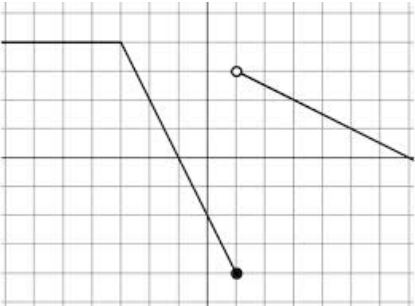


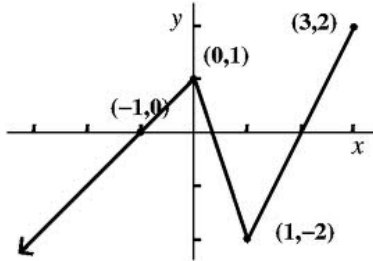
**Algebra II Honors - Midterm Exam Review**  
**\*\*All questions are NO CALCULATOR, unless specified.\*\***

**Chapter 1**

<p><b>1.</b> For the function <math>y = -x^2 - 6x - 7</math>, find the vertex and axis of symmetry.</p> <p>Ⓐ vertex (3, -2); axis of symmetry <math>x = 3</math></p> <p>Ⓑ vertex (-3, 2); axis of symmetry <math>x = 4</math></p> <p>Ⓒ vertex (-3, 2); axis of symmetry <math>x = -3</math></p> <p>Ⓓ vertex (3, -2); axis of symmetry <math>x = -4</math></p>	<p><b>2.</b> If the graph of <math>y = ax^2 + bx + c</math> opens down, which of the following must be true?</p> <p>Ⓐ <math>a &lt; 0</math>                      Ⓑ <math>a &gt; 0</math></p> <p>Ⓒ <math>c &lt; 0</math>                      Ⓓ <math>c &gt; 0</math></p>
<p><b>3.</b> Which function does <i>not</i> have a maximum value?</p> <p>Ⓐ <math>y = -x^2 - 5x - 6</math></p> <p>Ⓑ <math>y = -x^2 - x - 6</math></p> <p>Ⓒ <math>y = 3x^2 - 15x + 2</math></p> <p>Ⓓ <math>y = 49 - x^2</math></p>	<p><b>4.</b> What is the vertex of <math>y = -3(x - 2)^2 - 4</math>?</p> <p>Ⓐ (-2, -4)                      Ⓑ (-2, 4)</p> <p>Ⓒ (2, -4)                      Ⓓ (2, 4)</p>
<p><b>5.</b> What are the <math>x</math>-intercepts of <math>y = -2(x - 7)(x + 2)</math>?</p> <p>Ⓐ -7 and 2                      Ⓑ 7 and -2</p> <p>Ⓒ 14 and -4                      Ⓓ 14 and -2</p>	<p><b>6.</b> Factor the expression <math>m^2 - 4m - 21</math>.</p> <p>Ⓐ <math>(m - 7)(m - 3)</math>    Ⓑ <math>(m - 7)(m + 3)</math></p> <p>Ⓒ <math>(m + 7)(m - 3)</math>    Ⓓ <math>(m + 7)(m + 3)</math></p>
<p><b>7.</b> Which value of <math>c</math> makes the expression <math>x^2 - 5x + c</math> a perfect square trinomial?</p> <p>Ⓐ <math>-\frac{5}{2}</math>                      Ⓑ <math>\frac{5}{2}</math></p> <p>Ⓒ <math>\frac{25}{4}</math>                      Ⓓ 25</p>	<p><b>8.</b> What are the roots of the equation <math>z^2 + 11z - 42 = 0</math>?</p> <p>Ⓐ -3, -14                      Ⓑ 3, -14</p> <p>Ⓒ -3, 14                      Ⓓ 3, 14</p>
<p><b>9.</b> Factor the expression <math>8x^2 + 28x + 12</math>.</p> <p>Ⓐ <math>2(x + 2)(4x + 3)</math></p> <p>Ⓑ <math>2(x + 3)(2x + 1)</math></p> <p>Ⓒ <math>4(x + 1)(2x + 3)</math></p> <p>Ⓓ <math>4(x + 3)(2x + 1)</math></p>	<p><b>10.</b> Simplify the expression <math>\frac{2}{2 + \sqrt{3}}</math></p> <p>Ⓐ <math>\frac{4}{13}</math>                      Ⓑ 2</p> <p>Ⓒ <math>4 - 2\sqrt{3}</math>                      Ⓓ <math>\frac{4 - 2\sqrt{3}}{-5}</math></p>
<p><b>11.</b> What are the solutions of the equation <math>w^2 = -9w</math>?</p> <p>Ⓐ -9, 3                      Ⓑ 0, -9</p> <p>Ⓒ 0, 9                      Ⓓ 1, 9</p>	<p><b>12.</b> What are the solutions of <math>23 = 2(x - 3)^2 + 7</math>?</p> <p>Ⓐ <math>\pm 3</math>                      Ⓑ <math>3 \pm 2\sqrt{2}</math></p> <p>Ⓒ <math>\pm 2\sqrt{2}</math>                      Ⓓ <math>6 \pm 4\sqrt{2}</math></p>

