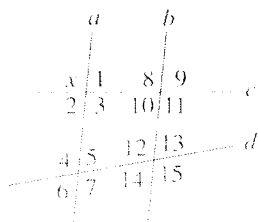




33. The table below shows the total number of goals scored in each of 43 soccer matches in a regional tournament. What is the average number of goals scored per match, to the nearest 0.1 goal?

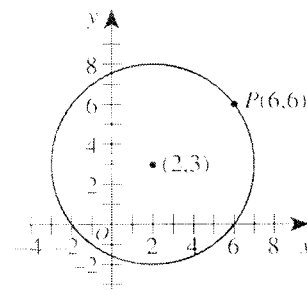
Total number of goals in a match	Number of matches with this total
0	4
1	10
2	5
3	9
4	7
5	5
6	1
7	2

- A. 1.0
B. 2.8
C. 3.0
D. 6.1
E. 17.1
34. Lines a , b , c , and d are shown below and $a \parallel b$. Which of the following is the set of all angles that *must* be supplementary to $\angle x$?

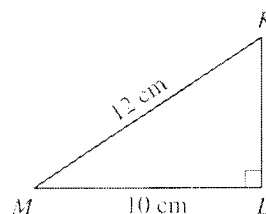


- F. $\{1, 2\}$
G. $\{1, 2, 5, 6\}$
H. $\{1, 2, 9, 10\}$
J. $\{1, 2, 5, 6, 9, 10\}$
K. $\{1, 2, 5, 6, 9, 10, 13, 14\}$
35. $(3x^3)^3$ is equivalent to:
- A. x
B. $9x^6$
C. $9x^9$
D. $27x^6$
E. $27x^9$
36. Which of the following is equivalent to the inequality $4x - 8 > 8x + 16$?
- F. $x < -6$
G. $x > -6$
H. $x < -2$
J. $x > -2$
K. $x < -6$

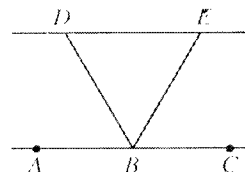
37. As shown in the standard (x,y) coordinate plane below, $P(6,6)$ lies on the circle with center $(2,3)$ and radius 5 coordinate units. What are the coordinates of the image of P after the circle is rotated 90° clockwise ($\odot$) about the center of the circle?



- A. $(2, 3)$
B. $(3, 2)$
C. $(5, -1)$
D. $(6, 0)$
E. $(7, 3)$
38. For right triangle $\triangle KLM$ below, what is $\sin \angle M$?
- F. $\frac{10}{12}$
G. $\frac{12}{10}$
H. $\frac{\sqrt{44}}{10}$
J. $\frac{10}{\sqrt{44}}$
K. $\frac{\sqrt{44}}{12}$



39. In the figure below, B lies on $\overline{AC}$, $\overline{BD}$ bisects $\angle ABE$, and $\overline{BE}$ bisects $\angle CBD$. What is the measure of $\angle DBE$?

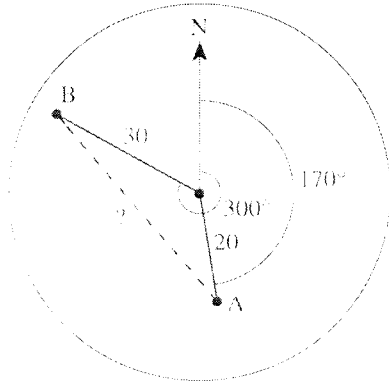


- A. 90°
B. 60°
C. 45°
D. 30°
E. Cannot be determined from the given information
40. If there are 8×10^{12} hydrogen molecules in a volume of 4×10^3 cubic centimeters, what is the average number of hydrogen molecules per cubic centimeter?
- F. 5×10^{10}
G. 2×10^3
H. 2×10^8
J. 32×10^{16}
K. 32×10^{18}



41. In the figure below, a radar screen shows 2 ships. Ship A is located at a distance of 20 nautical miles and bearing 170° , and Ship B is located at a distance of 30 nautical miles and bearing 300° . Which of the following is an expression for the straight-line distance, in nautical miles, between the 2 ships?

(Note: For $\triangle ABC$ with side of length a opposite $\angle A$, side of length b opposite $\angle B$, and side of length c opposite $\angle C$, the law of cosines states $c^2 = a^2 + b^2 - 2ab \cos \angle C$.)



