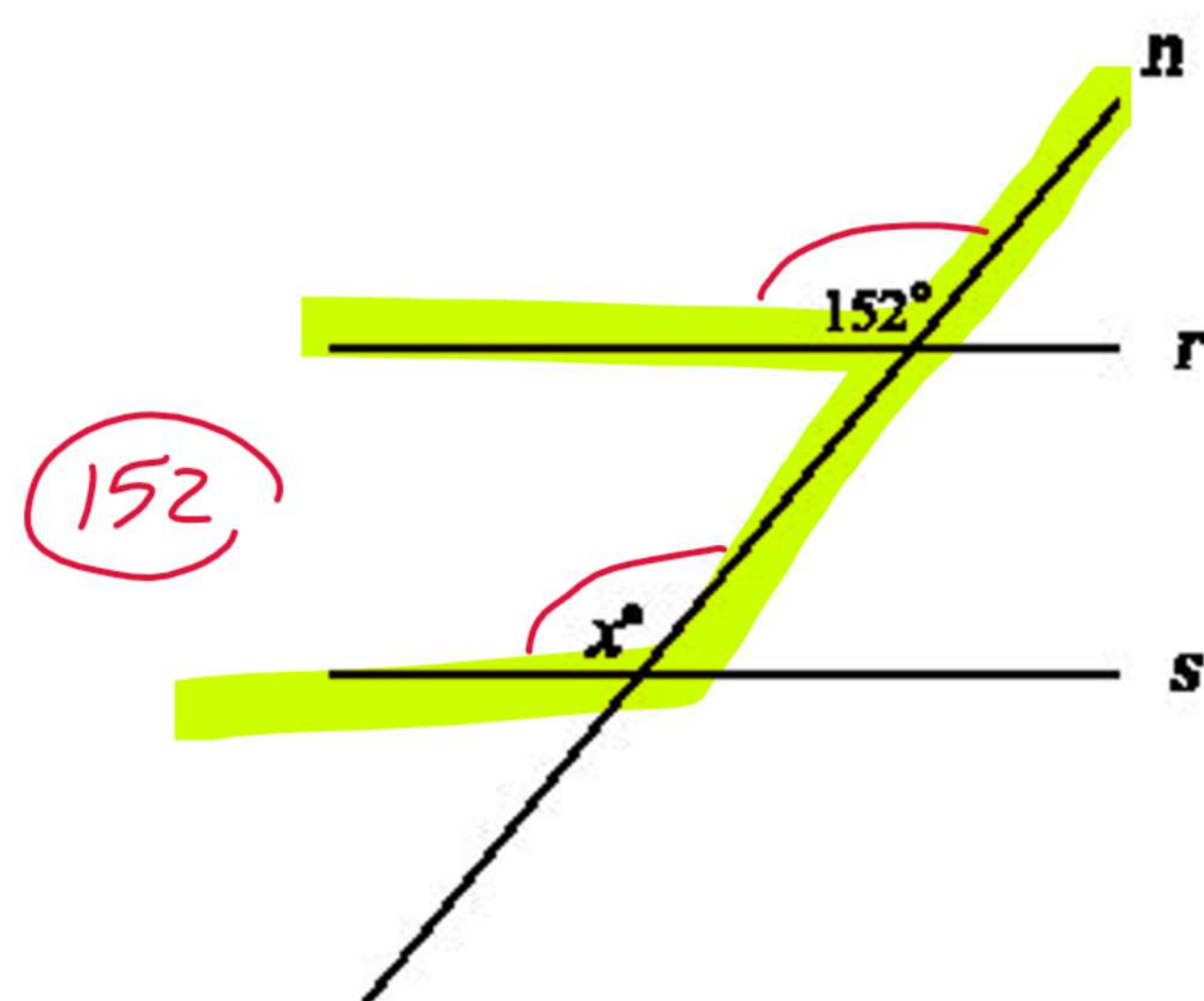




Note: Figure not drawn to scale.

(1)

In the figure, line n intersects lines r and s . Line r is parallel to line s . What is the value of X ?

152

(2) During a portion of a flight, a small airplane's cruising speed varied between 125 miles per hour and 145 miles per hour. Which inequality best represents this situation, where s is the the cruising speed, in miles per hour, during this portion of the flight?

