

$$\sqrt[a]{x^b} = x^{\frac{b}{a}}$$

12. What is the **coefficient** of x^3 when $\frac{2}{5}x^3 + 2x^2 - 3$ is **multiplied** by $5x + \frac{2}{5}$?

A. 10
B. $\frac{4}{25}$
C. $\frac{54}{5}$
D. $\frac{254}{25}$

$$\left(\frac{2}{5}x^3 + 2x^2 - 3\right)\left(5x + \frac{2}{5}\right)$$

$$\frac{2}{5}x \cdot \frac{2}{5}x^3 + 10x^3$$

$$\frac{4}{25}x^3 + \frac{25 \cdot 10}{25 \cdot 1}x^3$$

$$\frac{4}{25}x^3 + \frac{250}{25}x^3$$

$$\frac{254}{25}x^3$$

$$\sqrt{16} = 4$$

15. If m and k are positive numbers, which of the following expressions is equivalent to $(16k^{12}m^4)^{\frac{1}{4}}$?

~~A.~~ $4k^3m$
~~B.~~ $2k^3$
~~C.~~ $4k^3m^2$
D. $2k^3m$

$$16^{\frac{1}{4}} \cdot k^{12 \times \frac{1}{4}} \cdot m^{4 \times \frac{1}{4}}$$

