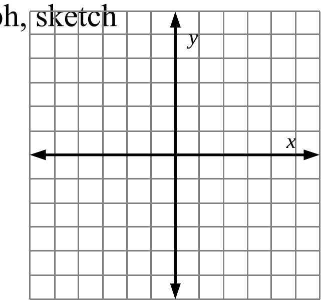
Pre-Calculus

Name ___________________________

Chapter 1

1. Given the following function, state the equation of the parent graph, sketch the graph, and describe the transformation completely.

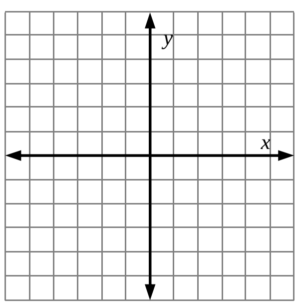
   $f(x) = -2\sqrt{x+3} + 5$

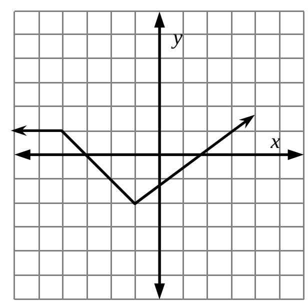


2. Given $f(x) = 2x - 5$ and $g(x) = \sqrt{x+5}$ find:

   a. $g(f(x))$ b. $g^{-1}(x)$

3. Given the graph of $f(x)$ at right, sketch $-2f(x) + 1$.



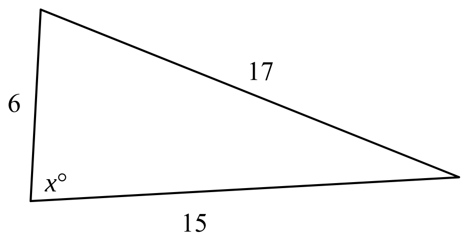


4. Find the equation for the perpendicular bisector of $\overline{AB}$ given $A(-3, 7)$ and $B(5, 11)$. Write your answer in point-slope form.

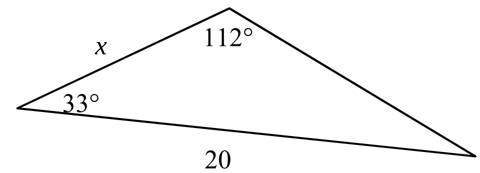
5. Find the length of $\overline{AB}$ in the previous problem. Express your answer in simply radical form.

6. Solve for the missing value of x in each triangle below.

a.



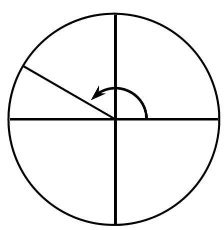
b.



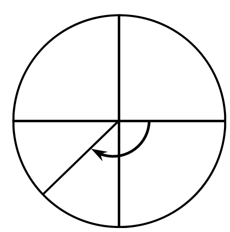
7. Find the area of the triangle in part (a) of the previous problem.

8. Find the special angle in each circle below.

a.



b.



9. a. Convert 235° to radians.

b. Convert 3.2 radians to degrees.

10. Simplify. $\dfrac{\left(\sqrt[3]{x^2y}\right)^6}{x^{-3}y^5}$

11. Factor completely. $5x^5 - 125xy^4$

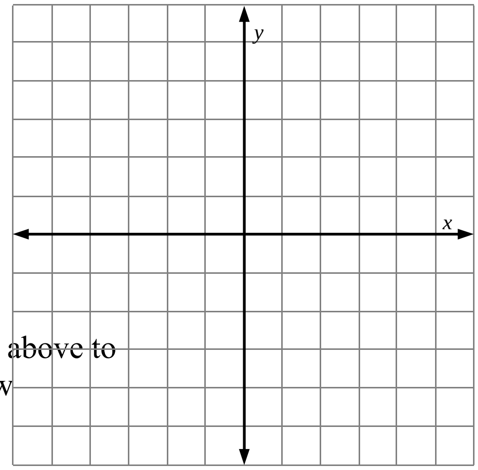
12. Solve. $x^2 + 12x = -27$

Pre-Calculus

Name ___________________________

Chapter 2

1. Graph $g(x) = \begin{cases} x^2 - 3 & \text{for } x \le 2 \\ -x + 6 & \text{for } x > 2 \end{cases}$.



2. How could you change the linear function in $g(x)$ above to make $g(x)$ a continuous function? Write your new function and explain why you know it continuous.