<p><b>13.</b> What are the solutions of <math>-3 - y^2 = 24</math>?</p> <p>Ⓐ <math>\pm 3\sqrt{3}</math>                      Ⓑ <math>\pm 3i\sqrt{3}</math>  Ⓒ <math>\pm 9\sqrt{3}</math>                        Ⓓ <math>\pm 9i\sqrt{3}</math></p>	<p><b>14.</b> What is the standard form of the expression <math>\frac{i}{2+i}</math>?</p> <p>Ⓐ <math>\frac{1}{2}i+1</math>                      Ⓑ <math>\frac{2}{3}i-1</math>  Ⓒ <math>\frac{i}{2}+1</math>                        Ⓓ <math>\frac{2}{5}i+\frac{1}{5}</math></p>
<p><b>15.</b> What is the vertex of <math>y = 3x^2 - 30x + 77</math>?</p> <p>Ⓐ <math>(-5, -2)</math>                      Ⓑ <math>(-5, 2)</math>  Ⓒ <math>(5, -2)</math>                        Ⓓ <math>(5, 2)</math></p>	<p><b>16.</b> What is the value of <math>c</math> if the discriminant of <math>-2x^2 - 3x + c</math> is 41?</p> <p>Ⓐ <math>-4</math>                                Ⓑ <math>4</math>  Ⓒ <math>\frac{11}{2}</math>                                Ⓓ <math>\frac{25}{4}</math></p>
<p><b>17.</b> How many real number solutions does the equation <math>7x^2 - 5x + 1 = 0</math> have?</p>	<p><b>18.</b> A rectangular garden is 25 feet long by 10 feet wide. You have enough mulch to cover 1000 square feet.</p> <p><b>a.</b> You would like to extend both the length and the width of the garden by <math>x</math> feet to use up all of the mulch. Write an equation to represent the area of the new garden.</p> <p><b>b.</b> Solve the equation from part (a).</p> <p><b>c.</b> Which solution do you have to reject? <i>Explain.</i></p>
<p><b>19.</b> Graph the function <math>y = x^2 - 2x + 1</math>. Label the vertex and the axis of symmetry.</p>	<p><b>20.</b> Tell whether the function <math>y = x^2 - 5x + 6</math> has a <i>minimum value</i> or a <i>maximum value</i>. Then find that value.</p>
<p><b>21.</b> Graph the function <math>y = 2(x - 1)^2</math>. Label the vertex and the axis of symmetry.</p>	<p><b>22.</b> Graph the function <math>y = -(x + 2)(x - 2)</math>. Label the vertex, the axis of symmetry and the <math>x</math>-intercepts.</p>
<p><b>23.</b> Write the quadratic function <math>y = 2(x + 3)(x - 1)</math> in standard form.</p>	<p><b>24.</b> Write the quadratic function <math>y = 5(x - 2)^2 - 5</math> in standard form.</p>
<p><b>25.</b> Determine which number sets each quantity belongs to.</p> <p>a. 4.35            b. <math>\sqrt{49}</math>            c. <math>-\frac{3}{4}</math>            d. <math>\pi</math></p>	<p><b>26.</b> State the domain and the range of each function in interval notation.</p> 

27. State the domain and the range of each function in interval notation.



28. Write the equation of the parabola with the given vertex and point.

vertex  $(-3, 1)$  passing through  $(2, -4)$

## Chapter 2

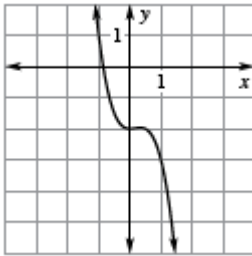
1. What is the simplified form of  $\frac{8a^2bc^{-1}}{12ab^3c}$ ?