13. What is the resulting **coefficient** of x when $-2x+3$ is **multiplied** by $-3x-2$?

A. -9
B. -5
C. 5
D. 6

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

$$4x - 9x = -5x$$

16. Given $f(x) = 2x^2 - 3x + 1$ and $g(x) = -3x + 5$, what is the value of $(f \circ g)(-2)$? (grid-in)

A. -40
B. 6
C. 210
D. 274

$$g(-2) = -3(-2) + 5 = 6 + 5 = 11$$

$$f(11) = 2(11)^2 - 3(11) + 1 = 2(121) - 33 + 1 = 242 - 32 = 210$$

14. What is the **product** of the roots of the equation $2x^2 + x - 10 = 0$?

A) -20
B) -5
C) -2.5
D) -2

$$x^2 + \frac{x}{2} - 5 = 0$$

$$x^2 - 5x + 6$$

$$\text{Sum} = +5$$

$$\text{Prod} = 6$$

17. What is the product of the solutions of the equation $x^2 - 3x = -2$?
(Grid-in)

A. -2
B. -3
C. 2
D. 3

$$x^2 - 3x + 2 = 0$$

$$\text{Prod} = 2$$

$$\text{Sum} = +3$$

18. The function $h(x) = x^2 - ax - 3$ has zeros at $x = 3$ and $x = -1$. What is the value of a ? (grid-in)

A. -1
B. -2
C. 2
D. 3

$$(3)^2 - 3a - 3 = 0$$

$$9 - 3a - 3 = 0$$

$$9 - 3 = 3a$$

$$6 = 3a$$

$$2 = a$$

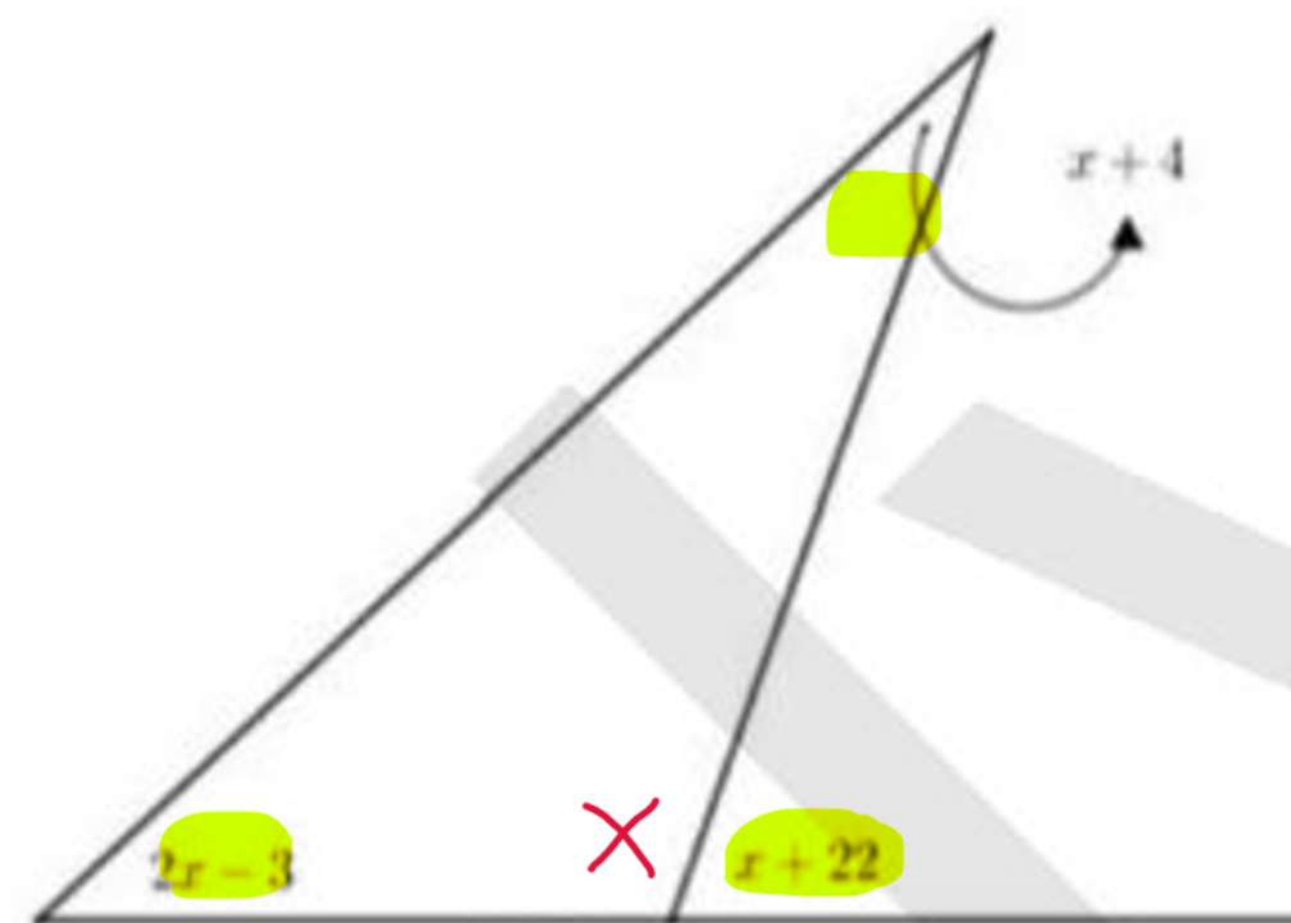
19. Using the figure below, what is the value of x ? (grid-in)

