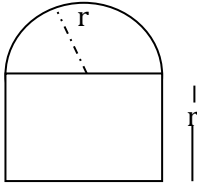
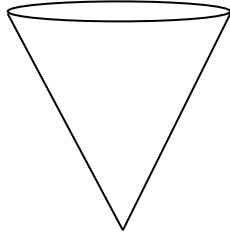


<p>1. Simplify the following rational expression:</p> $\frac{\frac{1}{x} - \frac{1}{3}}{\frac{1}{x^2} - \frac{1}{9}}$	<p>2. Rationalize the denominator:</p> $\frac{7}{3\sqrt{7}}$
<p>3. Simplify the exponential expression:</p> $\sqrt[3]{27a^6b^{12}}$	<p>4. Simplify the logarithmic expression:</p> $\log_5 27 - 2 \log_5 3$
<p>5. . Factor each expression completely:</p> $9x^3 - 9x^2 - x - 1$ $m^4 - 16$	<p>6. Solve for x in each equation:</p> $\frac{1}{8} = 2^{1-2x}$ $\log_3 x + 2 \log_3 2 = 4 \log_3 2$
<p>7. Solve for h:</p> $S = 2\pi r^2 + 2\pi rh$	<p>8. Solve by completing the square:</p> $x^2 - 8x + 3 = 0$
<p>9. Complete the square to rewrite the equation in vertex form:</p> $x^2 + x - 2y = 0$	<p>10. Find all solutions, real and imaginary, for:</p> $x^4 - 9x^2$ $m^4 - 16$

<p>11. Write an equation for a line in standard form passing through (2,2) and perpendicular to the line:</p> $2x - 3y = 6$	<p>12. Write an equation for a line in slope-intercept form passing through (4,0) and the midpoint of the line segment from (-1,5) to (3,7).</p>
<p>13. For the circle $(x + 3)^2 + (y - 2)^2 = 10$, expand and write in general, quadratic form.</p>	<p>14. Find the solution to each equation:</p> $x^2 + 3x = -1$ $\frac{3}{x + 1} = \frac{9}{4x + 5}$
<p>15. Find the solution to the following inequality:</p> $\frac{6}{x - 2} > 4$	<p>16. Find the solution(s) for each statement:</p> $ 2 - x \geq 4$
<p>17. Find the solution to the system of linear equations:</p> $\begin{cases} x - 3y + 10 = 0 \\ 3x - y + 6 = 0 \end{cases}$	<p>18. Shade the region that satisfies this system of inequalities:</p> $\begin{cases} x - 3y + 10 > 0 \\ 3x - y + 6 < 0 \end{cases}$
<p>19. Describe the vertices and foci of the ellipse with the following equation:</p> $(x - 3)^2 + (y + 2)^2 = 4$	<p>20. Find the domain and range for the function:</p> $g(x) = \frac{1}{2}e^x$

<p>21. Let $f(x) = x^2$ and $g(x) = \sqrt{1-x}$</p> <p>a. Describe the domain and range of each function.</p> <p>b. Form composite functions $f \circ g$ and $g \circ f$.</p> <p>c. Describe the domain and range for each composite function $f \circ g$ and $g \circ f$.</p>	<p>22. Find all solutions (real and complex) to the equation HINT: Use Rational Root Theorem: $12x^3 - 23x^2 - 3x + 2 = 0$</p>
<p>23. Simplify: $\frac{f(x+h)-f(x)}{h}$ where $f(x) = \frac{1}{x+1}$.</p>	<p>24. Sketch the graphs of each function:</p> <p>a. $h(x) = x^2 - 4x + 3$</p> <p>b. $f(x) = 2x^3 + 3$</p> <p>c. $g(x) = 4x + 6$</p>
<p>25. Make a sketch of each function, then write the inverse of the function and show its graph:</p> <p>a. $g(x) = \frac{1}{(x+2)^2}$, $x \geq 2$</p> <p>b. $h(x) = e^x$</p>	<p>26. Accurately graph: $h(x) = \frac{x^2-2x+1}{x^2-3x+2}$</p>
<p>27. Use synthetic division to divide :</p> $\frac{x^5 - 4x^4 + x^3 - 7x + 1}{x + 2}$	<p>28. Use long division to divide:</p> $\frac{x^5 - x^4 + x^3 + 2x^2 - x + 4}{x^3 + 1}$
<p>29. Sketch the graphs of each transformation of $y = \sin x$:</p> <p>a. Sketch of $y = \sin\left(\frac{x}{2}\right)$</p> <p>b. Sketch of $y = 2 \sin(x) - 3$</p>	<p>30. Find the intersection(s) by graphing of the functions when $0 \leq x \leq 2\pi$:</p> $\begin{cases} y = \sin x \\ y = \cos x \end{cases}$

