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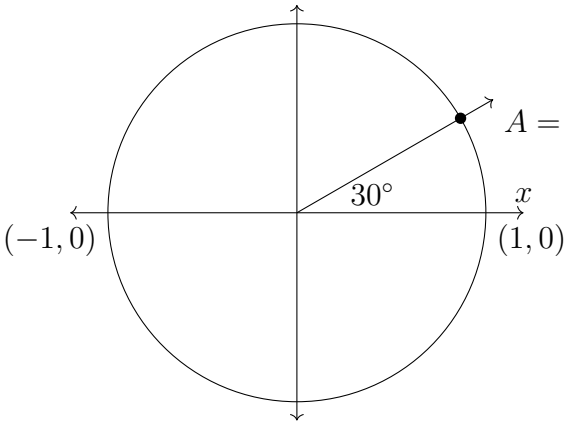
6.10 Quiz: The unit circle and cumulative year-to-date standards

1. Given a circle with radius of one, centered on the origin. An angle with measure 30° is placed in standard position.

   (a) Mark the point A, the intersection of the circle and angle ray, as an ordered pair.

   (b) Write down the value of $\sin 30°$

   (c) Write down the value of $\cos 30°$



2. Convert each angle measure from degrees to radians or vice-a-versa.

   (a) $60° =$

   (b) $\frac{\pi}{6} =$

3. For which angle measures θ is $\sin(\theta)$ negative? Select all that apply.

   (a) π

   (b) $\frac{3\pi}{2}$

   (c) $\frac{7\pi}{4}$

   (d) $\frac{\pi}{6}$

4. Given angle A in the first quadrant with $\cos A = \frac{2}{\sqrt{5}}$, find the value of $\sin A$ in radical form.

5. Simplify to standard form. *A.APR.1 Perform operations with polynomials*

   $(7x^3 - 3x^2 + 3x - 3) - (2x^3 - 7x^2 - 5)$

6. Given $A = 3x^2 - 2$ and $B = 3x - 4$, simplify $2A - B$.

7. Write down the solutions to $3x(x+1)(2x-5) = 0$. *A.APR.3 Find zeros of polynomials*

8. Solve: $x = \dfrac{4x - 6}{x - 1}$ *A.REI.2 Solve rational and radical equations*

9. Solve for x and check.

   (a) $\sqrt{x-2} + 5 = 8$

   (b) Check your solution.

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10. Write a recursive definition of the sequence *F.BF.2 Sequences*