A. 7.5

B. 10.5

C. 11.5

D. 14.5



$$x + 22 = 2x - 3 + x + 4$$

$$x + 22 = 3x + 1$$

$$x - 3x = 1 - 22$$

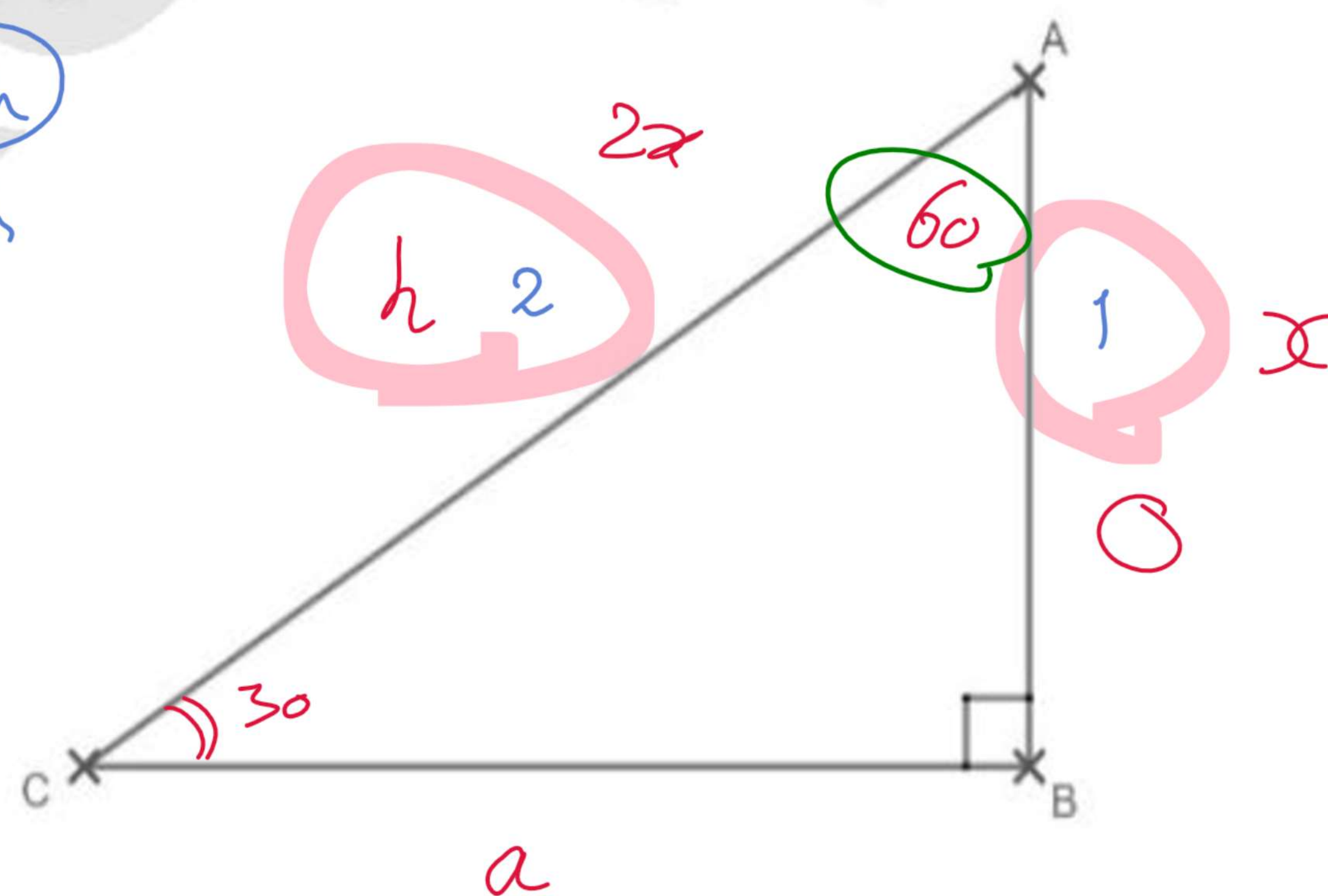
$$-2x = -21$$

$$x = \frac{-21}{-2}$$

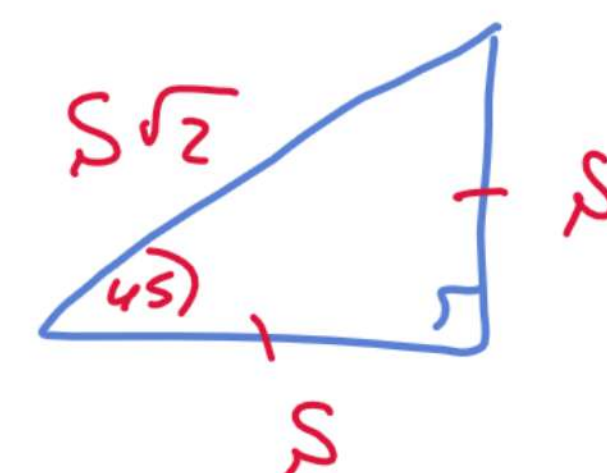
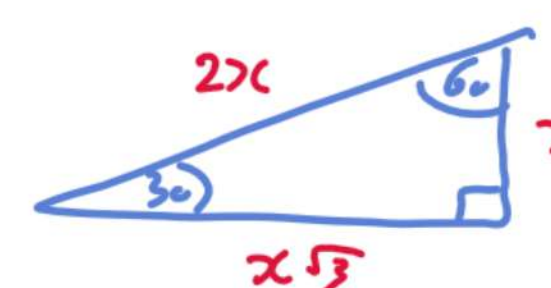
$$x = 10.5$$

20. In triangle ABC , $\sin C = 0.5$. What is the measure of $\angle A$?
(figure not drawn to scale)(Grid-in)

Soh
Cah
Toa



A. 15
B. 30
C. 45
D. 60



1. The secret value, k , of a 4-digit pin code $abcd$ is obtained by subtracting the triple of b from c , and dividing the resulting expression by half of the sum of a and d . What is the secret value, k , in terms of a, b, c and d ?

- A. $k = \frac{c-3b}{2a+2d}$
 B. $k = \frac{b-3c}{2a+2b}$
 C. $k = \frac{2c-6b}{a+d}$
 D. $k = \frac{6b-2c}{a+d}$

$$2 \times \frac{c-3b}{\frac{1}{2}(a+d)} = \frac{2c-6b}{a+d}$$

2. Vanessa's company has a bonus policy. At the end of each month, based on his or her performance, every employee gets effort points. At the end of each year, each employee gets paid a fixed bonus amount of 400\$ and an additional bonus of 50\$ for each effort point earned by the employee. At the end of the year 2019, Vanessa got a bonus of 1000\$. How many effort points had she earned during the year 2019?