- (A) $s \leq 20$
- (B) $s \leq 125$
- (C) $s \leq 145$
- (D) $125 \leq s \leq 145$

(3) If $4x = \frac{7}{4}$, What is the value of $24X$?

$x = \frac{7}{4}$ $24(\frac{7}{4}) = 42$

- (A) 1
- (B) 13
- (C) 34
- (D) 42

(4) Which expression is equivalent to

$$(x^3 + 8x^2 - 7x) + 6(x^2 + 5)$$

- (A) $x^3 + 6x^2 - 7x + 30$
- (B) $x^3 + 8x^2 - 7x + 30$
- (C) $x^3 + 14x^2 - 7x + 30$
- (D) $x^3 + 5x^2 - 7x + 30$

$x = 2$

$$(2^3 + 8(2)^2 - 7(2)) + 6(2^2 + 5) = 80$$

(5) The function f is defined by $f(x) = x^3 + 19$.

What is the value of $f(2)$?

$(2)^3 + 19$

27

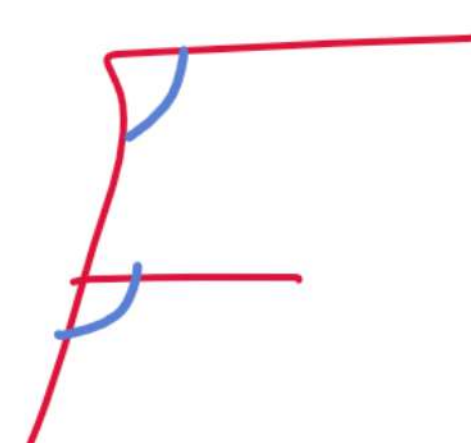
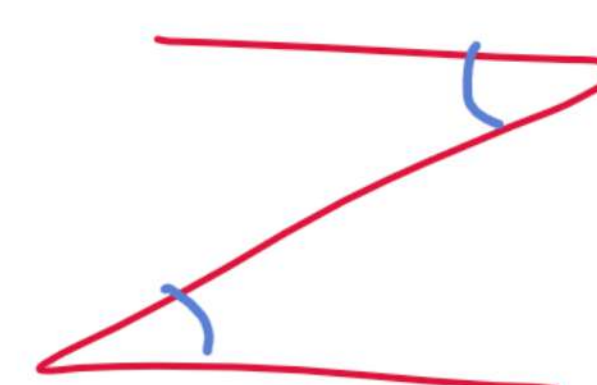
(6) The function g is defined by $g(x) = \frac{x}{2}$.

For what the value of X does $g(x) = 224$?

448

$\frac{x}{2} = 224 \times 2$

448



Sum = 180



(12) A company has a customer loyalty program. In January 2018, there were 800 customers enrolled in the loyalty program. For the next 24 months after January 2018, the total number of customers enrolled in the loyalty program each month was 5% greater than the total number enrolled the previous month. Which equation gives the total number of customers, c , enrolled in the company's loyalty program m months after January 2018, where $m < 24$?

- (A) $c = 800(0.05)^m$
 (B) $c = 800(1.05)^m$
 (C) $c = 800(1.5)^m$
 (D) $c = 800(5)^m$

Final $\downarrow$ Initial $\downarrow$ intervals
 $A = P(1 \pm r)^t$
 105%
 1.05

(13) The function $f(t) = 60,000(2)^{\frac{t}{580}}$ gives the number of bacteria in a population t minutes after an initial observation. How much time, in minutes, does it take for the number of bacteria in the population to double?

initial

580

$60,000 \times 2 = 60,000 \times 2^{\frac{t}{580}}$

$1 = \frac{t}{580}$

$580 = t$

(14) For $x > 0$, the function f is defined as follows: $f(x)$ equals 293% of x . Which of the following could describe this function?

$f(x) = 2.93x$
 $y = mx + b$

- (A) Decreasing exponential
 (B) Decreasing linear
 (C) Increasing exponential
 (D) Increasing linear

(15) $y = \frac{3}{8}x + 2$

One of two equations in a system of linear equations is given. The system has infinitely many solutions. What is the slope of the graph of the second equation?

