**CUMULATIVE REVIEW**
(Section 6.7 through Chapter 11)

Name _____

**Answer:**

**1.** A group of 9 students are to make a presentation on 3 issues. In how many ways can this assignment be made?

**2.** A traveler can visit 4 of 6 cities. An itinerary for the trip is a list of the 4 cities in the order to be visited. How many different itineraries are there for the trip?

**3.** Expand $(2x + 3)^4$

**4.** Find the 5th term of $(x - 2y)^{12}$

**Simplify:**

**5.** $\sqrt{9x^{10}}$

**6.** $\sqrt[4]{x^{18}y^4}$

**7.** $\dfrac{3}{\sqrt[3]{5}}$

**8.** $\dfrac{\sqrt[3]{192x^8}}{\sqrt[3]{3x}}$

**9.** $\dfrac{4}{3\sqrt{3}-2}$

**10.** $27^{\frac{-2}{3}}$

**Multiply and simplify:**

**11.** $\sqrt[3]{25xy^8} \cdot \sqrt[3]{5x^4y^3}$ **12.** $\left(2x^2r^3\right)^3\left(125x^6m^9\right)^{\frac{2}{3}}$ **13.** $x^{\frac{1}{6}} \cdot x^{\frac{1}{3}}$

**Solve:**

**14.** $7 + \sqrt{2x-1} = 10$ **15.** $(4x + 3)^{\frac{2}{3}} = (16x + 44)^{\frac{1}{3}}$ **16.** $\sqrt{2x-1} = x - 8$

**Let $f(x) = 2x^2 + 3$ and $g(x) = 3x - 1$**

**17.