- Ⓐ  $\frac{2ab^2c^2}{3}$       Ⓑ  $\frac{2a}{3b^2c^2}$   
 Ⓒ  $\frac{2a}{3b^2}$       Ⓓ  $\frac{2a}{3bc}$

2. What is  $(3.2 \times 10^5)(1.4 \times 10^{-2})$  written in scientific notation?

- Ⓐ  $4.48 \times 10^3$       Ⓑ  $4.48 \times 10^7$   
 Ⓒ  $44.8 \times 10^3$       Ⓓ  $44.8 \times 10^7$

3. Which equation is the graph of the polynomial function shown?



- Ⓐ  $f(x) = -2x^3 + x^2 - 2$   
 Ⓑ  $f(x) = 3x^4 - x^2 + 1$   
 Ⓒ  $f(x) = x^3 - x + 7$   
 Ⓓ  $f(x) = -2x^4 + x^2 - 1$

4. What is the degree of the polynomial  $h(t) = -8t^2 + 5 - 3t^3$ ?

- Ⓐ 1      Ⓑ 2      Ⓒ 3      Ⓓ 4

5. What is the greatest common monomial factor of  $9x^3y^2 + 15x^2y - 6xy^2$ ?

- Ⓐ  $3x^2$       Ⓑ  $3y^2$   
 Ⓒ  $3xy$       Ⓓ  $3x^2y^2$

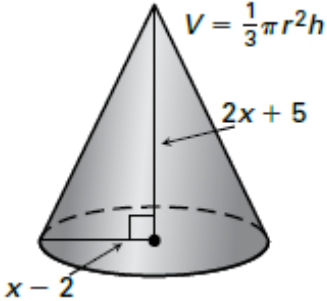
6. Given  $f(x) = 3x - 5$  evaluate  $f^{-1}(0)$ .

7. What is the *complete* factorization of  $3x^4 - 3x^2$ ?

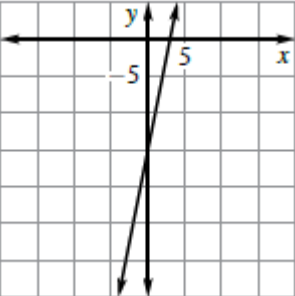
- Ⓐ  $3x^2(x^2 - 1)$   
 Ⓑ  $3x^2(x - 1)(x + 1)$   
 Ⓒ  $3x(x - 1)(x + 1)$   
 Ⓓ  $3(x^4 - x^2)$