3. Given $j(x) = g(x-3) + 4$ (as defined above), find the piecewise defined function that represents $j(x)$.

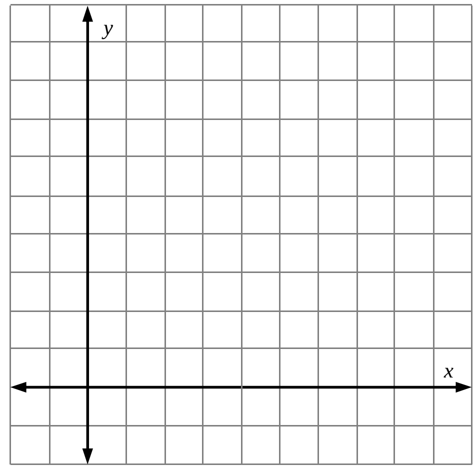
4. Expand.

$$\sum_{m=2}^{7} (\sqrt{2m-1})(-1)^m$$

5. Write the expression using summation notation.

$$\frac{1}{2} + \frac{3}{4} + \frac{5}{6} + \ldots + \frac{99}{100}$$

6. Write the sigma notation to find $A(f(x)=2\sqrt{x+1},\ 1\le x\le 4)$ using 6 midpoint rectangles. Then calculate the sum.



7. Given that $A(f(x), 2\le x\le 5)=21$ and $g(x)=f(x-3)+4$, find the corresponding area under the curve for $g(x)$ and state the corresponding domain.

8. Simplify.

a. $\frac{5}{x-2}-\frac{2x+1}{x-3}$

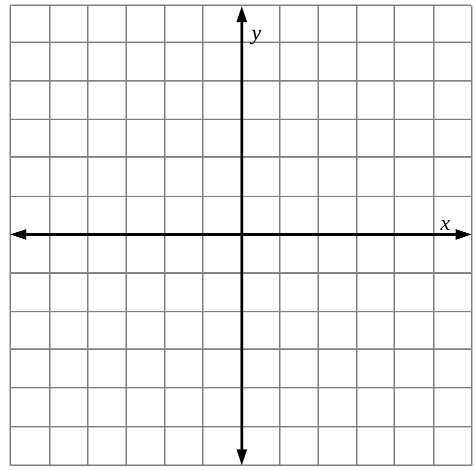
b. $\frac{6m^2-24}{m^2+5m-14}\cdot\frac{3m^2-14m+15}{3m^2-9m-30}$

Pre-Calculus

Name ___________________________

Chapter 3

1. Graph $f(x) = 2 - \log_2(x+3)$.



2. Find the inverse of $f(x) = \frac{-2x}{4x+3}$.

3. How are the quantities $\log_h g$ and $\log_h\left(\frac{1}{g}\right)$ related?

4. Simplify each expression.

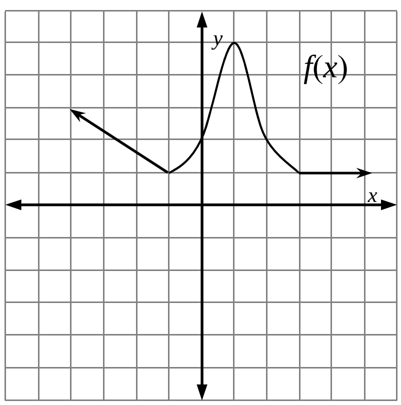
   a. $\log_{12} 9 + \log_{12} 16x - 2\log_{12} x$

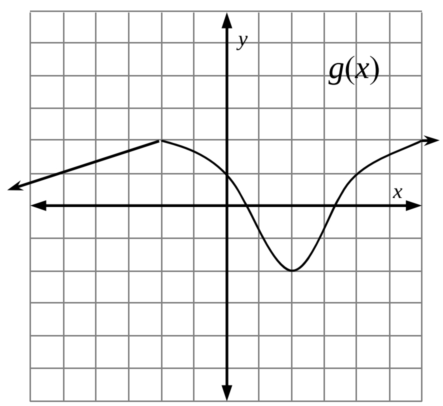
   b. $\frac{x^{-2}y^3}{2-y^{-3}}$

5. Solve. $5.4(x)^{2.8} - 3.1 = 12.9$

6. Rewrite $5(3)^{2x-4}$ in $a \cdot b^x$ form.

7. Given the graphs of $f(x)$ and $g(x)$ below, write an expression for $g(x)$ in terms of $f(x)$.





8. Sandy decided to do an experiment with a sandwich she left in her locker. She found it 3 days after she had put it there, took it to the lab, and counted 41 bacteria. 2 days later she counted 153 bacteria. She estimates that it will take 400 bacteria to completely cover her sandwich. How many days would it take this to happen, starting from the day she first put her sandwich in her locker?

