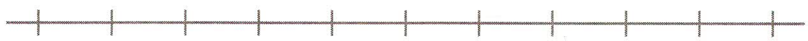
1. Albert could race 4 times as fast as Bernhard. For this reason Albert could race 48 miles in 3 hours less than it took Bernhard to race 30 miles. How fast could each of them race? What was the time of each racer?

2. There are 31 nickels, dimes, and quarters in the drawer with a value of \$4.70. How many coins of each type are there if there are twice as many quarters as there are dimes?

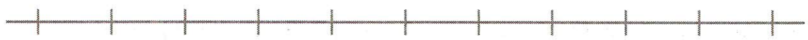
3. The sum of the digits of a two-digit number is 10. If the digits are reversed, the new number is one less than twice the original number. What is the original number?

Graph the solutions on a number line:

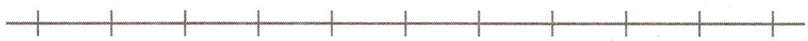
4. $x^2 - 3x \geq 4$; $D = \{\text{Integers}\}$



5. $x^2 + 7x < -10$; $D = \{\text{Reals}\}$



6. $-|x| + 4 \nleq -2$; $D = \{\text{Integers}\}$



7. Multiply: $\left(x^{1/4} + y^{1/2}\right)\left(x^{-1/2} - y^{-1/4}\right)$

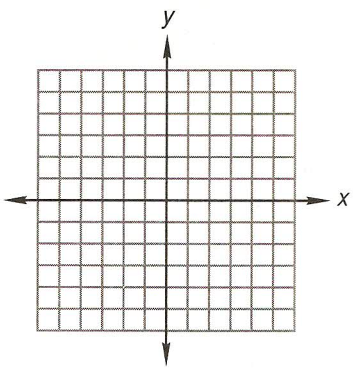
8. Factor: $8m^6n^3 + 27p^9$

9. Find x:

(a) $x = \log 3.2041$ (b) $\ln x = 6.417$ (c) $e^x = 14.3$ (d) $\log x = 2.735$

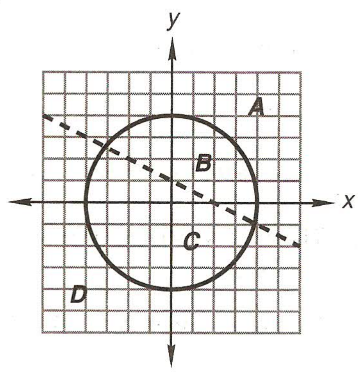
10. Show that $0.00\overline{317}$ is a rational number by writing it as a quotient of integers.

11. Complete the square as an aid in graphing: $y = x^2 + 4x - 2$



12. Which region of the graph satisfies this system of nonlinear inequalities?

$$\begin{cases} x^2 + y^2 \geq 16 & \text{(circle)} \\ y < -\dfrac{1}{2}x + 1 & \text{(line)} \end{cases}$$



13. Solve: $\begin{cases} 1\frac{1}{5}x + \frac{1}{2}y = 22 \\ 0.1x + 0.5y = 11 \end{cases}$

14. Solve: $\begin{cases} 2x - y = 10 \\ x + z = 4 \\ x - 2y = 11 \end{cases}$

15. Solve: $\begin{cases} x^2 + y^2 = 34 \\ 2x - y = 1 \end{cases}$

16. Find the number that is $\frac{5}{8}$ of the way from $3\frac{1}{4}$ to $5\frac{7}{12}$.

Simplify:

17. $\dfrac{4i^2 - 3i}{-\sqrt{-5}\sqrt{-5} + 2i^3}$

18. $\dfrac{\sqrt{3} + 7}{3\sqrt{3} - 5}$

19. Solve $3x = 2x^2 - 2$ by factoring.

20. Solve $4 + x = -5x^2$ by using the quadratic formula.