- (A) $-\frac{8}{3}$
 (B) $-\frac{3}{8}$
 (C) $\frac{3}{8}$
 (D) $\frac{8}{3}$

same line

(16) If $4x^2 - 32x - 40 = 0$,

What is the value of $x^2 - 8x$?

shift Solve

$ans^2 - 8ans$

- (A) 0
 (B) 4
 (C) 8
 (D) 10

$x^2 - 8x - 10 = 0$
 $x^2 - 8x = 10$

(17) The function f is defined by $f(x) = (x - 5)(x - 9)(x + k)$, where k is a constant. In the xy -plane, the graph of $y = f(x)$ passes through the point $(-3, 0)$. What is the value of $f(0)$?

$f(x) = (x - 5)(x - 9)(x + 3)$

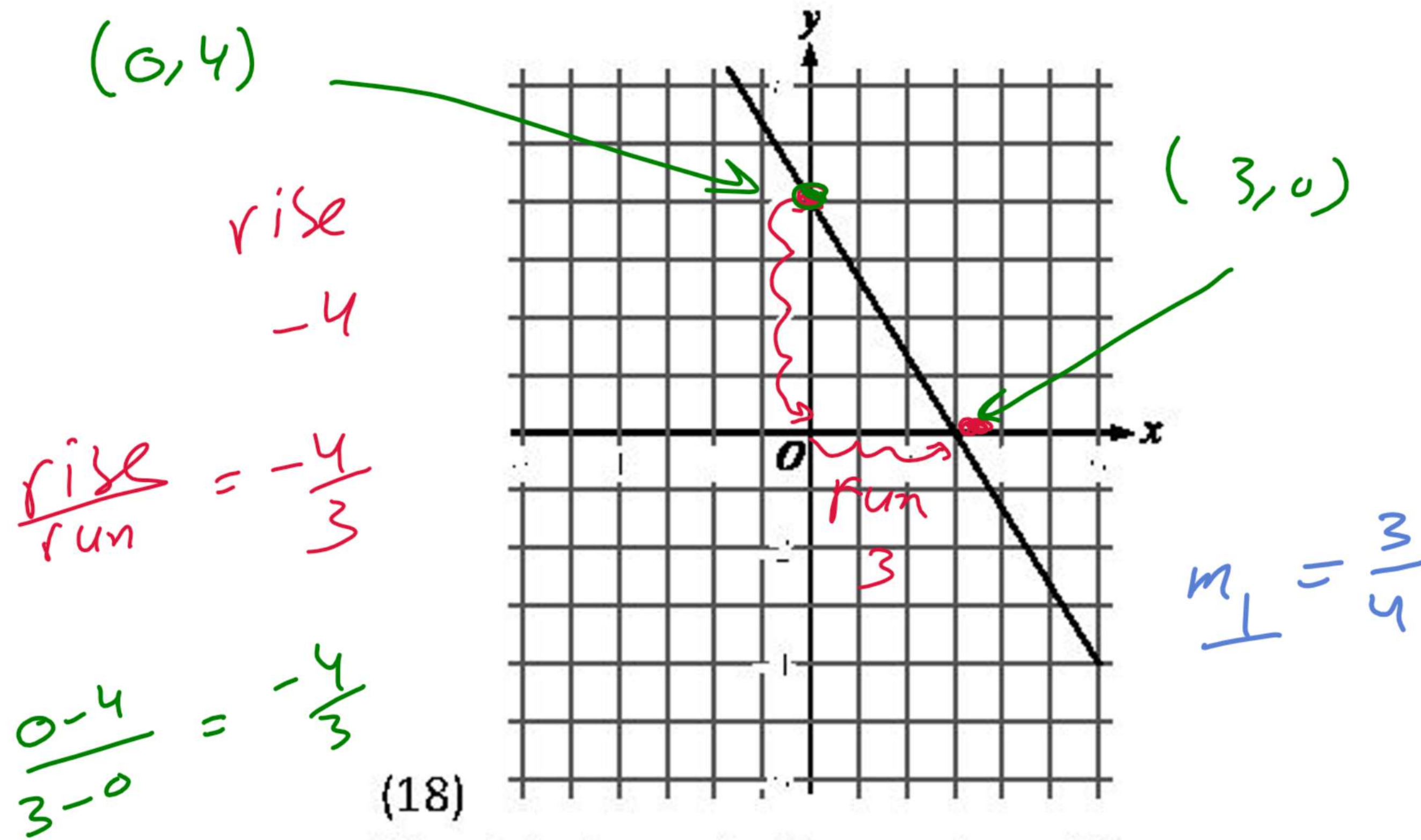
- (A) -288
 (B) -3
 (C) 11
 (D) 135

$f(0) = (0 - 5)(0 - 9)(0 + 3) = 135$

$x^2 + 5x + 6$

$(x + 2)(x + 3)$
 $-2, -3$





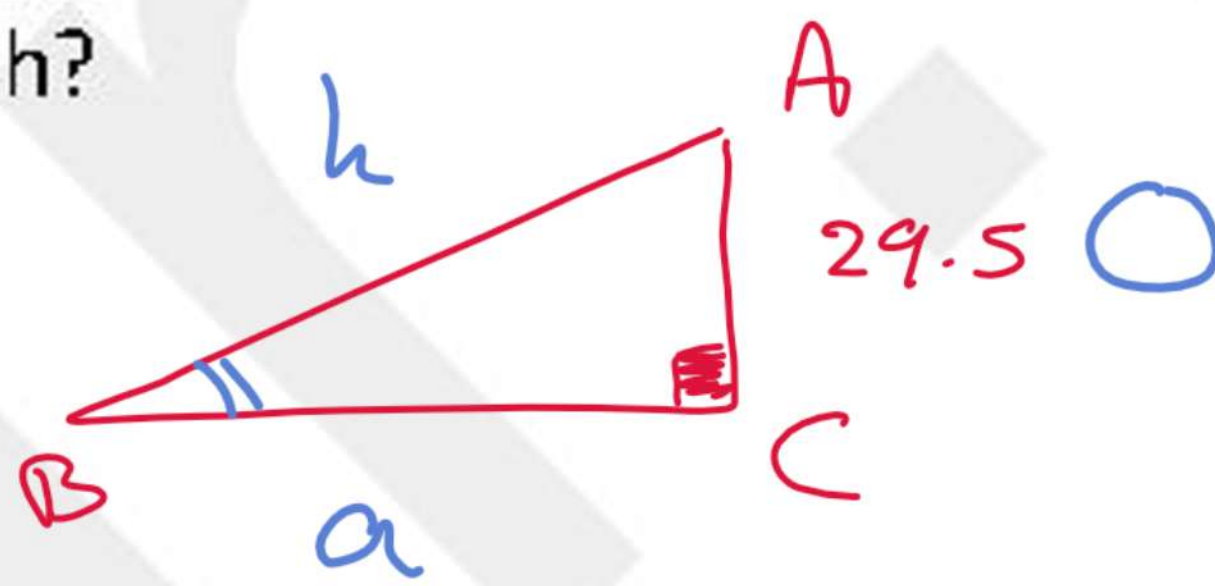
(18) Line k is shown in the xy -plane. Line j (not shown) is perpendicular to line k and passes through the point $(-20, -23)$. Which equation defines line j ?

- (A) $y = \frac{3}{4}x - 8$
- (B) $y = \frac{3}{4}x - 38$
- (C) $y = \frac{4}{3}x - 8$
- (D) $y = \frac{4}{3}x - 38$

Handwritten calculation: $\frac{3}{4}(-20) - 8 = -23$

(19) In right triangle ABC , angles A and B are acute, side AC has a length of 29.5 , and $\tan B = \frac{1}{9}$. What is the length of side BC , rounded to the nearest tenth?

- (A) 870.2
- (B) 265.5
- (C) 5.4
- (D) 3.3



Handwritten calculation using Soh Cah Toa:

$$\frac{29.5}{BC} = \frac{1}{9}$$

$$BC = \frac{29.5 \times 9}{1} = 265.5$$

(20) A rectangular banner has an area of $3,200$ square inches. A copy of the banner is made in which the length and width of the original banner are each increased by 20% . What is the area of the copy, in square inches?

