TOP 30 MISSED QUESTIONS *puzzle*

These questions were most often answered incorrectly by high school students across North Carolina on NC EMPT test over the past three years. The questions below are compiled from test versions 2018-2019 and 2019-2020 (Note: During COVID years, the 2019-2020 was also used in 2020-2021). The questions are typical of those found on actual college math placement exams throughout UNC institutions and NC community colleges, so it is important to practice and avoid the same errors. Below are the top thirty commonly missed questions. The last page contains the scrambled answers. These can be cut out and pasted into the answer box or rewritten in the answer box for each of the numbered problems.

1 Determine the x-intercept first, and then the y-intercept, of the graph of $7x - 5y = 35$.
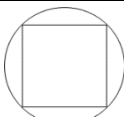
Answer:

2 Solve the inequality: $2x - 5 < 5x + 9$

Answer:

3 One brother is 6 feet tall and his younger brother is 5 feet tall. What is the length of the younger brother's shadow if the older brother's shadow is $\frac{8}{3}$ feet long?

Answer:

4 What is the domain of the function $y = \sqrt{x}$?

Answer:

5 Write in lowest terms: $\frac{2x^2 - 8}{x^2 + 2x}$ $\quad (x \neq 0, -2)$

Answer:

6 What is the equation of the line passing through $(-2, 5)$ and perpendicular to $y - 3x = 8$?

Answer:

7 The square shown to the right has a side length of 6 inches and is inscribed in the circle. What is the diameter of the circle in inches?

Answer:

8 Find an equivalent form of: $\frac{x}{3} + \frac{x}{2} - \frac{x}{5}$

Answer:

9 Solve for x: $4x^2 + 1 = 12x$

Answer:

10 A rectangular patio is 30 ft wide and is enclosed by 230 ft of fencing. What is the area of the patio in square feet?

Answer:

11 Which graph represents the solutions of the inequality $x^2 - 14x > 15$?

Answer:

12 Find the <u>sum</u> of the solutions of this absolute value equation: $|x + 4| = 2$
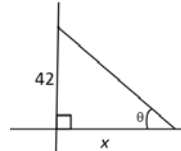
Answer:

13 A cable on a bridge is modeled by: $g(x) = -x^2 + 40x - 175$. For what value of x is the value of $g(x)$ the greatest?

Answer:

14 The quadratic equation $x^2 - 8x = 20$ is to be solved by completing the square. Which equation below would be a step in that solution?

Answer:

15 The angle of elevation, θ, from a ship to the top of a 42m lighthouse on the shore is 33°. Let x represent the horizontal distance in meters from the ship to the base of the lighthouse. Which equation would correctly find the value of x?
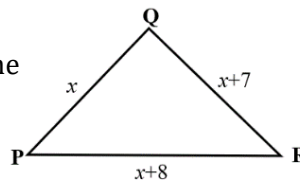

Answer:

16 Kelly bought 6 used CDs for a total of $39.00. At that rate, what would she have to pay for 11 used CDs?

Answer:

17 The price of propane is $4.10 per gallon. If this represents a 30% increase over last year's price, what was the price of a gallon of propane last year?

Answer:

18 Given right triangle PQR with right angle Q, what is the area of triangle PQR, in terms of x?

Answer:

19 Simplify: $\dfrac{x^2-4}{5x} \cdot \dfrac{30}{3x-6}$ $(x \neq 0, 2)$

Answer:

---

20 The graph of which of the following equations is a line that is parallel to the graph of $x - 5y = 8$?
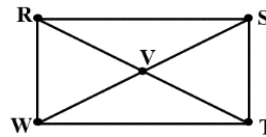
Answer:

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21 Given $f(x) = 2x^2 + x + 3$ and $g(x) = 4x^3 - 5x^2 - 7$, find $(f - g)(x)$.

Answer:

---

22 When the polynomial $4x^4 - 13x^2 - 2x + 1$ is divided by $x - 2$, what is the remainder?

Answer:

---

23 In rectangle $RSTW$, $RT = 3x + 15$ and $SW = 4x - 5$. $\overline{RT}$ and $\overline{SW}$ intersect at point V. Find the length of $\overline{WV}$.

Answer:

---

24 The equation $x - \dfrac{3}{x} = \dfrac{1}{2}$ has two solutions. Find the <u>sum</u> of the two solutions.

Answer:

---

25 Solve for x: $49x^4 = 25x^2$

Answer:

---

26 For all values of c, find an equivalent form to $(-32c^{10}d)^{\frac{1}{5}}$.

Answer:

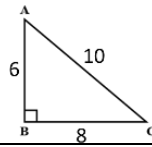**27** Find the solution to the quadratic inequality $x^2 - 14x \leq 15$. Answer in interval notation.

Answer:

---

28 Multiply these complex numbers and write the answer in $a + bi$ form: $(-3 + 2i)(-3 - 7i)$

Answer:

29 Refer to the given right ΔABC. Find the value of this expression:
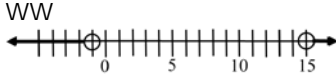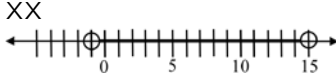$$5\sin A + 10\cos B - 8\tan B$$

Answer:

30 Find x, given this system of two equations: $\begin{cases} x + 2y = 5 \\ 4x - 6y = 9 \end{cases}$

Answer:

Scrambled Answers for the Top 30 Missed Questions Puzzle

BE CAREFUL! There are more possible answers than questions, so choose carefully.