8. If  $x + 3$  is a factor of  $x^3 - x^2 - 17x - 15$ , what is another factor?

- Ⓐ  $x + 1$       Ⓑ  $x - 1$   
 Ⓒ  $x + 5$       Ⓓ  $x - 3$

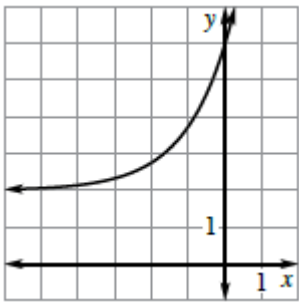
<p><b>9.</b> If <math>x - 2</math> is a factor of a polynomial <math>f(x)</math>, which of the following statements does not have to be true?</p> <p>Ⓐ <math>f(2) = 0</math></p> <p>Ⓑ <math>f(-2) = 0</math></p> <p>Ⓒ 2 is a root of <math>f(x)</math>.</p> <p>Ⓓ 2 is a zero of <math>f(x)</math></p>	<p><b>10.</b> Which is not a possible rational solution of <math>f(x) = 3x^3 - 11x^2 + 5x - 6</math>?</p> <p>Ⓐ <math>\pm \frac{1}{2}</math>                      Ⓑ <math>\pm \frac{2}{3}</math></p> <p>Ⓒ <math>\pm 2</math>                         Ⓓ <math>\pm 6</math></p>
<p><b>11.</b> How many zeros does <math>0 = -7m^3 - m^4 + 1</math> have?</p>	<p><b>12.</b> Use direct substitution to evaluate <math>2x^3 - 4x^2 + 8x - 3</math> for <math>x = -2</math></p>
<p><b>13.</b> Use synthetic substitution to evaluate <math>4x^4 - 2x^3 - 3x^2 + 3x</math> for <math>x = 2</math>.</p>	<p><b>14.</b> Graph <math>f(x) = -x^4 + 1</math>.</p>
<p><b>15. Perform the indicated operation.</b> <math>(x + 4)^2 (x - 2)</math></p>	<p><b>16. Perform the indicated operation.</b> <math>(x^3 + 2x - 1) - (2x^2 + 4x - 2)</math></p>
<p><b>17. Factor the polynomial completely using any method.</b> <math>x^3 + 3x^2 + x + 3</math></p>	<p><b>18. Divide.</b> <math>(x^3 - 4x^2 - 2x + 3) \div (x + 1)</math></p>
<p><b>19. Find all real zeros of <math>f(x) = x^3 - 7x - 6</math>.</b></p>	<p><b>20. Graph the function <math>f(x) = (x + 1)^2(x + 4)</math>.</b></p>
<p><b>21. Identify the end behavior for each of the following.</b></p> <p>a. <math>f(x) = -3x^4 + 3x^2 + 1</math>    b. <math>f(x) = 5x(3x - 1)^2</math></p>	<p><b>22.</b> Which polynomial represents the volume of the cone shown?</p>  <p>Ⓐ <math>\frac{2\pi}{3}x^3 - \pi x^2 - 4\pi x + \frac{20\pi}{3}</math></p> <p>Ⓑ <math>\frac{20\pi}{3}x^2 + \frac{\pi x}{3} - \frac{10\pi}{3}</math></p> <p>Ⓒ <math>\frac{-\pi x^2}{3} 4\pi x + \frac{20\pi}{3}</math></p> <p>Ⓓ <math>\frac{4\pi x^3}{3} + 4\pi x^2 - 5\pi x - \frac{50\pi}{3}</math></p>