- (A) 3,220
- (B) 3,240
- (C) 3,840
- (D) 4,608

Handwritten calculation:

$$3200 \times 1.2^2 = 4608$$

(21) $f(x) = (x - 4)^2 + 6$

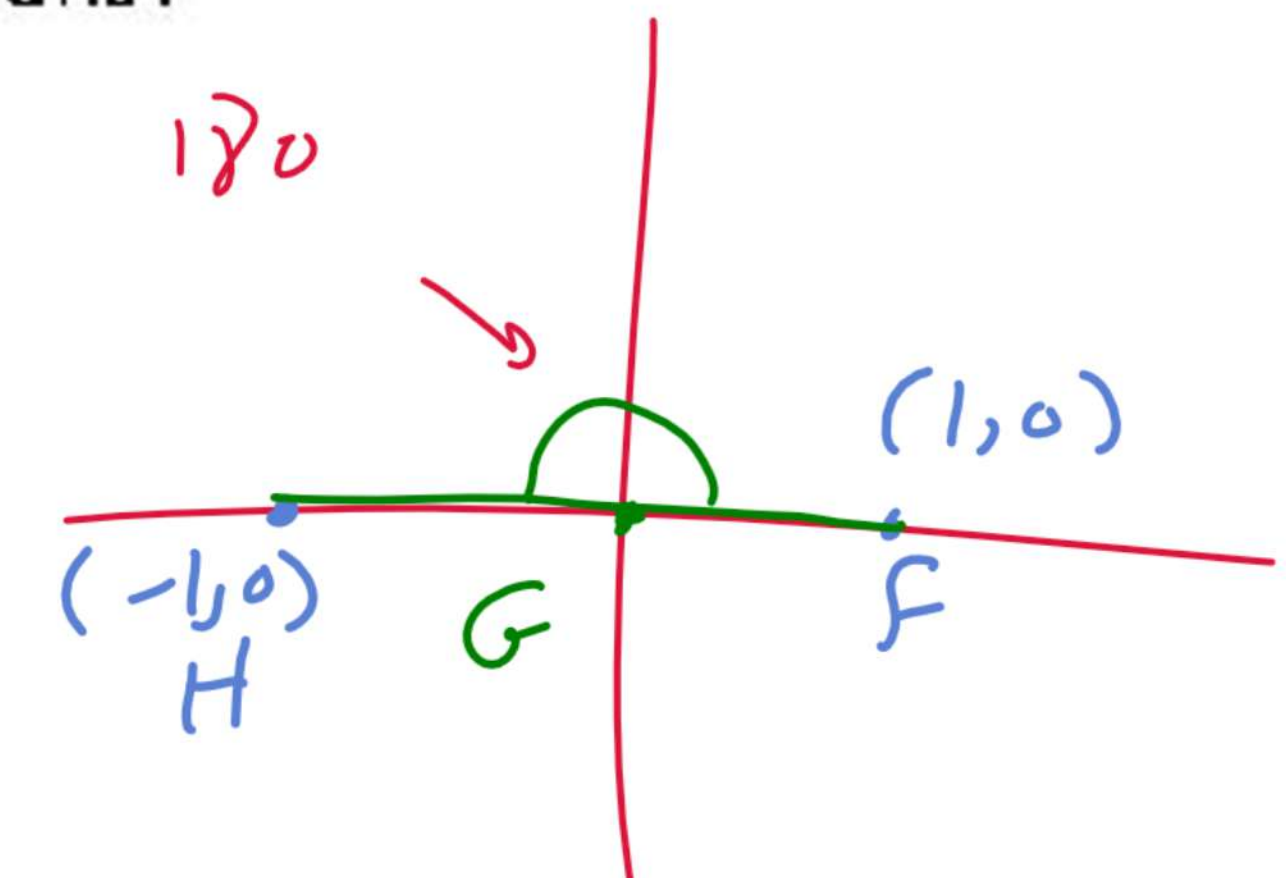
What is the minimum value of the given function?

- (A) 2
- (B) 4
- (C) 6
- (D) 10

Handwritten note: $V(4, 6)$

(22) Point F lies on a unit circle in the xy -plane and has coordinates $(1, 0)$. Point G is the center of the circle and has coordinates $(0, 0)$. Point H also lies on the circle and has coordinates $(-1, y)$, where y is a constant. Which of the following could be the positive measure of angle FGH , in radians?

- (A) $\frac{37\pi}{2}$
- (B) $\frac{39\pi}{2}$
- (C) 34π
- (D) 35π



Handwritten calculation:

$$35(180) = 6300 - 360 = 5940$$