Pre-Calculus

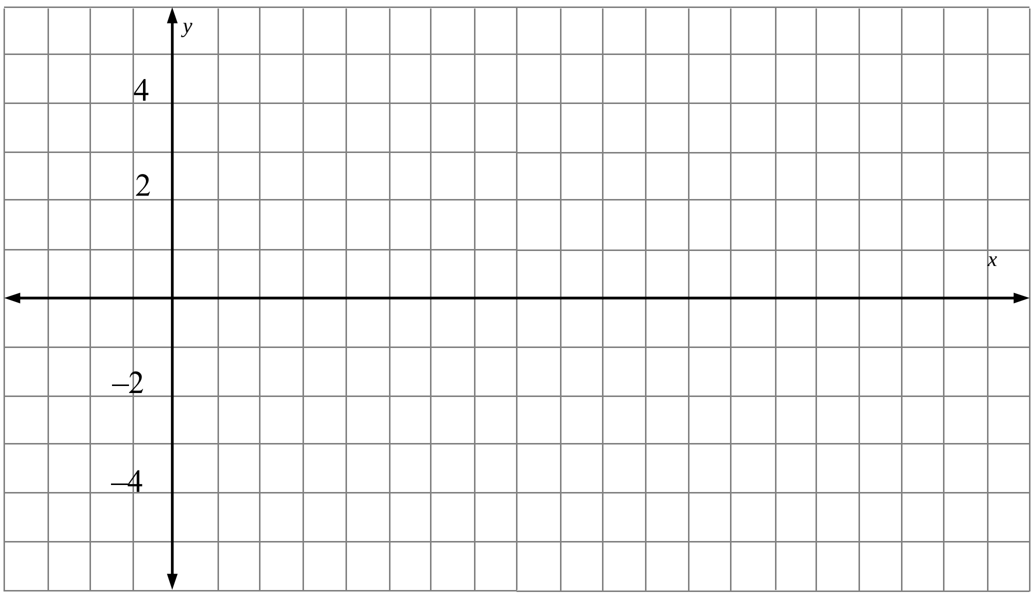
Name ___________________________

Chapter 4

1. Evaluate each trig expression.

   a. $\sin\left(\frac{81\pi}{4}\right)$ b. $\tan\left(-\frac{11\pi}{3}\right)$ c. $\sec\left(\frac{17\pi}{6}\right)$

2. Graph $y = 2 - 3\sin\left(\frac{\pi}{3}x - \pi\right)$. State the amplitude, period, and any transformations of the function.



3. If $\sec\theta < 0$ and $\tan\theta > 0$, in which quadrant does θ lie? Explain your reasoning.

4. Given $f(x) = 3x^2 - 6x$, write the summation notation you would use to approximate $A(f(x), 0 \le x \le 4$ using 8 left-endpoint rectangles.

5. Solve.

$$\begin{cases} \frac{6}{x} + \frac{3}{y} = 2 \\ \frac{2}{x} + \frac{9}{y} = 4 \end{cases}$$

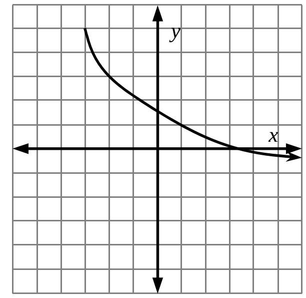
6. Simplify.

a. $\sqrt[3]{250x^8y^4}$

b. $\log_8 \left(\frac{1}{4}\right)$

c. $\frac{6^{\sqrt{8}} \cdot 6^{\sqrt{2}}}{6^{3\sqrt{2}}}$

Chapter 1 Test Answers

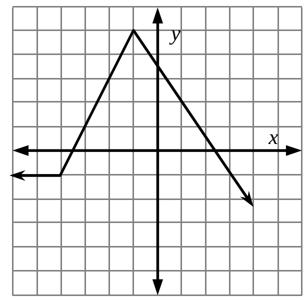


1. See graph at right.

Parent graph is $f(x) = \sqrt{x}$.

Vertical flip, vertical stretch by a factor of 2, left 3 units, up 5 units.