### Chapter 3

<p>1. What is the value of <math>(-243)^{3/5}</math>?</p> <p>Ⓐ -27                      Ⓑ -3 Ⓒ 3                            Ⓓ 27</p>	<p>2. What is the solution to <math>3x^5 + 350 = -379</math>?</p> <p>Ⓐ <math>-\frac{729}{\sqrt[5]{3}}</math>                      Ⓑ -3 Ⓒ 3                              Ⓓ <math>\frac{729}{\sqrt[5]{3}}</math></p>
<p>3. Which expression is the simplest form of <math>4\sqrt[3]{32} - \sqrt[3]{32}</math>?</p> <p>Ⓐ <math>3\sqrt[3]{4}</math>                      Ⓑ <math>6\sqrt[3]{4}</math> Ⓒ 6                              Ⓓ <math>16\sqrt[3]{2} - 4</math></p>	<p>4. What is the simplified expression of the length of the triangle's hypotenuse?</p> <p><math>3x^{1/2}</math></p> <p><math>2x^{3/2}</math></p> <p>Ⓐ <math>\sqrt{2x^{3/2} + 3x^{1/2}}</math>                      Ⓑ <math>2x^{3/2} + 3x^{1/2}</math> Ⓒ <math>\sqrt{4x^3 + 9x}</math>                              Ⓓ <math>4x^3 + 9x^2</math></p>
<p>5. What is the simplified form of <math>-z^2\sqrt{16z^3} + 3\sqrt{36z^7}</math>?</p> <p>Ⓐ <math>-z^3\sqrt{z}</math>                      Ⓑ <math>14z^3\sqrt{z}</math> Ⓒ <math>14z^4\sqrt{z}</math>    Ⓓ <math>92z^3\sqrt{z}</math></p>	<p>6. If <math>h(t) = t^{2/3} - 9</math> and <math>j(t) = 3t + 5t^{2/3}</math>, what is <math>h(t) - j(t)</math>?</p> <p>Ⓐ <math>-4t^{2/3} - 3t - 9</math>                      Ⓑ <math>4t^{2/3} + 3t + 9</math> Ⓒ <math>3t + 6t^{4/3}</math>                              Ⓓ <math>-7t^{7/3} - 9</math></p>
<p>7. What is <math>g(f(x))</math> if <math>f(x) = 3x^2</math> and <math>g(x) = 2x^{1/2}</math>?</p> <p>Ⓐ <math>x\sqrt{6}</math>                              Ⓑ <math>2 x \sqrt{3}</math> Ⓒ <math>6\sqrt{x}</math>                              Ⓓ <math>6x</math></p>	<p>8. Given <math>u(x) = \sqrt{4x-1}</math> and <math>v(x) = x - 5</math> what is the domain of <math>u(v(x))</math>?</p> <p>Ⓐ All real numbers                      Ⓑ <math>x \geq 0</math> Ⓒ <math>x \geq \frac{1}{4}</math>                                      Ⓓ <math>x \geq \frac{21}{4}</math></p>
<p>9. Which function represents the inverse of the graph shown?</p>  <p>Ⓐ <math>y = -5x + 3</math>                      Ⓑ <math>y = \frac{1}{5}x - 3</math> Ⓒ <math>y = \frac{1}{5}x + 3</math>                              Ⓓ <math>y = 5x + 3</math></p>	<p>10. What is the inverse of the power function <math>g(t) = -\frac{8}{27}t^3</math>?</p> <p>Ⓐ <math>h(t) = -\frac{2}{3}\sqrt[3]{t}</math>                      Ⓑ <math>h(t) = -\frac{8}{27}\sqrt[3]{t}</math> Ⓒ <math>h(t) = -\frac{3}{2}\sqrt[3]{t}</math>                              Ⓓ <math>h(t) = -\frac{3}{2}t</math></p>

<p><b>11.</b> Which of the following pairs of functions are <i>not</i> inverses of one another?</p> <p>Ⓐ <math>u(x) = x - 2; v(x) = x + 2</math></p> <p>Ⓑ <math>u(x) = 5x - 1; v(x) = \frac{1}{5}x + \frac{1}{5}</math></p> <p>Ⓒ <math>u(x) = x^3 + 1; v(x) = \sqrt[3]{x} - 1</math></p> <p>Ⓓ <math>u(x) = \sqrt{x-2}; v(x) = x^2 + 2</math></p>	<p><b>12.</b> The graph of <math>y = \sqrt{x}</math> is shifted 2 units up and 3 units to the left. Which is the equation of the translated function?</p> <p>Ⓐ <math>y = \sqrt{x-2} - 3</math></p> <p>Ⓑ <math>y = \sqrt{x+2} - 3</math></p> <p>Ⓒ <math>y = \sqrt{x+2} + 3</math></p> <p>Ⓓ <math>y = \sqrt{x+3} + 2</math></p>
<p><b>13.</b> What are the domain and range of the function <math>y = 5\sqrt{x-2}</math> ?</p> <p>Ⓐ Domain: all real numbers; range: all real numbers</p> <p>Ⓑ Domain: <math>x \geq 2</math>; range: all real numbers</p> <p>Ⓒ Domain: all real numbers; range: <math>y \geq 0</math></p> <p>Ⓓ Domain: <math>x \geq 2</math>; range: <math>y \geq 0</math></p>	<p><b>14.</b> What is (are) the solution(s) to <math>x - 2 = \sqrt{2x-1}</math>?</p> <p>Ⓐ <math>x = 1</math>                      Ⓑ <math>x = 5</math></p> <p>Ⓒ <math>x = 1</math> and <math>5</math>              Ⓓ No solution</p>
<p><b>15.</b> Solve <math>(x - 5)^{2/3} - 2 = 2</math>?</p>	<p><b>16.</b> Evaluate <math>-27^{4/3}</math> without using a calculator.</p>
<p><b>17.</b> Verify that <math>f</math> and <math>g</math> are inverse functions.</p> $f(x) = 2x + 5, g(x) = \frac{x-5}{2}$	<p><b>18.</b> Find the inverse of the function.</p> $f(x) = \frac{2x+5}{3}$
<p><b>19.</b> Graph the function. Then state the domain and range.</p> $y = 2\sqrt{x+2} - 2$	<p><b>20.</b> Graph the function. Then state the domain and range.</p> $y = \frac{1}{2}\sqrt[3]{x+3} - 1$
<p><b>21.</b> Solve the equation.</p> $4 = \sqrt[3]{2x-8}$	<p><b>22.</b> Solve the equation.</p> $x + 2 = \sqrt{28-x}$
<p><b>23.</b> Solve the equation.</p> $\sqrt{3x+5} = \sqrt{4x-2}$	<p><b>24.</b> Let <math>f(x) = 2x^3 - 5</math> and <math>g(x) = 3x^2</math>. Perform the indicated operation and state the domain.</p> $f(g(x))$
<p><b>25.</b> Identify the remainder.</p> <p>a. <math>\frac{4x^4 - 3x^2 + 3x - 1}{x^2 - x + 1}</math>      b. <math>(3x^5 - 4x^3 + 2x - 5)(x+1)^{-1}</math></p>	