** Find $f(x) - g(x)$

**18.** Find $f(x) \cdot g(x)$

**19.** Find $(f \circ g)(x)$ and $(g \circ f)(x)$

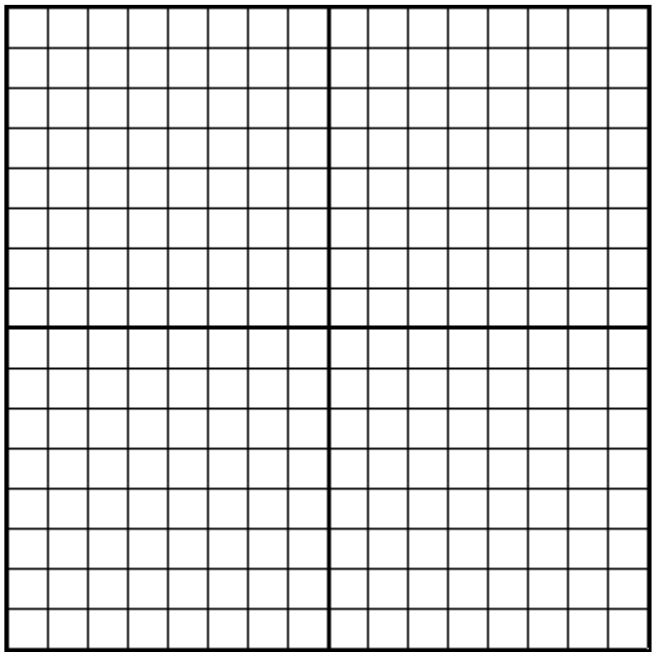
**20.** Find $f(g(2))$ and $g(f(2))$

**21.** Find the inverse of $g(x)$; is the inverse a function?

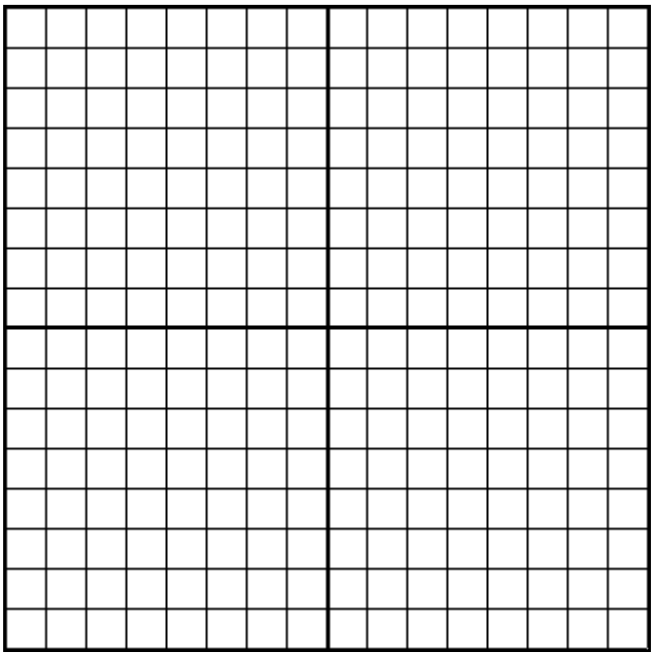
**22.** Find $(g^{-1}(g(10))$

**Graph:**

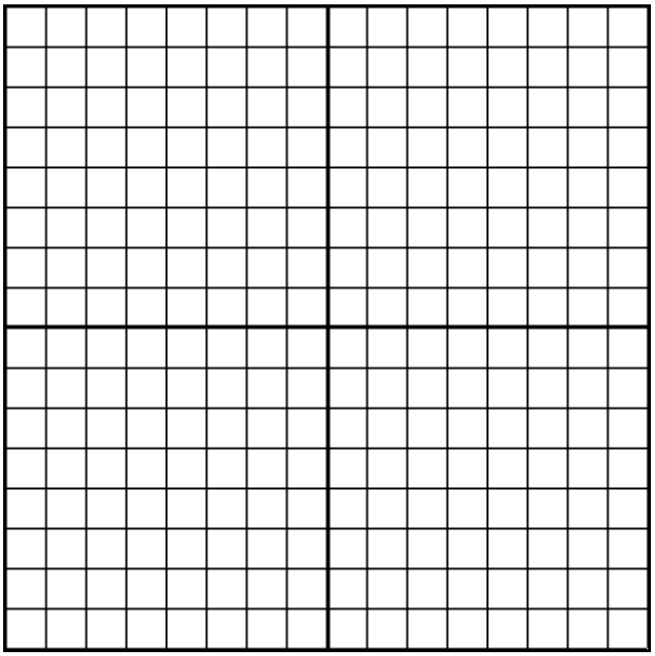
**23.** $y = x^2 - 2$ and its inverse



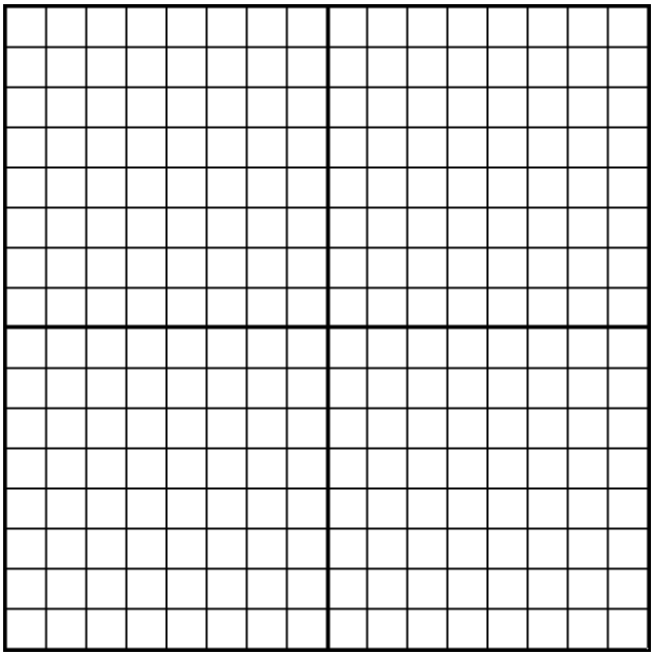
**24.** $y = 3^x$



**25.** $y = \log_4 x$



**26.** $y = \frac{1}{x}$ and $y = -\frac{3}{x}$



**Answer:**

**27.** Find the amount in a continuously compounded account if you invest $950 at an annual rate of 6.5% for 10 years.

**28.** An investment company promises to double your money in 14 years. Assuming continuous compounding of interest, what rate of interest is needed?

**29.** An element has a half-life of 30 hours. Write an exponential function for a 100 mg sample. Find the amount of the element remaining after 50 hours.