- A. 2
 B. 2.375
 C. 12
 D. 200

$$400 + 50x = 1000$$

$$50x = 600$$

$$x = \frac{600}{50}$$

$$x = 12$$

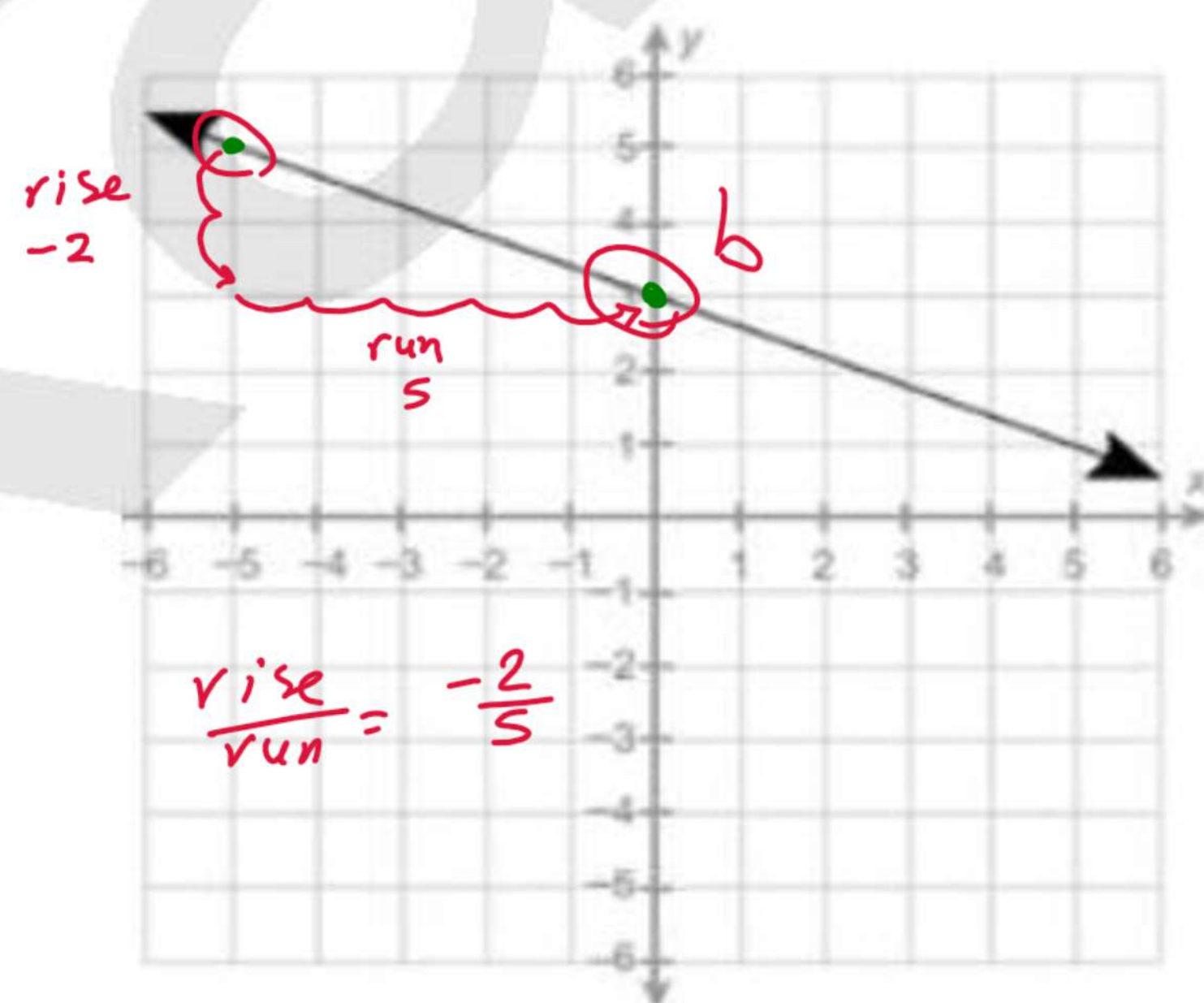
3. The straight line m has an equation $y = 3x$. The point A of coordinates (1,3) is on m . The line p is perpendicular to m at point A. Which of the following points is on p ?

