

Warm-up before 7.5: Rational Exponents

Name: _____
 Period: _____

Simplify each expression.

$$1. \frac{5}{8} - \frac{3}{8}$$

$$= \frac{2}{8}$$

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

$$2. \frac{3}{4} + \frac{1}{8}$$

$$= \frac{6}{8} + \frac{1}{8}$$

$$= \frac{7}{8}$$

$$3. x^4 \cdot x^5$$

$$= x^{4+5}$$

$$= x^9$$

$$4. \frac{5^5 m^{10}}{5^2 m^3}$$

$$= 5^{5-2} m^{10-3}$$

$$= 5^3 m^7 = 125m^7$$

5. Given: $y = (x-1)^2 - 9$

a) Vertex: $(1, -9)$

b) Roots: $0 = (x-1)^2 - 9$

$$\sqrt{9} = \sqrt{(x-1)^2}$$

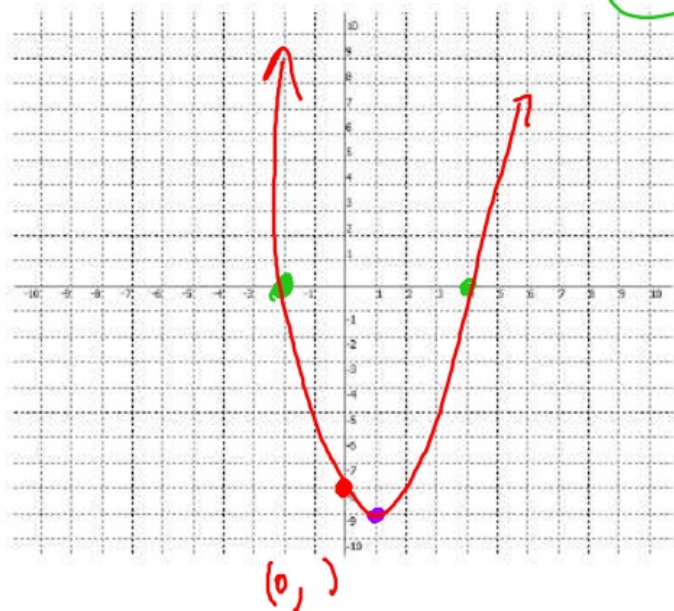
$$\pm 3 = x-1$$

$$1 \pm 3 = x$$

$$+3, 1-3 = x \quad x = 4, -2$$

c) y-intercept: $y = (0-1)^2 - 9$
 $y = -8 \quad (0, -8)$

d) graph



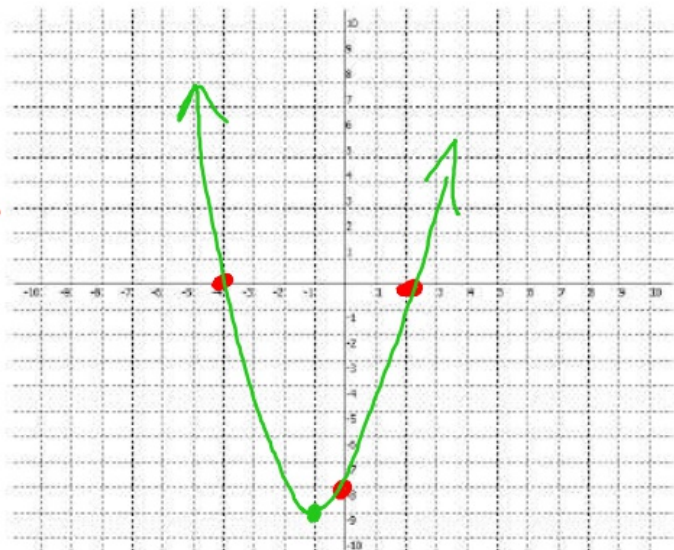
6. Given: $y = x^2 + 2x - 8$

a) Vertex: $y = x^2 + 2x + 1 - 8 - 1$
 $(-1, -9)$ $y = (x+1)^2 - 9$

b) Roots: $0 = x^2 + 2x - 8$ $M: -8$ $K: +2$
 $0 = (x-2)(x+4)$
 $x-2 = 0 \quad x+4 = 0$
 $x = 2, -4$
 $(2, 0) \quad (-4, 0)$

c) y-intercept: $y = (0)^2 + 2(0) - 8$
 $y = -8$

d) graph



Definition of a rational number:

Rule: $\sqrt[k]{a^m} = a^{\frac{m}{k}}$

Rewrite using rational exponents

a) $\sqrt[3]{a^2} = a^{\frac{2}{3}}$

b) $\sqrt{x^1} = x^{\frac{1}{2}}$

c) $\sqrt[5]{jk} = (jk)^{\frac{1}{5}}$ OR $j^{\frac{1}{5}}k^{\frac{1}{5}}$

d) $\sqrt[7]{8c^2d} = (8c^2d)^{\frac{1}{7}}$ OR $8^{\frac{1}{7}}c^{\frac{2}{7}}d^{\frac{1}{7}}$

Rewrite without rational exponents (Radical form)

$$e) f^{\frac{1}{4}} = \sqrt[4]{f}$$

$$f) 16^{\frac{1}{2}} = \sqrt{16} \\ = \textcircled{4}$$

$$16^{\frac{1}{2}} \\ = (4^2)^{\frac{1}{2}} \\ = 4^{2 \cdot \frac{1}{2}} \\ = 4$$

$$g) (x^2 y^3)^{\frac{1}{5}} = \sqrt[5]{x^2 y^3}$$

$$h) n^{\frac{2}{3}} = \sqrt[3]{n^2}$$

Review rules of exponents

$$a^m \cdot a^n = a^{m+n} \quad \frac{a^m}{a^n} = a^{m-n} \quad (a^m)^p = a^{m \cdot p}$$

Simplify

i) $x^{\frac{1}{3}} \cdot x^{\frac{1}{6}}$

$$= x^{\frac{2}{6} + \frac{1}{6}}$$

$$= x^{\frac{2+1}{6}}$$

$$= x^{\frac{3}{6}} = x^{\frac{1}{2}}$$

j) $5^{\frac{3}{4}} \cdot 5^{\frac{1}{8}}$

$$= 5^{\frac{3}{4} + \frac{1}{8}}$$

$$= 5^{\frac{6}{8} + \frac{1}{8}}$$

$$= 5^{\frac{7}{8}}$$

k) ~~$2^{\frac{1}{4}} \cdot 8^{\frac{1}{4}}$~~

$$\begin{aligned} & \frac{7^{\frac{5}{8}}}{7^{\frac{3}{8}}} \\ \text{d) } & \\ & = 7^{\frac{5}{8} - \frac{3}{8}} \\ & = 7^{\frac{2}{8}} = 7^{\frac{1}{4}} \end{aligned}$$

Solve

$$\text{m) } (\sqrt{x+3})^2 = (5)^2$$

$$x+3 = 25$$

$$x = 22$$

$$\text{n) } \sqrt{3m+1} - 4 = 6$$

$$\begin{array}{r} +4 \quad +4 \\ \hline (\sqrt{3m+1})^2 = (10)^2 \end{array}$$

$$3m+1 = 100$$

$$3m = 99$$

$$m = 33$$

Homework Section 7-5 and 7-6

Page 315: 9,10, 13,14, 16,17, 18,19, 22,23, 25, 26, 33, 34, 48, 49, 50, 51, 54, 55, 57 - 61

Page 319: 1 – 4 all

**you must write down the original problems,
work necessary to solve the problem
and their answers earn credit for the assignment**