqrt[3]{27x^2}$

$$= 12\sqrt[3]{x^2} - 6\sqrt[3]{x^2}$$

$$= 6\sqrt[3]{x^2}$$

Pre-Calculus 11

$$d) -3\sqrt{2x} \cdot 4\sqrt{3x}$$

$$= -12\sqrt{6x}$$

$$= -12x\sqrt{6}$$

$$e) (4\sqrt{3x}-2)(2\sqrt{x}-5)$$

$$= 8\sqrt{3x} \cdot 2\sqrt{x} - 20\sqrt{3x} - 4\sqrt{x} + 10$$

$$= 8x\sqrt{3} - 20\sqrt{3x} - 4\sqrt{x} + 10$$

4. Divide/Rationalize each denominator. (2 marks each)

$$a) \frac{-1\sqrt{5}}{\sqrt{5} \cdot \sqrt{5}}$$

$$= \frac{-\sqrt{5}}{5}$$

$$b) \frac{2(\sqrt{3})^2(\sqrt{3})}{\sqrt{2}(\sqrt{3})^2(\sqrt{3})}$$

$$= \frac{2\sqrt{3} \cdot 3}{2\sqrt{3}}$$

$$= 3\sqrt{3}$$

$$c) \frac{-\sqrt{3}(1+\sqrt{2})}{1-\sqrt{2}(1+\sqrt{2})}$$

$$= \frac{-\sqrt{3}-\sqrt{6}}{1-2-\sqrt{2}}$$

$$= \frac{-\sqrt{3}-\sqrt{6}}{-1-\sqrt{2}}$$

$$= \frac{(\sqrt{3}+\sqrt{6})(-1-\sqrt{2})}{(-1-\sqrt{2})(-1-\sqrt{2})}$$

$$= \frac{(\sqrt{3}+\sqrt{6})(-1-\sqrt{2})}{1+2+2\sqrt{2}+2}$$

$$= \frac{(\sqrt{3}+\sqrt{6})(-1-\sqrt{2})}{5+2\sqrt{2}}$$

5. Solve each equation and check your answer. State your restriction(s). (4 marks each)

$$a) \sqrt{2x-3}-5=0$$

$$\sqrt{2x-3}=5$$

$$2x-3=25$$

$$2x=28$$

$$x=14$$

check

$$\sqrt{2(14)-3}-5=0$$

$$5-5=0$$

$$b) 10\sqrt{\frac{x}{2}}=\sqrt{300}$$

$$100\left(\frac{x}{2}\right)=300$$

$$50x=300$$

$$x=6$$

check

$$10\sqrt{\frac{6}{2}}=\sqrt{300}$$

$$10\sqrt{3}=\sqrt{300}$$

dec. = dec.

Practice

$$x \geq 4$$

$$c) \sqrt{2x-1}-\sqrt{x-4}=2$$

$$(\sqrt{2x-1})^2 = (2+\sqrt{x-4})^2$$

$$2x-1 = 4+4\sqrt{x-4}+x-4$$

$$x-1 = 4\sqrt{x-4}$$

$$x^2-2x+1 = 16(x-4)$$

$$x^2-2x+1 = 16(x-4)$$

$$x^2-2x+1 = 16x-64$$

$$x^2-18x+65 = 0$$

$$x = \frac{-(-18) \pm \sqrt{(-18)^2 - 4(1)(65)}}{2(1)}$$

$$x = \frac{18 \pm \sqrt{324-260}}{2}$$

$$x = \frac{18 \pm \sqrt{64}}{2}$$

$$x = \frac{18 \pm 8}{2}$$

$$x = 13$$

$$x = 5$$

check $x=13$

$$\sqrt{2(13)-1} = 2+\sqrt{13-4}$$

$$\sqrt{25} = 2+\sqrt{9}$$

$$5 = 2+3 \checkmark$$

$$\sqrt{2(5)-1} = 2+\sqrt{5-4}$$

$$\sqrt{9} = 2+\sqrt{1}$$

$$3 = 2+1 \checkmark$$

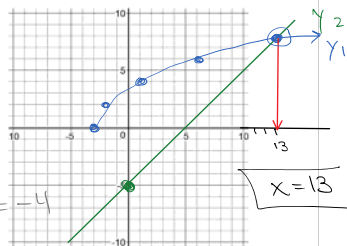
6. Solve the following graphically, state restrictions and check your solution: (4 marks each)

$$a) 2\sqrt{x+3}+5=x$$

$$2\sqrt{x+3}=x-5$$

$$a=2, m=1$$

$$(-3,0), b=-5$$



$$x=13$$

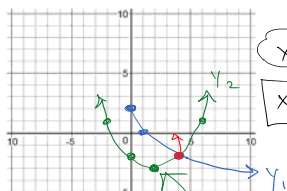
$$x \geq -3$$

$$b) -2\sqrt{x}+2 = \frac{1}{4}(x^2-x)-2$$

$$-2\sqrt{x} = \frac{1}{4}(x^2-x)-4$$

$$a=-2, m=-1$$

$$(0,2), \frac{1}{4}(x-2)^2-3$$



$$x \geq 0$$

$$x=4$$

$$\left(\frac{-4}{2}\right)^2 = (-2)^2 = 4$$

$$\frac{1}{4} \cdot \frac{1}{4} = \frac{1}{16}$$

$$y = \left(\frac{1}{4}x^2 - \frac{1}{4}x\right) - 2$$

$$y = \frac{1}{4}(x^2 - 4x + 4 - 4) - 2$$

$$a = -2$$

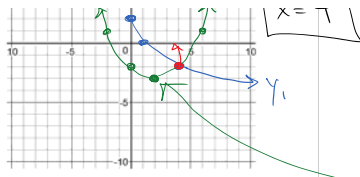
$$\frac{1}{4}(x^2 - 4x + 4 - 4) - 2$$

$$(0, 2)$$

$$\frac{1}{4}(x-2)^2 - 3$$

$$a = \frac{1}{4}$$

$$(2, -3)$$



$$y = \frac{1}{4}(x^2 - 4x + 4 - 4) - 2$$

$$y = \frac{1}{4}(x-2)^2 - 3$$

$$(2, -3)$$

7. What is the restriction on the variable in each radical expression? (1 mark each)

a) $\sqrt{x+3}$
 Practice $x \geq -3$

b) $\sqrt{2-9x}$

$$2 - 9x \geq 0$$

$$\frac{-2}{-9} \geq \frac{-9x}{-9}$$

$$x \leq \frac{2}{9}$$