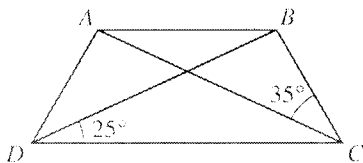
- A. $\sqrt{20^2 + 30^2 - 2(20)(30)\cos 60^\circ}$
 B. $\sqrt{20^2 + 30^2 - 2(20)(30)\cos 130^\circ}$
 C. $\sqrt{20^2 + 30^2 - 2(20)(30)\cos 170^\circ}$
 D. $\sqrt{20^2 + 30^2 - 2(20)(30)\cos 300^\circ}$
 E. $\sqrt{20^2 + 30^2 - 2(20)(30)\cos 470^\circ}$

42. What rational number is halfway between $\frac{1}{5}$ and $\frac{1}{3}$?

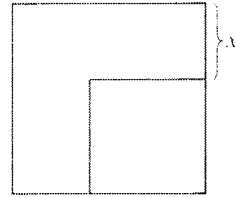
- F. $\frac{1}{2}$
 G. $\frac{1}{4}$
 H. $\frac{2}{15}$
 J. $\frac{2}{15}$
 K. $\frac{8}{15}$

43. In isosceles trapezoid $ABCD$, $\overline{AB}$ is parallel to $\overline{DC}$, $\angle BDC$ measures 25° , and $\angle BCA$ measures 35° . What is the measure of $\angle DBC$?

- A. 85°
 B. 95°
 C. 105°
 D. 115°
 E. 125°



44. In the figure below, the area of the larger square is 50 square centimeters and the area of the smaller square is 18 square centimeters. What is x , in centimeters?



- F. 2
 G. $2\sqrt{2}$
 H. $4\sqrt{2}$
 J. 16
 K. 32

45. Which of the following is a rational number?

- A. $\sqrt{2}$
 B. $\sqrt{\pi}$
 C. $\sqrt{7}$
 D. $\sqrt{\frac{5}{25}}$
 E. $\sqrt{\frac{64}{49}}$

46. If $a < b$, then $|a - b|$ is equivalent to which of the following?

- F. $a + b$
 G. $-(a + b)$
 H. $\sqrt{a - b}$
 J. $a - b$
 K. $-(a - b)$

47. Tom has taken 5 of the 8 equally weighted tests in his U.S. History class this semester, and he has an average score of exactly 78.0 points. How many points does he need to earn on the 6th test to bring his average score up to exactly 80.0 points?

- A. 90
 B. 88
 C. 82
 D. 80
 E. 79

③③ Avg. Number of goals per match:

① Number of Goals ② Number of Match w/ THIS TOTAL

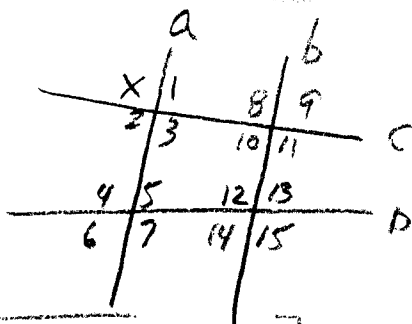
0	4	① · ② ⇒	0
1	10		10
2	5		10
3	9		27
4	7		28
5	5		25
6	1		6
7	2		14
	43 MATCHES		120 goals

$$\therefore \frac{120 \text{ goals}}{43 \text{ MATCHES}}$$

$$\Rightarrow \boxed{2.8 \text{ GOALS/MATCH}}$$

$$\begin{array}{r} 002.79 \\ 43 \overline{) 120.00} \\ \underline{-86} \\ 340 \\ \underline{301} \\ 390 \\ \underline{387} \end{array}$$

③④ a // b



Set $\angle$'s supplementary to $\angle X$? (180°)