    $a_1 = 13$, $a_2 = 9$, $a_3 = 5$, $a_4 = 1, \ldots$

11. Simplify to the form $a + bi$ with a, b real numbers. $x \in R$. *N.CN.2 Complex numbers*

    (a) $(x - 3i) - (2x - 2i)$ (b) $(5 - 3i)(2 + 3i) =$

12. Simplify each expression, using imaginary numbers as necessary. $a > 0$

    (a) $\sqrt{-49a^2} =$ (b) $\frac{3}{5}\sqrt{-50} =$

13. Rewrite each expression as a radical. *N.RN.2 Radicals and rational exponents*

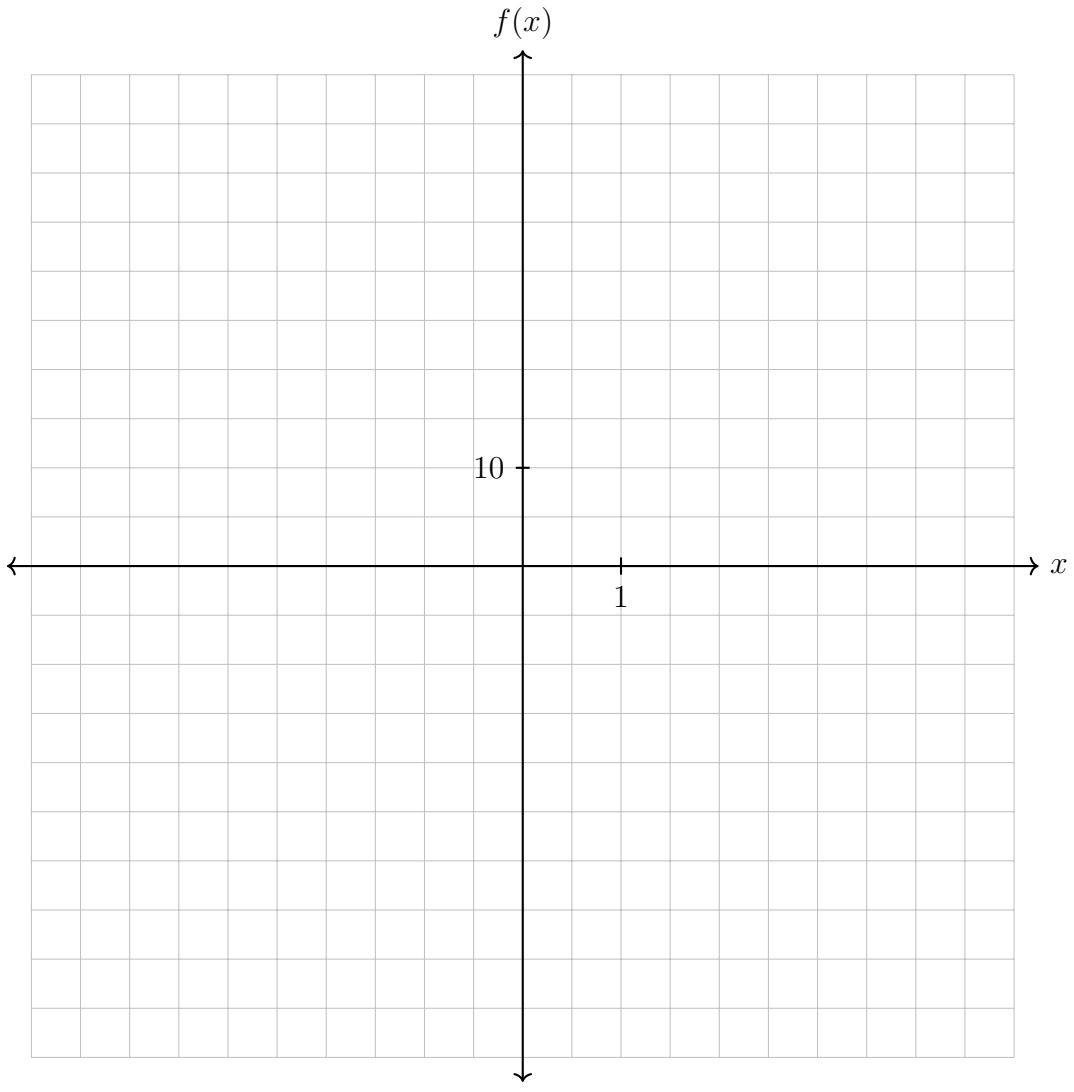
    (a) $12^{-\frac{1}{2}} =$ (b) $(27x)^{\frac{2}{3}} =$

14. Rewrite each expression as a fractional exponent. $x > 0$

    (a) $\sqrt{7} =$ (b) $\sqrt[3]{x^6} =$

15. Biologists are studying a new bacterium. They create a culture with 10,000 of the bacteria and anticipate that the number of bacteria will double every 5 hours. Write an equation for the number of bacteria, B, in terms of the number of hours, t, since the experiment began.

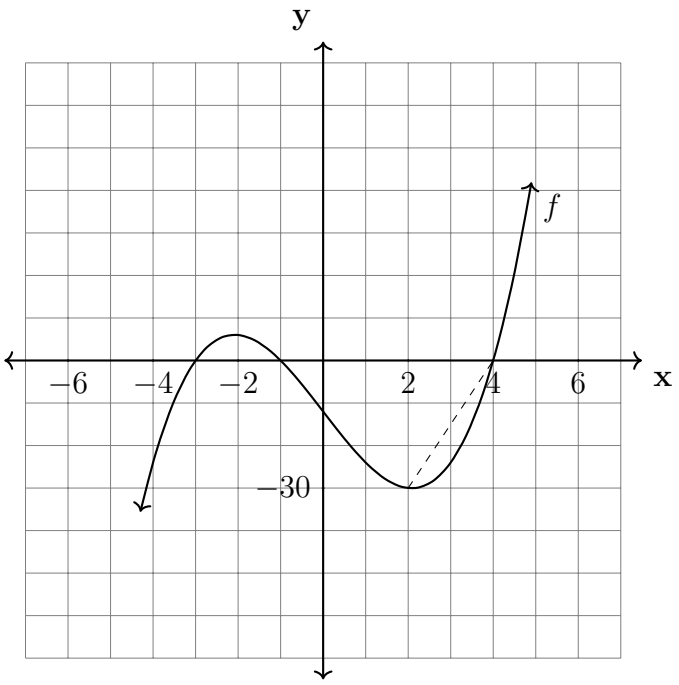
16. Graph the function $f(x) = 2x^5 + 3x^4 - 17x^3 - 12x^2 + 36x$.



Mark and label the zeros of the function.