**Evaluate; round to nearest ten-thousandths if necessary:**

**30.** $3 \log_3 3 - \log_3 3$ **31.** $\log_9 \frac{1}{3} + 3 \log_9 3$ **32.** $\frac{1}{2} \log_5 1 - 2 \log_5 5$

**33.** $7^{x-3} = 25$ **34.** $6^{3x+1} = 215$

**Solve; round to nearest ten-thousandths if necessary:**

**35.** $\log(x-21)+\log x=2$ **36.** $\ln 3x = 6$ **37.** $e^{3x}=12$

**Do:**

**38.** Suppose $y$ varies directly as $x$ and inversely as the square of $z$. When $x = 35$ and $y = 7$, the values of $z$ is 50. Write the function that models the relationship and find $z$ when $x = 5$ and $y = 1$.

**39.** Identify any holes, or horizontal or vertical asymptotes of the graph.

$$\frac{15x^2-7x-2}{x^2-4}$$

**Simplify:**

**40.** $$\frac{y^2+5y+4}{y^2-49} \div \frac{2y^2+5y-12}{y^2+9y+14}$$

**41.** $$\frac{m}{m+3} - \frac{6m}{m^2-9}$$

**42.** $$\frac{\frac{2y}{2y+1}-1}{1-\frac{2y}{2y-1}}$$

**Solve:**

**43.** $\frac{4}{3x+3} = \frac{12}{x^2-1}$

**44.** $\frac{1}{4x} - \frac{3}{4} = \frac{7}{x}$

**45.** $\frac{3}{x+5} + \frac{-2}{x-5} = \frac{-4}{x^2-25}$

**Identify each conic section as a parabola, circle, ellipse, or hyperbola. Then write each equation in standard form:**

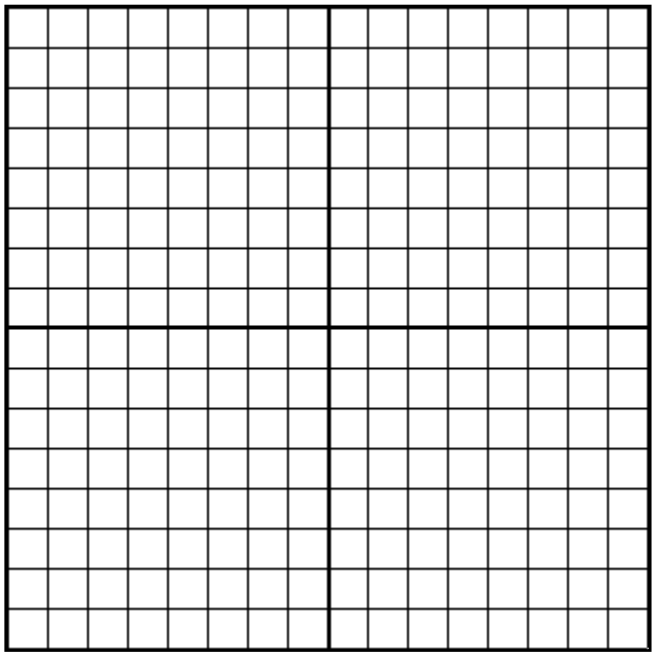
**46.** $y^2 + 2x^2 - 8y + 4x = 12$

**47.** $3x^2 - 6x = 9y^2 + 24$

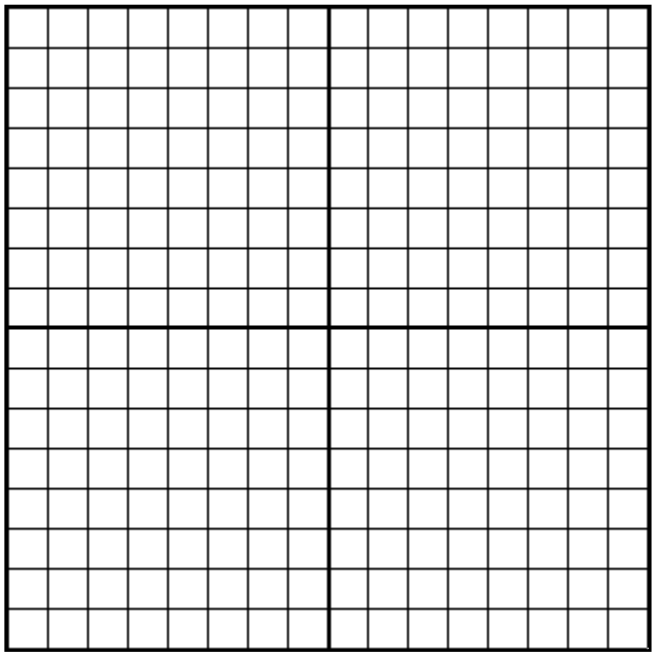
**48.** $7x^2 + 14x - y = 3$

**49.** $y^2 + 2y + x^2 - 6 = 0$

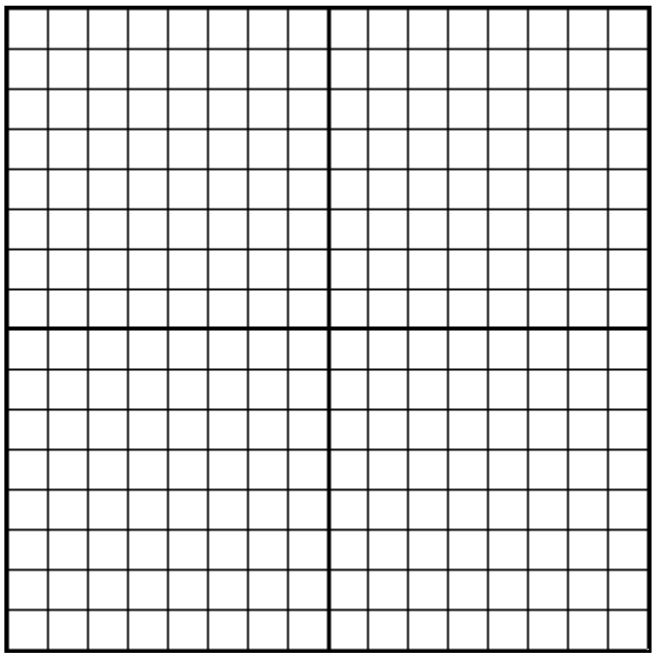