2. a. $g(f(x)) = \sqrt{2x}$ b. $g^{-1}(x) = x^2 - 5$



3. See graph at right.

4. $y - 9 = -2(x - 1)$

5. $AB = 4\sqrt{5}$

6. a. $x = 98.95^\circ$ b. $x = 12.37$

7. $\approx 44.45\ \text{u}^2$

8. a. $\frac{2\pi}{3}$ b. $-\frac{3\pi}{4}$

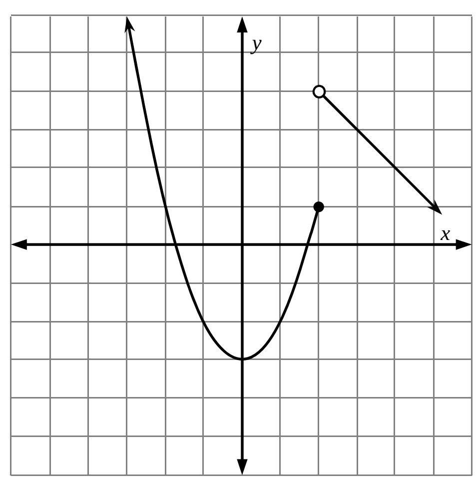
9. a. $\frac{47\pi}{36}$ b. $\frac{576}{\pi}^\circ \approx 183.35^\circ$

10. $\frac{x^7}{y^3}$

11. $5x(x^2 + 5y^2)(x^2 - 5y^2)$

12. $x = -9, -3$

Chapter 2 Test Answers



1. See graph at right.

2. Shift it down 3 units: $-x + 3$

3. $j(x) = \begin{cases} (x-3)^2 + 1 & x \le 5 \\ -x + 13 & x > 5 \end{cases}$

4. $\sqrt{3}, -\sqrt{5}, \sqrt{7}, -\sqrt{9}, \sqrt{11}, -\sqrt{13}$

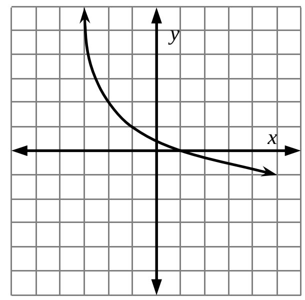
5. $\sum_{n=1}^{50} \frac{2n-1}{2n}$

6. $\sum_{x=0}^{5}\left(0.5\left(2\sqrt{0.5x+2.25}\right)\right)=\sum_{x=1}^{6}\left(0.5\left(2\sqrt{0.5x+1.75}\right)\right)\approx 11.139$

7. 33 units^2; $5 \le x \le 8$

8. a. $\frac{-2x^2+8x-13}{(x-3)(x-2)}$ b. $\frac{2(3m-5)(m-3)}{(m+7)(m-5)}$

Chapter 3 Test Answers



1. See graph at right.

2. $f^{-1}(x)=\frac{-3x}{4x+2}$

3. They are opposites.

4. a. $2-\log_{12} x$ b. $\frac{y^6}{2y^3x^2-x^2}$

5. $x \approx 1.474$

6. $\left(\frac{5}{81}\right)(9)^x$

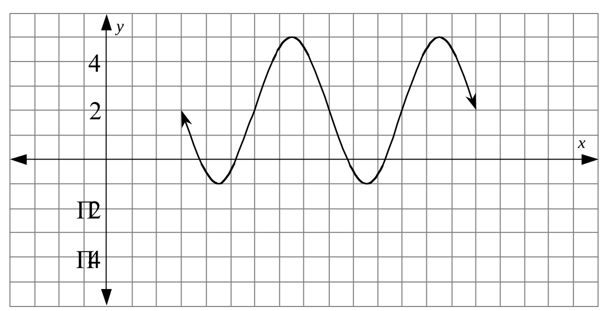
7. $g(x)=-f(\frac{1}{2}x)+3$

8. $x \approx 6.5$ days

Chapter 4 Test Answers

1. a. $\frac{\sqrt{2}}{2}$ b. $\sqrt{3}$ c. $-\frac{2\sqrt{3}}{3}$

2. amp = 3, period = 6, vertical flip, up 2 units, right 3 units



3. $\sec\theta<0 \Rightarrow \frac{1}{\cos\theta}<0 \Rightarrow \cos\theta<0$ This is in quadrants 2 and 3.
$\tan\theta>0$ This is when $\sin\theta$ and $\cos\theta$ have the same sign, which is in quadrants 1 and 3.
Therefore, $\sec\theta<0$ and $\tan\theta>0$ in Quadrant 3.

4. $\sum_{x=0}^{7}\left(0.5\left(3(0.5x)^2-6(0.5x)\right)\right)$

5. $x=8,\ y=\frac{12}{5}$

6. a. $5x^2y\sqrt[3]{2x^2y}$ b. $x=-\frac{2}{3}$ c. 1