## Chapter 4

<p>1. Which function is shown in the graph?</p>  <p>Ⓐ <math>f(x) = 2(2.3)^x - 2</math>          Ⓑ <math>f(x) = 4(2.3)^x</math>          Ⓒ <math>f(x) = 4(2.3)^x + 2</math>          Ⓓ <math>f(x) = 5(2.3)^x - 3</math></p>	<p>2. Gasoline costs \$1.99 per gallon. If the price per gallon increases an average of 6% per month, which function models the exponential growth of the pricing?</p> <p>Ⓐ <math>f(x) = 1.06(1.99)^x</math>          Ⓑ <math>f(x) = 1.99(1.06)^x</math>          Ⓒ <math>f(x) = [1.06(1.99)]^x</math>          Ⓓ <math>f(x) = \frac{1.99}{1.06^x}</math></p>
<p>3. Which function represents exponential growth?</p> <p>Ⓐ <math>u(t) = -7.0\left(\frac{2}{3}\right)^t</math>          Ⓑ <math>u(t) = -7.0\left(\frac{3}{2}\right)^t</math>          Ⓒ <math>u(t) = 7.0(0.8)^t</math>          Ⓓ <math>u(t) = 7.0\left(\frac{10}{9}\right)^t</math></p>	<p>4. What is the horizontal asymptote of the function <math>y = 2(0.3)^{x-1} - 4</math>?</p> <p>Ⓐ <math>y = -4</math>                      Ⓑ <math>y = 0.3</math>          Ⓒ <math>y = 2</math>                              Ⓓ <math>y = 4</math></p>
<p>5. What is the simplified expression of <math>\frac{7(e^{3x})^2}{14e^{-x}}</math>?</p> <p>Ⓐ <math>\frac{1}{2}e^{5x}</math>                      Ⓑ <math>\frac{1}{2}e^{8x}</math>          Ⓒ <math>\frac{1}{2}e^{9x^2-x}</math>                  Ⓓ <math>\frac{7}{2}e^{8x}</math></p>	<p>6. Which function does <i>not</i> model exponential decay?</p> <p>Ⓐ <math>r(x) = \frac{3}{4}e^{-3x}</math>          Ⓑ <math>r(x) = \frac{4}{3}e^{-3x}</math>          Ⓒ <math>r(x) = 4e^{-3x}</math>          Ⓓ <math>r(x) = \frac{3}{4}e^{3x}</math></p>
<p>7. Which expression is equivalent to <math>x</math>?</p> <p>Ⓐ <math>\log x</math>                      Ⓑ <math>\log 2x</math>          Ⓒ <math>\log 10x</math>                  Ⓓ <math>\log 100x</math></p>	<p>8. What is an equivalent expression for <math>2 \log_4 3 + \log_4 2</math>?</p> <p>Ⓐ <math>2 \log_4 6</math>                  Ⓑ <math>\log_4 6</math>          Ⓒ <math>\log_4 12</math>                      Ⓓ <math>\log_4 18</math></p>