- A. (3, 9)
 B. (5, $\frac{5}{3}$)
 C. (3, 0)
 D. (0, 0)

$$m = -\frac{1}{3}$$

$$A) \frac{9-3}{3-1} = 3$$

$$B) \frac{\frac{5}{3}-3}{5-1} = -\frac{1}{3}$$



4. The graph shown represents which of the following equations?

- A. $y = -\frac{2}{5}x - 3$
 B. $y = \frac{2}{5}x + 3$
 C. $y = -\frac{2}{5}x + 3$
 D. $y = -\frac{5}{2}x + 3$

5. When a system of two linear equations has **no solution**, how do the graphs of the equations appear?

A. The lines intersect at a single point.
 B. The lines have the same x-intercept.
 C. The lines are **parallel**.
 D. The lines are **confounded**.

8. What is the solution for x in $2 = \sqrt{2x - 3}$?

A. 2.5
 B. 3.5
 C. 4.5
 D. 0.5

Shift
Solve

$$\begin{aligned} 4 &= 2x - 3 \\ 7 &= 2x \\ \frac{7}{2} &= x \\ 3.5 &= x \end{aligned}$$

6. Amina has a bag of 6 black balls and 4 green balls. Hamad has a bag of 3 black balls and 5 green balls. If one ball is drawn from each bag, what is the probability that one is black and one is green?

A. 0.225
 B. 0.25
 C. 0.475
 D. 0.525



or + and x

$$\frac{6}{10} \times \frac{5}{8} + \frac{4}{10} \times \frac{3}{8} = 0.525$$

7. A store did a sale on a pair of shoes. It is **now** for \$103.5 instead of \$230. What is the **percent discount**?

A. 50%
 B. 45%
 C. 55%
 D. 58%

new old

$$\% \text{ change} = \frac{N - O}{O} \times 100$$

$$= \frac{103.5 - 230}{230} \times 100 = -55$$

9. If the ratio of vaccinated teachers to non-vaccinated teachers in a school is 6:7, what is the percentage of the vaccinated school teachers?

a) 7.69%
 b) 85.71%
 c) 46.15%
 d) 53.84%

$$\begin{array}{lcl} \checkmark & : & \cancel{N} : \text{Total} \\ 6 & : & 7 : 13 \\ x & : & : 100 \end{array}$$

$$x = \frac{6 \times 100}{13} = 46.15\%$$

10. During the final game of UEFA Euro 2020 between Italy and England, 67,173 fans attended the game in Wembley Stadium in London, England. Assuming that the ratio of adults to children who attended the game was approximately 13 to 6, which of the following numbers represents approximately the number of children who attended the game live in the stadium?

A. 21213
 B. 31002
 C. 36170
 D. 45960

Ab: C . Total

$$\begin{array}{lcl} \cancel{13} & : & \cancel{6} : 19 \\ x & : & 67173 \end{array}$$

