

**Pre-Calculus Review Quiz #13**

Chapter: 11-1 to 11-3

Name \_\_\_\_\_ Pd \_\_\_\_\_

**Topic 1: Exponent Rules**

1.  $3(2x^2y)(y^2)$

2.  $(3x^4)^2(x^2)^3$

3.  $\frac{12x^2y^3}{3xy^5}$

4.  $(8x^5y)^{-2}$

5.  $(3x^2)^0$

6.  $\frac{16x^{-4}}{8}$

7.  $\sqrt[3]{x^{12}}$

8.  $\sqrt[2]{x^6}$

9.  $\left(\frac{b^{2n}}{b^{-2n}}\right)^{\frac{1}{2}}$

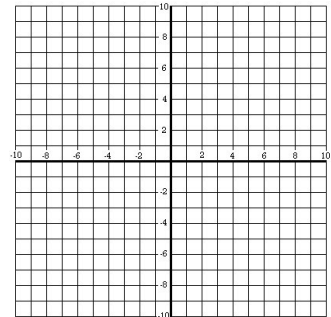
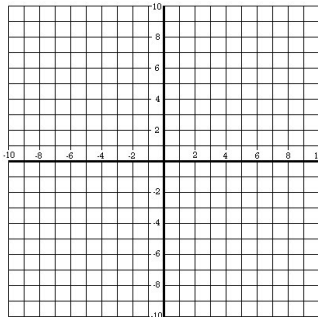
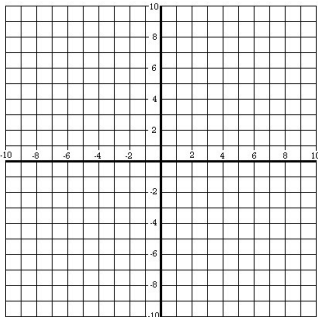
10.  $(3^{-2}x^{-4}y)^{\frac{-1}{2}}$  show answer as radical

**Topic 2: Sketching graphs**

11.  $y = 0.5(2)^x$

12.  $y = -2(0.2)^x$

13.  $y = \log_{10} x$



14. Describe when the function  $f(x) = b^x$  will represent growth or decay.

### Topic 3: Solving for x

15.  $8.5 = x^{\frac{-2}{3}}$

16.  $520 = 20x^{\frac{9}{5}} + 60$

17.  $\frac{1}{5}\sqrt{x^5} = 2.1$

### Topic 4: Extensions and Applications

18. Tom is investing \$400 in an account that earns an APR of 7% interest continuously.
- How much will the account be worth in 10 years?
  - How long until the account is worth a million dollars?

19. Find the projected population of Janesville in 2015 if the population was 142,000 in 1970 and the annual growth rate is 4%

20. Sociologists have found that information spreads among a population at an exponential rate. Suppose that the function  $y = 525(1 - e^{-0.038t})$  models the number of people in a town of 525 people who have heard news within  $t$  hours of its distribution. When will 75% of the population be aware of new information?

21.  $f(x) = 1 \cdot n^x$  and represents exponential growth.  $g(x) = 1 \cdot m^x$  and represents exponential decay.
- Sketch a graph with possible graphs for both  $f(x)$  and  $g(x)$  shown.
  - On your graph, clearly indicate the ordered pair where they must intersect.

