

**Simplify**

1.  $\underline{12x^2y^3}$

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

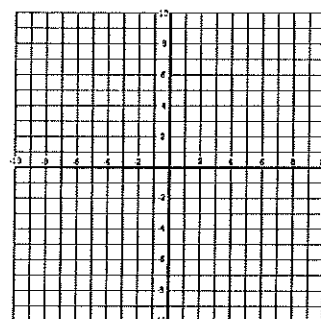
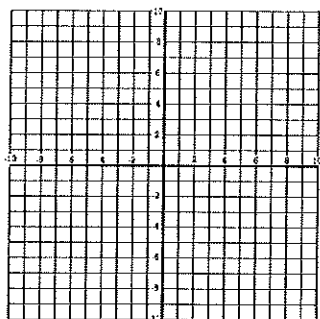
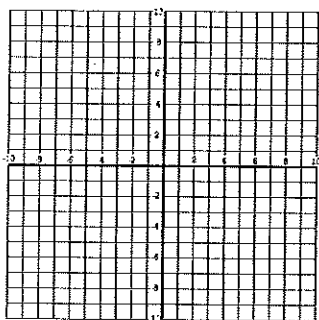
3.  $(3^{-2}x^{-4}y)^{\frac{-1}{3}}$  show answer as radical

**Sketching the graphs below:**

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

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

6.  $y = \log_4 x$



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

8. 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?

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

10. 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?

11. The Loudness,  $L$  in decibels is given by  $L = 10 \log R$  where  $R$  is the relative intensity of the sound.
- A stadium crowd produces a loudness of 90 decibels. What is the relative intensity of each person if there are 15,000 people in the crowd?
  - How many decibels does the sound increase when the relative intensity is doubled?

**Solve for x**

12.  $\log_4(x^2 + 2) + \log_4 4 = \log_4 - 8$

13.  $\log_6 11x - \log_6(x^2 - 3) = \log_6 2$

14.  $5e^{-x} - 7 = 2$

15.  $\ln 5x = 2$

16. Which of the would you type in for  $Y_1$  to graph  $y = \log_2 x$

A.  $y = \frac{\log x}{\log 2}$

B.  $y = \frac{\log 10}{\log 2}$

C.  $y = \frac{\log x}{\log 10}$

D.  $y = \frac{\log 2}{\log x}$

17. State the 30<sup>th</sup> term for the arithmetic sequence for which  $a_1 = 3$  and  $d = 2.5$

18. State the second and third terms for the sequence in the question above.

19. Write a geometric sequence that has 3 geometric means between 256 and 81

20. State the second and third terms for the sequence in the question above.

Use the series  $1 + \frac{1}{1 \cdot 2} + \frac{1}{1 \cdot 2 \cdot 3} + \frac{1}{1 \cdot 2 \cdot 3 \cdot 4} + \dots$  to answer questions 21 – 22

21. Write this series using sigma notation

22. Find the sum of the series

23. Solve  $4\sin^2x - 1 = 0$  for all real values of  $x$ .

24.  $\sum_{n=1}^5 n - 3$

25.  $\sum_{n=0}^4 \frac{1}{2^n}$

26. convert the polar coordinate  $Q(4, \pi/6)$  to rectangular coordinates.

Simplify

\* 1.  $\frac{12x^2y^3}{4x^5y}$   $\frac{3y^2}{x^3}$

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

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

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

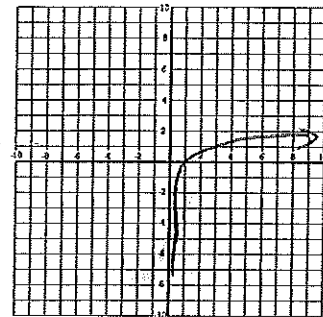
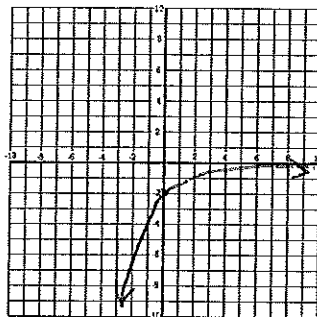
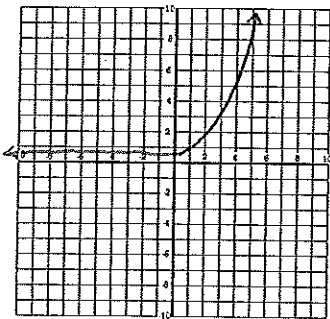
$3^1 x^2 y^{-1/2} = \frac{3x^2}{\sqrt{y}} = \frac{3x^2\sqrt{y}}{y}$

Sketching the graphs below:

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

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

6.  $y = \log_4 x$



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

$b > 1$  growth  
 $0 < b < 1$  decay

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

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

$400e^{0.07t}$

$400e^{0.07(10)} = 805.50$

$1000000 = 400e^{0.07t}$

$t = 111.77$

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

$A = P(1+r)^t$  (not continuous)  
 $A = P(1+0.04)^{45}$   
22,620

$y = 142000e^{-0.04t}$   
 $142000e^{-0.04(45)}$

23472

10. 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?