$$x = \frac{6 \times 67173}{19} = 21213$$

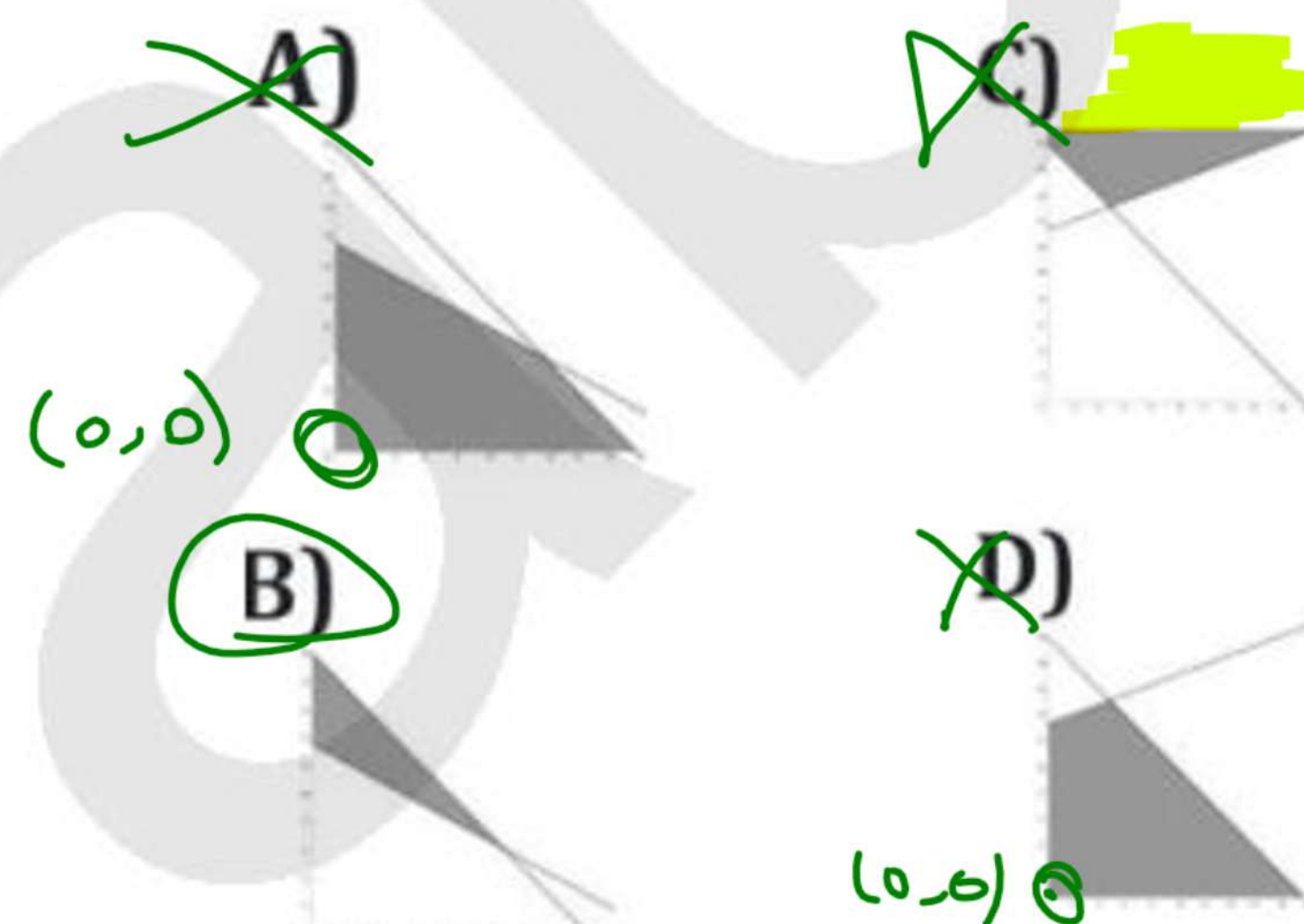
11. From 2020 to 2021, the amount in Tom's bank account decreased by 11% to \$49840. What was the initial amount in her bank account?

A. \$54820
~~B. \$44358~~
 C. \$56000
~~D. \$45309~~

$$0.89n = \frac{49840}{0.89}$$

Final $\rightarrow A = P(1 \pm r)^t \leftarrow \text{intervals}$
 initial \uparrow

13. Christopher needs to save \$250 for the new PlayStation he wishes to buy in a week. He went to work in a coffee shop where he is going to be paid \$10 per hour. In addition, he accepted to help his father in carpentering for \$18.5 per hour. However, he cannot work more than 20 hours this week due to his university schedule. Which of the following graphs will show the correct representation of this problem?



12.
$$\begin{cases} -3y + 0.5x = 1 \\ -2.3x = -1.5 - 0.3y \end{cases}$$

$$\begin{aligned} 0.5x - 3y &= 1 \\ -2.3x + 0.3y &= -1.5 \end{aligned}$$

From the system of equations above which can be graphed in the xy-plane, what is the sum of the abscissa and the ordinate of the intersection of the two lines?

A) $\frac{53}{135}$

C) $\frac{23}{27}$

B) $\frac{65}{141}$

D) $\frac{157}{5}$

$$x = \frac{28}{45}, y = \frac{-31}{135}$$

$$\begin{aligned} x + y &= \frac{28}{45} + \frac{-31}{135} \\ &= \frac{53}{135} \end{aligned}$$

Mode
5
1

14. In a sports academy, the ratio of kids learning basketball to kids learning football is 8:10, while the ratio of kids learning football to kids learning ping-pong is 15:6. If there are 20 kids learning basketball, how many kids are learning ping-pong?

A) 10

C) 25

B) 12

D) 40

$$\begin{aligned} B : f : P \\ 8 : 10 : \\ \frac{12}{20} : \frac{15}{10} : \frac{6}{10} \\ \frac{8 \times 15}{10} = 12 \end{aligned}$$

$$x = \frac{6 \times 20}{12} = 10$$



Sat 10:30 PM
 EST: 1 Tues 10:30 PM

EST: 2 Sat 1:00 PM
 Mon 3:00 PM