<p>31. Solve for x on the interval $0 \leq x \leq 2\pi$</p> <p>a. $\sin x = \frac{\sqrt{3}}{2}$</p> <p>b. $\cos x = -\frac{\sqrt{2}}{2}$</p>	<p>32. Simplify the trig identities:</p> $\tan x \csc x - \cos x$ $\frac{\sin x}{\csc x} + \frac{\cos x}{\sec x}$
<p>33. A kite is 100 m above the ground. If there are 200 m of string out, what is the angle between the string and the horizontal (assume that the string is perfectly straight)?</p>	<p>34. A rectangle is inscribed inside the parabola $y = 4 - x^2$, so that one of its vertices is at $(x, 4 - x^2)$.</p> <p>a. Represent the area of the rectangle as a function of x.</p> <p>b. Describe the domain for this function because the rectangle is inscribed in the parabola.</p>
<p>35. Two points on a coordinate plane are located at $(5,4)$ and $(-2, -20)$. Find the distance between the points.</p>	<p>36. Two cars start moving from the same point. One travels south at 100 <i>kph</i>, the other, west, at 50 <i>kph</i>. How far apart are they in two hours?</p>
<p>37. The figure at the right is composed of a rectangle and a semicircle.</p> <p>a. Write the formula for the perimeter of the figure.</p> <p>b. Write the formula for the area of the figure.</p> <div style="text-align: center;">  </div>	
<p>38. A water tank has the shape of a cone. The tank is 10 m high and has a radius of 3 m at the top. If the water is 5 m deep in the middle, what is the surface area of the top of the water?</p> <div style="text-align: center;">  </div>	

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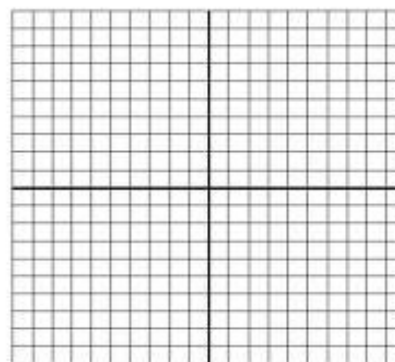
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21. a. _____

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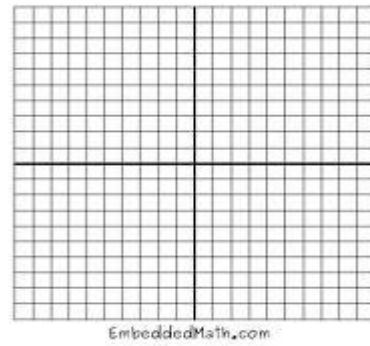
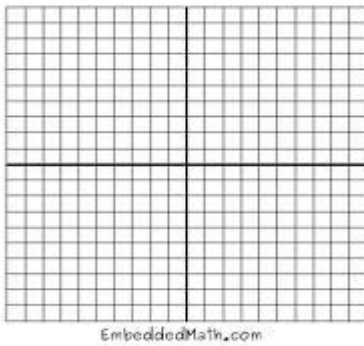
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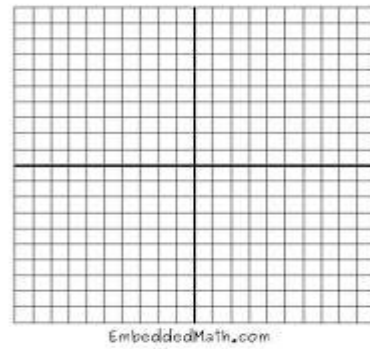
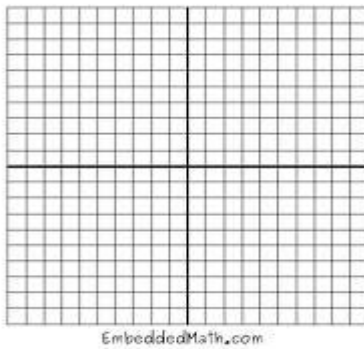
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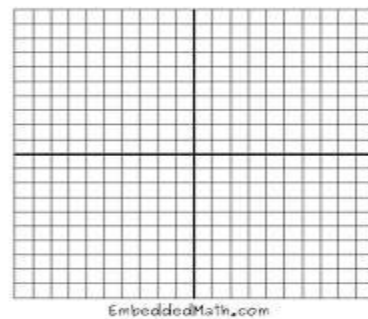
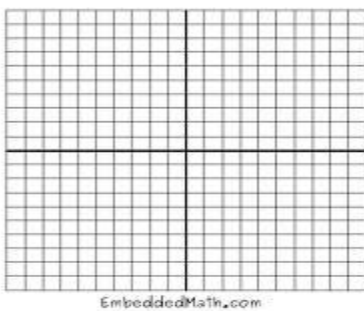
24. c.

25. a.



25. b.

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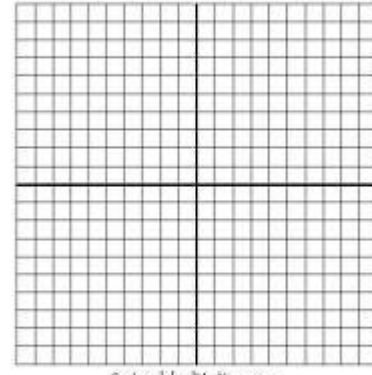
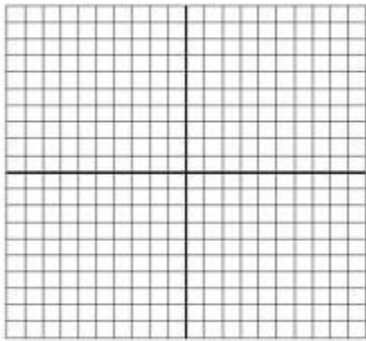
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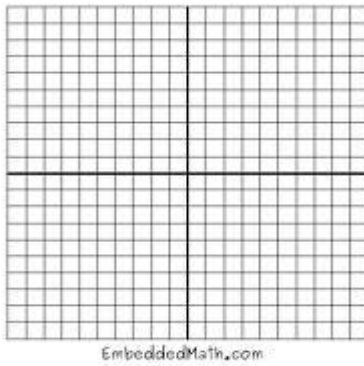
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29. b.



31. a. _____

32. _____

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37. a. _____

38. _____

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