$\frac{525}{.75} = 393.75$

$393.75 = 525(1 - e^{-0.038t})$

$+0.75 = 1 - e^{-0.038t}$

$-0.25 = -e^{-0.038t}$

$\ln 0.25 = -0.038t$

$36.5 = t$

11. The Loudness,  $L$  in decibels is given by  $L = 10 \log R$  where  $R$  is the relative intensity of the sound.
- A stadium crowd produces a loudness of 90 decibels. What is the relative intensity of each person if there are 15,000 people in the crowd?
  - How many decibels does the sound increase when the relative intensity is doubled?

$$90 = 10 \log R$$

$$9 = \log R$$

$$10^9 = R$$

$$L = 10 \log(10^9 \cdot 2)$$

$$L = 93 \quad \text{increases 3 decibels}$$

Solve for  $x$

12.  $\log_4(x^2 + 2) + \log_4 4 = \log_4 8$

$$\log_4 4(x^2 + 2) = \log_4 8$$

$$x^2 + 2 = 2 \quad x^2 = -4 \quad (x = \pm 2i)$$

13.  $\log_6 11x - \log_6(x^2 - 3) = \log_6 2$

$$\log_6 \frac{11x}{x^2 - 3} = \log_6 2$$

$$11x = 2x^2 - 6$$

$$0 = 2x^2 - 11x - 6$$

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

14.  $5e^{-x} - 7 = 2$

$$e^{-x} = \frac{9}{5}$$

$$-x = .588$$

$$(x = -.588)$$

15.  $\ln 5x = 2$

$$5x = e^2$$

$$(x = 1.48)$$

16. Which of the would you type in for  $Y_1$  to graph  $y = \log_2 x$

(A)  $y = \frac{\log x}{\log 2}$

B.  $y = \frac{\log 10}{\log 2}$

C.  $y = \frac{\log x}{\log 10}$

D.  $y = \frac{\log 2}{\log x}$

17. State the 30<sup>th</sup> term for the arithmetic sequence for which  $a_1 = 3$  and  $d = 2.5$

$$a_{30} = 3 + 2.5(30 - 1) = 75.5$$

18. State the second and third terms for the sequence in the question above.

$$3, 5.5, 8$$

19. Write a geometric sequence that has 3 geometric means between 256 and 81

$$256 \quad \underline{192} \quad \underline{144} \quad \underline{108} \quad 81$$

$$81 = 256 r^{5-1}$$

$$r = 3/4$$

20. State the second and third terms for the sequence in the question above.

$$\underline{dvh}$$

Use the series  $1 + \frac{1}{1 \cdot 2} + \frac{1}{1 \cdot 2 \cdot 3} + \frac{1}{1 \cdot 2 \cdot 3 \cdot 4} + \dots$  to answer questions 21 - 22

21. Write this series using sigma notation

$$\sum_{n=1}^{\infty} \frac{1}{n!}$$

22. Find the sum of the series

$$1.718$$

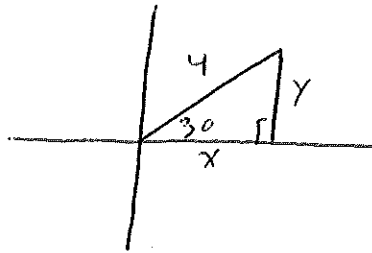
23. Solve  $4\sin^2 x - 1 = 0$  for all real values of  $x$ .

$$(\sin x)^2 = \frac{1}{4} \quad \sin x = \frac{1}{2} \quad x = \sin^{-1}\left(\frac{1}{2}\right) \quad x = 30 \text{ or } 150$$

24.  $\sum_{n=1}^5 n - 3$       0

25.  $\sum_{n=0}^4 \frac{1}{2^n}$       1.9375

26. convert the polar coordinate  $Q(4, \pi/6)$  to rectangular coordinates.  
 $30^\circ$



$$x = 4 \cos 30$$
$$x = 3.5$$

$$y = 4 \sin 30$$
$$y = 2$$