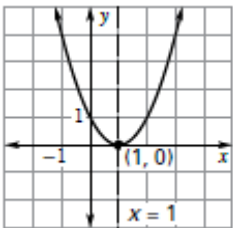
<p><b>9.</b> Which of the following is <i>not</i> equivalent to <math>\log_5 8</math>?</p> <p>Ⓐ <math>\frac{\ln 8}{\ln 5}</math>                      Ⓑ <math>2 \log_5 4</math></p> <p>Ⓒ <math>3 \log_5 2</math>                      Ⓓ <math>\log_5 4 + \log_5 2</math></p>	<p><b>10.</b> What is the inverse of the function <math>y = 8^{2x}</math>?</p> <p>Ⓐ <math>y = \frac{\ln x}{2 \ln 8}</math>                      Ⓑ <math>y = \frac{2 \ln x}{\ln 8}</math></p> <p>Ⓒ <math>y = \frac{\ln 8}{2 \ln x}</math>                      Ⓓ <math>y = \frac{2 \ln 8}{\ln x}</math></p>
<p><b>11.</b> What is the solution to the equation <math>\log_4 4x + 2 \log_4 x = 4</math>?</p> <p>Ⓐ 1                                      Ⓑ 2</p> <p>Ⓒ 3                                      Ⓓ 4</p>	<p><b>12.</b> A pheasant farmer started her farm with 120 pheasants. An analysis of her records shows that her pheasant population has increased by 15% each year. The farmer wants to determine a model of pheasant population growth using an exponential function. According to her model, what will the pheasant population be in 10 years?</p> <p>Ⓐ 311                                      Ⓑ 485</p> <p>Ⓒ 501                                      Ⓓ 1380</p>
<p><b>13.</b> What is the value of <math>x</math> in the equation <math>3^x = \left(\frac{1}{9}\right)^{(2x-10)}</math> ?</p>	<p><b>14. Graph the function <math>y = 2 \cdot 3^{x+1} - 2</math>. State the domain and range.</b></p>
<p><b>15. (Calculator)</b> Your grandparents deposited \$2000 into a college savings account for you 5 years ago. If the account pays 2.5% annual interest, compounded quarterly, find the current balance of the savings account.</p>	<p><b>16. (Calculator)</b> You buy a computer for \$1200. The value of the computer decreases by 30% each year. Find the value of the computer after 4 years.</p>
<p><b>17. Graph the function <math>y = e^{-3x}</math>. State the domain and range.</b></p>	<p><b>18. Evaluate the logarithm without using a calculator.</b></p> <p>a. <math>\log_5 25</math>                                      b. <math>\log_{1/3} 81</math></p> <p>c. <math>10^{\log_5 x}</math>                                      d. <math>\log_4 16^x</math></p>
<p><b>19. Expand the expression.</b></p> <p>a. <math>\ln 16x^2</math></p> <p>b. <math>\log_5 \frac{2x^3}{4y}</math></p>	<p><b>20. Condense the expression.</b></p> <p>a. <math>\log_3 2x + 3 \log_3 4x</math></p> <p>b. <math>\ln 72x - 2 \ln 2y</math></p>
<p><b>21. Solve.</b></p> <p>a. <math>27^{(2x+4)} = \left(\frac{1}{9}\right)^{(x-46)}</math></p> <p>b. <math>\log_2 (x + 8) = 4</math></p> <p>c. <math>\log_6 x + \log_6 (x + 16) = 2</math></p>	<p><b>22. State the domain and range of <math>y = \log_3 (x + 2) - 2</math>.</b></p>



# ANSWERS

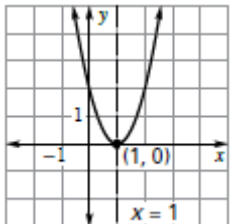
## Ch 1

1. C
2. A
3. C
4. C
5. B
6. B
7. C
8. B
9. D
10. C
11. B
12. B
13. B
14. D
15. D
16. B
17. 0
18. a.  $1000 = (10 + x)(25 + x)$   
 b.  $x = 15$  or  $x = -50$  c.  $x = -50$  because you cannot have a negative length.
- 19.