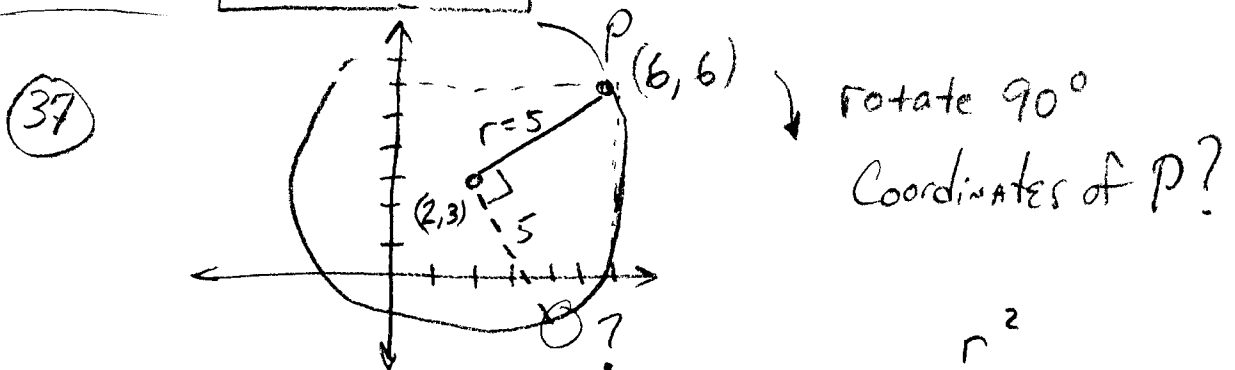
$$\boxed{\{\angle 1, \angle 2, \angle 9, \angle 10\}}$$

$$(35) \quad (3x^3)^3 = 3^3 x^9 = \boxed{27x^9}$$

$$(36) \quad \begin{array}{rcl} 4x - 8 & > & 8x + 16 \\ -8x + 8 & -8x & + 8 \end{array}$$

$$\frac{-4x}{-4} > \frac{24}{-4}$$

$$\boxed{x < -6}$$



Eg. of circle $\Rightarrow (x-2)^2 + (y-3)^2 = 25$

(A) (2, 3) } CANNOT BE ON circle

(B) (3, 2)

(C) (5, -1) $\rightarrow$ CK $\Rightarrow (5-2)^2 + (-1-3)^2 \stackrel{?}{=} 25 \checkmark$

(D) (6, 0) $\rightarrow$ CK $\Rightarrow (6-2)^2 + (0-3)^2 \stackrel{?}{=} 25 \checkmark$

(E) (7, 3) $\rightarrow$ CK $\Rightarrow (7-2)^2 + (3-3)^2 \stackrel{?}{=} 25$ NO

Check distance (6, 6) to (C), (D)

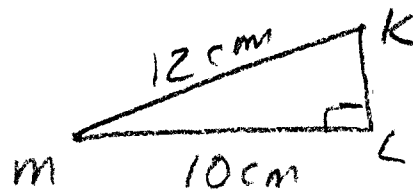
$x^2 = 5^2 + 5^2$
 $x^2 = 50$
 $x = \sqrt{50}$

(A) $d = \sqrt{(6-6)^2 + (6-0)^2} \neq \sqrt{50}$

(C) $d = \sqrt{(6-5)^2 + (6+1)^2} = \sqrt{50} \checkmark$

ANS(C) $\Rightarrow$ (5, -1)

(38) $\sin M = ?$



$$\sin M = \frac{\overline{KL}}{12}$$

$$\overline{KL}^2 + 10^2 = 12^2$$

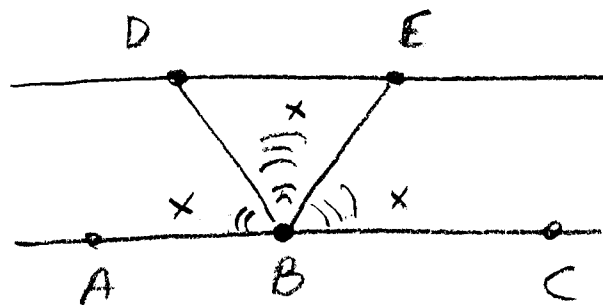
$$\overline{KL}^2 = 44$$

$$\overline{KL} = \sqrt{44} = \sqrt{4}\sqrt{11} = 2\sqrt{11}$$

$$\therefore \sin M = \frac{2\sqrt{11}}{12} = \boxed{\frac{\sqrt{11}}{6} \text{ or } \frac{\sqrt{44}}{12}}$$

↑
RADICAL SHOULD BE SIMPLIFIED

(39)