Chapter: 11-1 to 11-3

Topic 1: Exponent Rules

1.  $3(2x^2y)(y^2)$

$6x^2y^3$

2.  $(3x^4)^2(x^2)^3$

$9x^8x^6 = 9x^{14}$

3.  $\frac{12x^2y^3}{3xy^5} = \frac{4x}{y^2}$

4.  $(8x^5y)^{-2} = 8^{-2}x^{-10}y^{-2} = \frac{1}{64x^{10}y^2}$

5.  $(3x^2)^0 = 1$

6.  $\frac{16x^{-4}}{8} = \frac{2}{1x^4}$

7.  $\sqrt[3]{x^{12}} = x^{12/3} = x^4$

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

9.  $\left(\frac{b^{2n}}{b^{-2n}}\right)^{1/2}$

$(b^{2n+2n})^{1/2}$

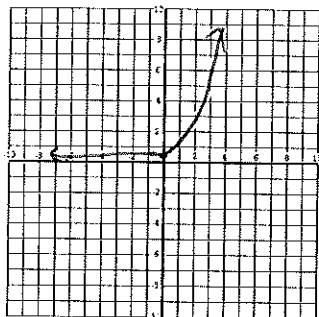
$(b^{4n})^{1/2} = b^{2n}$

10.  $(3^{-2}x^{-4}y)^{1/2}$  show answer as radical

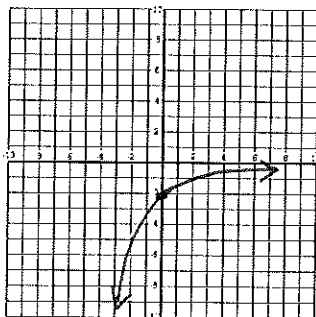
$3^{-1}x^{-2}y^{-1/2} = \frac{3x^2}{y^{1/2}} = \frac{3x^2}{\sqrt{y}}$

Topic 2: Sketching graphs

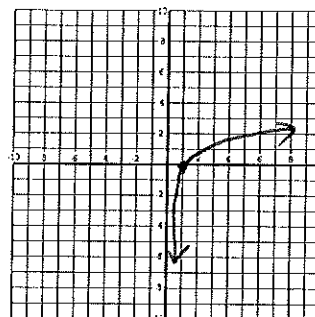
11.  $y = 0.5(2)^x$



12.  $y = -2(0.2)^x$



13.  $y = \log_{10} x$



14. Describe when the function  $f(x) = b^x$  will represent growth or decay.

$b > 1$        $0 < b < 1$

Notebook/Homework Check:

### Topic 3: Solving for x

$$15. (8.5) = (x^{\frac{2}{3}})^{-3/2}$$

$$x = (8.5)^{-3/2} = .04$$

↙ .04

$$16. 520 = 20x^{\frac{3}{5}} + 60$$

$$460 = 20x^{\frac{3}{5}}$$

$$(23) = (x^{\frac{3}{5}})^{\frac{5}{3}}$$

$$5.71 = x$$

$$17. \frac{1}{5} \sqrt{x^5} = 2.1 \cdot 5$$

$$(x^{\frac{5}{2}})^{\frac{2}{5}} = (10.5)^{\frac{2}{5}}$$

$$2.56$$

### Topic 4: Extensions and Applications

18. Tom is investing \$400 in an account that earns an APR of 7% interest continuously.

- How much will the account be worth in 10 years?
- How long until the account is worth a million dollars?

$$1,000,000 = 400e^{.07t}$$

$$\ln 2500 = \ln e^{.07t}$$

$$\frac{7.82}{.07} = \frac{.07t}{.07}$$

$$t = 111.8$$

$$A = 400e^{.07t}$$

$$A = 400e^{.07(10)}$$

$$A = 805.50$$

19. Find the projected population of Janesville in 2015 if the population was 142,000 in 1970 and the annual growth rate is 4%

$$N = 142,000e^{.04(45)}$$

$$2015 - 1970 = 45$$

$$N = 859,049.9$$

20. Sociologists have found that information spreads among a population at an exponential rate. Suppose that the function  $y = 525(1 - e^{-0.038t})$  models the number of people in a town of 525 people who have heard news within  $t$  hours of its distribution. When will 75% of the population be aware of new information?

$$.75(525) = 393.75$$

use 394

$$394 = 525(1 - e^{-0.038t})$$

$$.75 = 1 - e^{-0.038t}$$

$$.25 = e^{-0.038t}$$

$$\ln .25 = -.038t$$

$$t = \frac{\ln .25}{-.038}$$

$$t = 36.5$$

hours

21.  $f(x) = 1 \cdot n^x$  and represents exponential growth.  $g(x) = 1 \cdot m^x$  and represents exponential decay.

- Sketch a graph with possible graphs for both  $f(x)$  and  $g(x)$  shown.
- On your graph, clearly indicate the ordered pair where they must intersect.