**50. Identify the vertex, focus, and directrix of** $x = -\frac{1}{8}(y-2)^2 + 4$. **Then graph.**



**51.** **Find the foci of the ellipse** $\frac{(x-3)^2}{25}+\frac{(y-2)^2}{16}=1.$ **Then graph.**



**52.** **Find the foci of the hyperbola** $\frac{x^2}{25}-\frac{y^2}{9}=1$**. Then graph.**



**Solve each system of equations:**

**53.**
$$x^2+y^2=25$$
$$3x^2-y^2=11$$

**54.**
$$x^2+y^2=20$$
$$y=x+2$$

**Do:**

**55.** Find the $25^{th}$ term of the arithmetic sequence: 26, 13, 0, -13...

**56.** Is the sequence arithmetic or geometric? Name the next two terms. 2, 1, 0.5, 0.25…

**57.** Identify the sequence as arithmetic or geometric, and then find the common difference or ratio.

15, 30, 45, 60...

**58.** Evaluate: $\sum_{n=3}^{8}(7-n)$

**59.** Find $S_8$: 120 + 60 + 30 + 15 + ...

**60.** Generate the first five terms of the geometric sequence: $a = 5,\ r = -3$

# CUMULATIVE REVIEW ANSWERS
(Section 6.7 through Chapter 11)

**1.** 84

**2.** 360

**3.** $16x^4 + 96x^3 + 216x^2 + 216x + 81$

**4.** $7920x^8y^4$

**5.** $3x^5$

**6.** $x^4y\sqrt{x}$

**7.** $\frac{3\sqrt[3]{25}}{5}$

**8.** $4x^2\sqrt[3]{x}$

**9.** $\frac{12\sqrt{3}+8}{23}$

**10.** $\frac{1}{9}$

**11.** $5xy^3\sqrt[3]{x^2y^2}$

**12.** $200x^{10}r^{15}$

**13.** $x^{\frac{1}{2}}$ or $\sqrt{x}$

**14.** $x = 5$

**15.** $x = \frac{5}{4}$ or $\frac{-7}{4}$

**16.** $x = 13$ (5 is extraneous)

**17.** $2x^2 - 3x + 4$

**18.** $6x^3 - 2x^2 + 9x - 3$

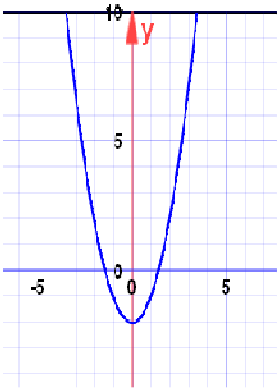
**19.** $18x^2 - 12x + 5$

**20.** $f(g(2)) = 53$ $g(f(2)) = 32$

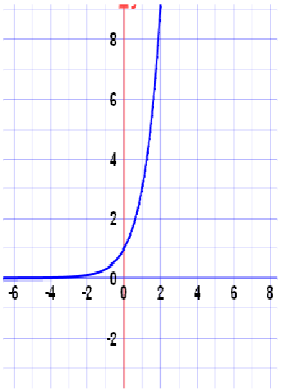
**21.** $g^{-1}(x) = \frac{1}{3}x + \frac{1}{3}$, function