$\overline{BD}$ BISECTS $\angle ABE$

$\overline{BE}$ BISECTS $\angle CBD$

$$m\angle DBE = ?$$

TRANSITIVE PROPERTY

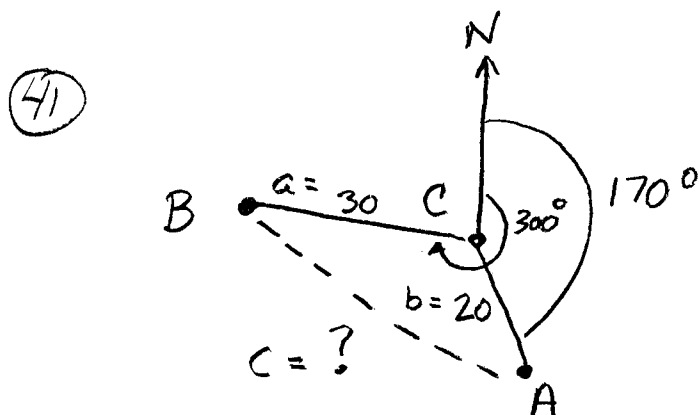
$$\text{If } m\angle ABD = m\angle DBE$$

$$\text{And } m\angle DBE = m\angle EBC$$

$$\text{Then } m\angle ABD = m\angle EBC$$

$$\therefore 3x = 180 \quad \boxed{x = 60^\circ}$$

④① $\frac{8 \times 10^{12}}{4 \times 10^4} \text{ H}_2 \text{ molecules cm}^3 = \boxed{2 \times 10^8 \frac{\text{H}_2 \text{ mol.}}{\text{cm}^3}}$



$$m\angle ACB = 300 - 170 = 130^\circ$$

$$c^2 = a^2 + b^2 - 2ab \cos C$$

$$\boxed{C = \sqrt{30^2 + 20^2 - 2(30)(20)\cos(130^\circ)}}$$

④③ WHAT RATIONAL number halfway between $\frac{1}{5}$ and $\frac{1}{3}$

$$\frac{1}{5} \downarrow \frac{3}{15} \quad \boxed{\frac{24}{15}} \quad \frac{5}{15} \downarrow \frac{1}{3}$$

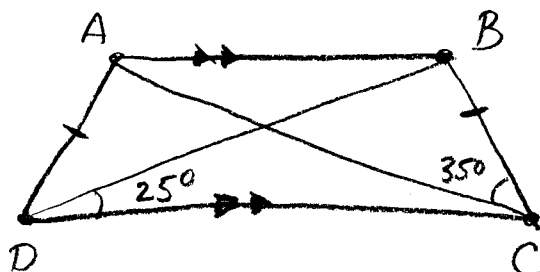
④④ Isosceles Trapezoid
 $m\angle DBC = ?$

$$m\angle D = m\angle C$$

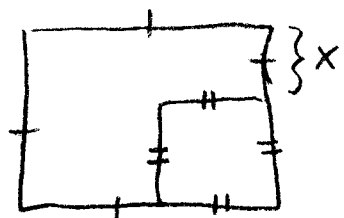
$$\therefore \triangle ADC \cong \triangle BCD \Rightarrow \text{SAS} \quad \therefore m\angle DCA = 25^\circ \quad \text{CPCTC}$$

$$\therefore m\angle C = 35 + 25 = 60^\circ$$

$$\therefore m\angle DBC = 180 - 60 - 25 = \boxed{95^\circ}$$



44



$$A_{\square} = 50 \text{ cm}^2$$

$$A_{\square} = 18 \text{ cm}^2$$

$$x = ?$$

$$A_{\square} = \sqrt{50} \cdot \sqrt{50}$$

$$A_{\square} = \sqrt{18} \cdot \sqrt{18}$$

$$\therefore x = \sqrt{50} - \sqrt{18}$$

$$\sqrt{25\sqrt{2}} - \sqrt{9\sqrt{2}}$$

$$5\sqrt{2} - 3\sqrt{2}$$

$$= \boxed{2\sqrt{2} = x}$$

45 RATIONAL? (A) $\sqrt{2}$ NO

(B) $\sqrt{7}$ NO

(C) $\sqrt{7}$ NO

$$(D) \sqrt{\frac{5}{25}} = \frac{\sqrt{5}}{5} = \text{NO}$$

$$(E) \sqrt{\frac{64}{49}} = \frac{\sqrt{64}}{\sqrt{49}} = \frac{8}{7} = \text{YES}$$

46 $a < b$, then $|a-b| = ?$

$$+(a-b) \quad \swarrow \text{and} \quad \searrow$$

$$\downarrow$$

$$\boxed{\text{K ANSW}} \quad \downarrow$$

④7. 5 of 8 tests done, Avg = 78.0
Points on test 6 to get Avg = 80.0?

$$\frac{(5 \cdot 78) + X}{6} = 80$$

$$\begin{array}{r} 390 + X = 480 \\ - 390 \quad \quad - 390 \end{array}$$

$$\boxed{X = 90}$$