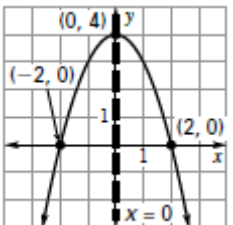


20. minimum;  $-1/4$

21.



22.



23.  $y = 2x^2 + 4x - 6$

24.  $y = 5x^2 - 20x + 15$

25.

- a) R, Q      b) R, Q, Z, W, N, D      c) R, Q      d) R, I, T

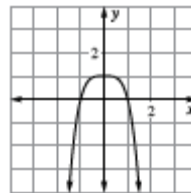
26. D:  $(-\infty, \infty)$  R:  $[-4, 4]$

27. D:  $(-\infty, 3]$  R:  $(-\infty, 2]$

28.  $y = -\frac{1}{5}(x + 3)^2 + 1$

## Ch 2

1. B
2. A
3. A
4. C
5. C
6.  $\frac{5}{3}$
7. B
8. A
9. B
10. A
11. 4
12. -51
13. 42
- 14.



15.  $x^3 + 6x^2 - 32$

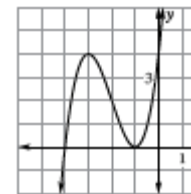
16.  $x^3 - 2x^2 - 2x + 1$

17.  $(x + 3)(x^2 + 1)$

18.  $x^2 - 5x + 3$

19. -2, -1, 3

20.



21.

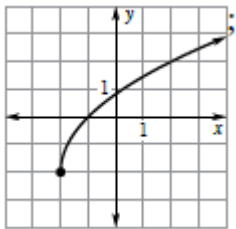
- a)  $x \rightarrow \infty, f(x) \rightarrow -\infty$   
 $x \rightarrow -\infty, f(x) \rightarrow -\infty$
- b)  $x \rightarrow \infty, f(x) \rightarrow \infty$   
 $x \rightarrow -\infty, f(x) \rightarrow -\infty$

22. A

**Ch 3**

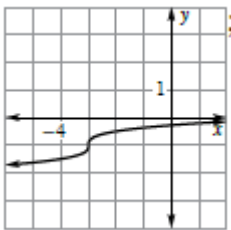
1. A
2. B
3. B
4. C
5. B
6. A
7. B
8. D
9. C
10. C
11. C
12. D
13. D
14. B
15. 13, -3
16. -81
17.  $f(g(x)) = x, g(f(x)) = x$
18.  $f^{-1}(x) = \frac{3x-5}{2}$

19.



domain:  $x \geq -2$ ;  
range:  $y \geq -2$

20.

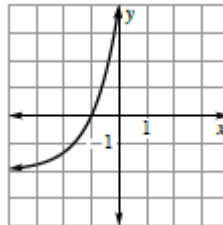


domain: all real numbers;  
range: all real numbers

21. 36
22. 3
23. 7
24.  $54x^6 - 5$ ; all real numbers

**Ch 4**

1. C
2. B
3. D
4. A
5. A
6. D
7. C
8. D
9. B
10. A
11. D
12. B
13. 4
- 14.

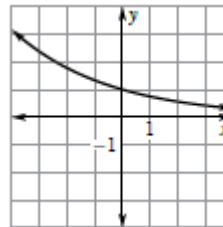


domain: *all reals*;  
range:  $y > -2$

15. \$2265.42

16. \$288.12

17.



domain: *all reals*;  
range:  $y > 0$

18. a. 2    b. -4    c.  $5x$     d.  $2x$ 19. a.  $\ln 16 + 2\ln x$     b.  $3\log_5 x - \log_5 2 - \log_5 y$ 20. a.  $\log_3 128x^4$     b.  $\ln \frac{18x}{y^2}$ 

21. a. 10    b. 8    c. 2

22.

domain:  $x > -2$ ;  
range: *all reals*