**22.** 10

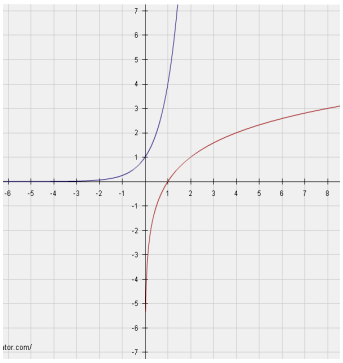
**23.**



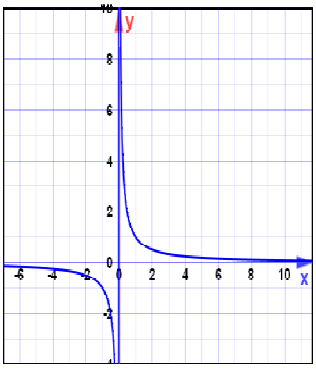

**24.**




**25**



**26**




**27.** A = $1819.76

**28.** rate = .0495 or 4.95%

**29.** $y = 100(.9772)^{hrs}$ ; 31.56 mg

**30.** 2

**31.** 1

**32.** -2

**33.** 4.6542

**34.** .6658

**35.** $x = 25$

**36.** $x = 134.4763$

**37.** $x = .8283$

**38.** $y = \dfrac{500x}{z^2}$; $z = 50$

**39.** No Holes; Horizontal asymptote: $y = 15$
Vertical asymptotes: $x = -2$ *and* $x = 2$;

**40.** $\dfrac{y^2 + 3y + 2}{2y^2 - 17y + 21}$

**41.** $\dfrac{m^2 - 9m}{m^2 - 9}$

**42.** $\dfrac{2y - 1}{2y + 1}$

**43.** $x = 10$

**44.** $x = -9$

**45.** $x = 21$

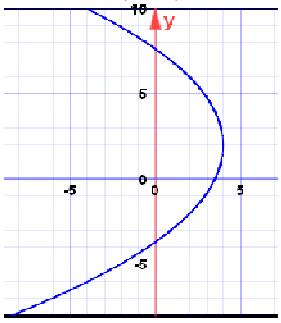
**46.** Ellipse; $\dfrac{(x+1)^2}{15} + \dfrac{(y-4)^2}{30} = 1$

**47.** Hyperbola; $\dfrac{(x-1)^2}{9} - \dfrac{y^2}{3} = 1$

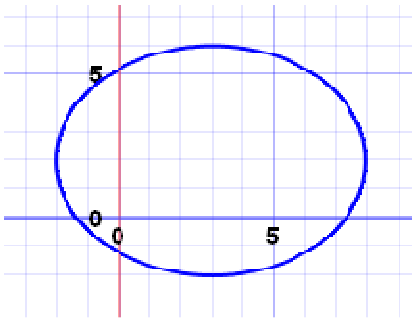
**48.** Parabola; $y = 7(x+1)^2 - 10$

**49.** Circle; $x^2 + (y+1)^2 = 7$

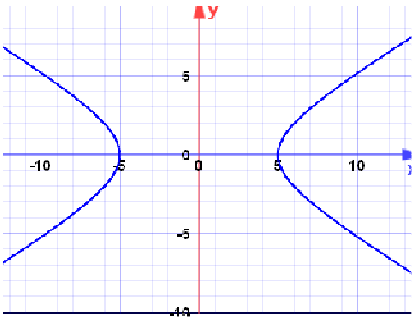
**50.** Vertex: (4, 2); Focus: (2, 2); Directrix: $x = 6$




**51.** Focus: (0, 2), (6, 2)




**52.** Focus: $(\pm\sqrt{34}, 0)$




**53.** {(3, 4), (3, -4), (-3, 4), (-3, -4)}

**54.** {(-4, -2), (2, 4)}

**55.** -286

**56.** Geometric; 125, .0625

**57.** d =15

**58.** 9

**59.** 239.0625

**60.** 5, -15, 45, -135, 405