Describe the behavior of the given function as x approaches positive infinity.

17. The polynomial $f(x) = x^3 - 13x - 12$ is shown on the graph below. What is the slope between the local minimum at $x = 2$ and the x-intercept at $x = 4$? This is called the *average rate of change* between $x = 2, 4$.

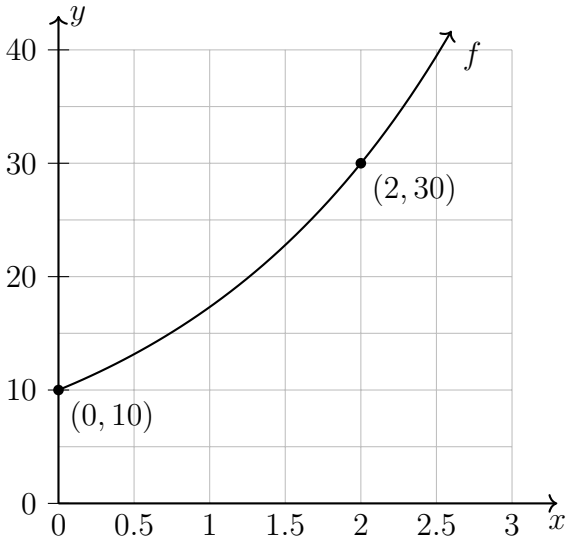


18. The graph shows the exponential function $f(x)$.

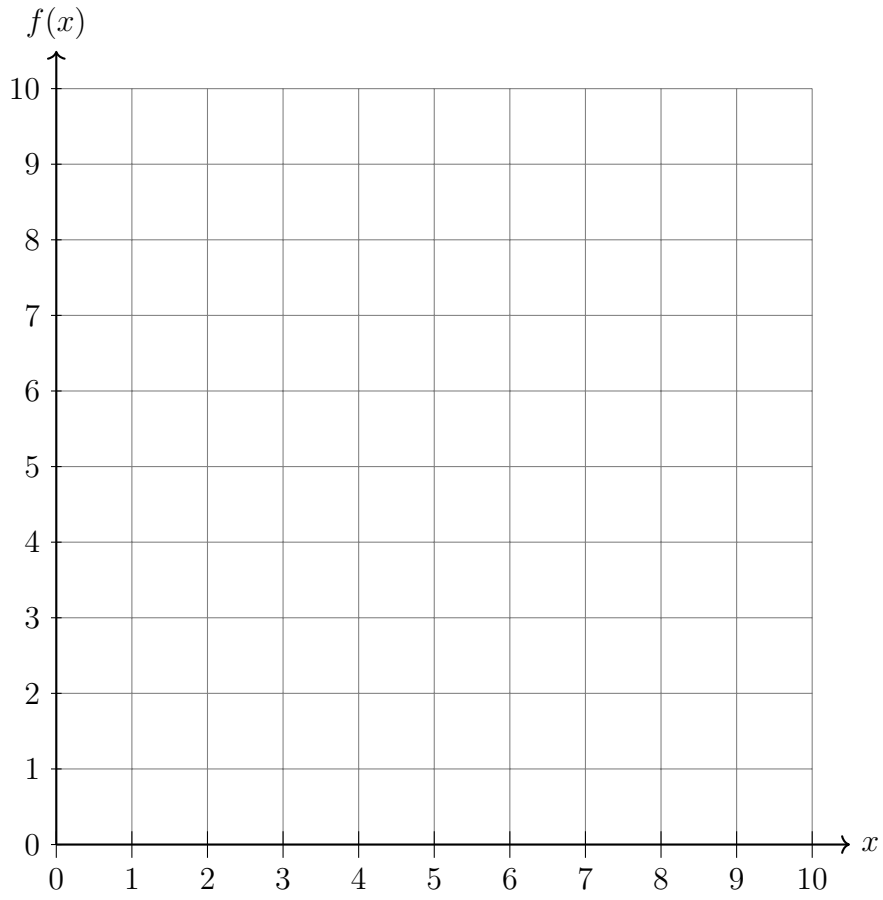
(a) Write down the initial value of the function.

(b) By what factor do the values of f increase each time x increases by 1?

(c) Write an expression for the function $f(x)$.



19. Graph the continuous exponential function $f(x) = 3e^{0.08x}$ on the grid below.



(a) Graph the line $y = 6$. Mark the intersection of the line with f and label it as an ordered pair, rounded *the nearest whole number*.

(b) The function $f(x)$ models the growth of an investment. Explain what the values of 3 and 0.8 represent in the context of the investment.

(c) How long will the investment take to double?