A $y - 2 = 3(x + 5)$	**B** $-\dfrac{14}{3} < x$	**C** $-4x^3 + 7x^2 + x + 10$	**D** $\dfrac{3 \pm 2\sqrt{2}}{2}$
E 9	**F** $(-\infty, -1] \cup [15, \infty)$	**G** $\tan 33° = \dfrac{42}{x}$	**H** $\dfrac{16}{5}$
I $\dfrac{x}{30}$	**J** 0	**K** $x - 4 = \pm 6$	**L** $\pm\dfrac{5}{7}, 0$
M $(x - 4)^2 = 20$	**N** $(5,0)$ and $(0,-7)$	**O** 71.50	**P** $y - 5 = -\dfrac{1}{3}(x + 2)$
Q $\dfrac{1}{2}x(x + 7)$	**R** 37.5	**S** $2 - \dfrac{4}{x}$	**T** $-\dfrac{32}{5}c^2\sqrt[5]{d}$
U 74.50	**V** $12 \pm \sqrt{2}$	**W** 75	**X** $6\sqrt{2}$
Y $3\sqrt{2}$	**Z** $-4x^3 - 3x^2 + x - 4$	**AA** $\dfrac{19x}{30}$	**BB** $\sin 33° = \dfrac{42}{x}$
CC $x < -\dfrac{14}{3}$	**DD** $\dfrac{20}{9}$	**EE** $\dfrac{2(x + 2)}{x}$	**FF** $(-5,0)$ and $(0,7)$
GG $10x - 2y = 8$	**HH** 20	**II** 6	**JJ** -8
KK $6,900$	**LL** $-2c^2\sqrt[5]{d}$	**MM** $[-1, 15]$	**NN** $x \geq 0$
OO $\dfrac{2(x - 2)}{x}$	**PP** $9 - 14i$	**QQ** $\dfrac{2x - 3}{2x}$	**RR** $23 + 15i$
SS 3.15	**TT** $2,550$	**UU** $\dfrac{24}{7}$	**VV** $2x - 10y = 8$
WW	**XX**	**YY** $\dfrac{1}{2}$	**ZZ** $\dfrac{11}{14}$

TOP 30 MISSED QUESTIONS *puzzle*
ANSWER KEY

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Answer:

N: $(5, 0)$ and $(0, -7)$

---

2 Solve the inequality: $2x - 5 < 5x + 9$

Answer:

B: $-\dfrac{14}{3} < x$

---

3 One brother is 6 feet tall and his younger brother is 5 feet tall. What is the length of the younger brother's shadow if the older brother's shadow is $\dfrac{8}{3}$ feet long?

Answer:

DD: $\dfrac{20}{9}$

---

4 What is the domain of the function $y = \sqrt{x}$?

Answer:

NN: $x \geq 0$

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5 Write in lowest terms: $\dfrac{2x^2 - 8}{x^2 + 2x}$ $(x \neq 0, -2)$
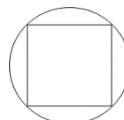
Answer:

OO: $\dfrac{2(x-2)}{x}$

---

6 What is the equation of the line passing through $(-2, 5)$ and perpendicular to $y - 3x = 8$?

Answer:

P: $y - 5 = -\dfrac{1}{3}(x + 2)$

---

7 The square shown to the right has a side length of 6 inches and is inscribed in the circle. What is the diameter of the circle in inches?

Answer:

X: $6\sqrt{2}$

---

8 Find an equivalent form of: $\frac{x}{3} + \frac{x}{2} - \frac{x}{5}$

Answer:

AA: $\dfrac{19x}{30}$

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9 Solve for x: $4x^2 + 1 = 12x$

Answer:

D: $\dfrac{3 \pm 2\sqrt{2}}{2}$

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10 A rectangular patio is 30 ft wide and is enclosed by 230 ft of fencing. What is the area of the patio in square feet?

Answer:

TT: $2,550$

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11 Which graph represents the solutions of the inequality $x^2 - 14x > 15$?

Answer:

JJ: -8

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Answer:

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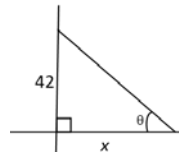
Answer:

HH: 20

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Answer:

K: $x - 4 = \pm 6$

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Answer:

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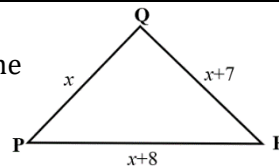
Answer:

O: 71.50

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Answer:

SS: 3.15

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Answer:

Q: $\dfrac{1}{2}x(x + 7)$

---

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VV: $2x - 10y = 8$

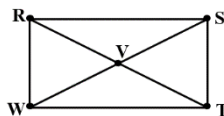**21** Given $f(x) = 2x^2 + x + 3$ and $g(x) = 4x^3 - 5x^2 - 7$, find $(f - g)(x)$.

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C: $-4x^3 + 7x^2 + x + 10$

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Answer:

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R: 37.5

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Answer:

YY: $\dfrac{1}{2}$

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L: $\pm\dfrac{5}{7}, 0$

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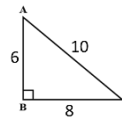**27** Find the solution to the quadratic inequality $x^2 - 14x \leq 15$. Answer in interval notation.

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MM: $[-1, 15]$

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Answer:

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