See instructional videos at www.TonkaMath.com

1. Find the GCF of 60 and 68 *[240-N401]*

   A. 2
   B. 4 *(circled)*
   C. 6
   D. 8
   E. 12

   used GCD on Calculator
   Greatest common Divisor
   found it under "catalog" button
   above the zero key on graphing calc.

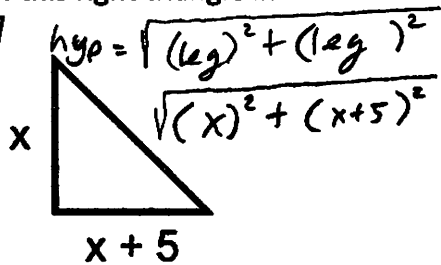2. The volume of a right circular cone can be found with the following formula: $v = \frac{1}{3}\pi r^2 h$. If your ice cream cone can hold 150 cubic centimeters and has a height of 8 cm. What is the cone's radius to the nearest cm. *[215-G405]*

   F. 2
   G. 3
   H. 4 *(circled)*
   J. 5
   K. 6

   $v = \frac{1}{3}\pi r^2 h$
   $150 = \frac{1}{3}(3.14)r^2 \cdot 8$
   $150 = 8.37333 \, r^2$
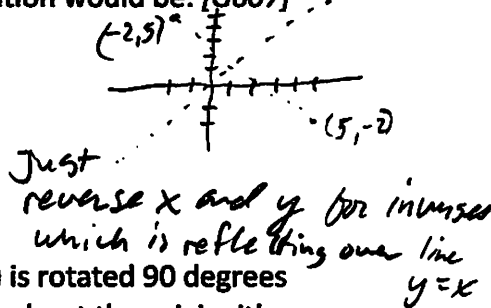 $\sqrt{17.914} = \sqrt{r^2}$ $r = 4.23 \approx 4$

3. Find the hypotenuse of this right triangle in terms of x. *[216-G602]*

   A. $\sqrt{2x+5}$
   B. $\sqrt{2x^2+5}$
   C. $\sqrt{x^2+x+5}$
   D. $\sqrt{x^2+(x+5)^2}$ *(circled)*
   E. $\sqrt{2x^2+25}$

   $hyp = \sqrt{(leg)^2 + (leg)^2}$
   $\sqrt{(x)^2 + (x+5)^2}$

   (right triangle with legs X and x+5)

4. If the point (-2,5) is reflected across the line y = x it's new location would be: *[G607]*

   F. (x,y)
   G. $(7,-3)$
   H. $(2,-5)$
   J. $(5,-2)$ *(circled)*
   K. $(5,2)$

   $(-2,5)$
   Just reverse x and y for inverses which is reflecting over line y=x

5. If the point (3 , 1) is rotated 90 degrees counterclockwise about the origin, it's new location would be: *[G608]*

   A. $(-1, 3)$ *(circled)*
   B. $(1, -3)$
   C. $(3, 4)$
   D. $(4, 3)$
   E. *none of the above*

   (x,y) becomes
   $(opposite \, y, x)$
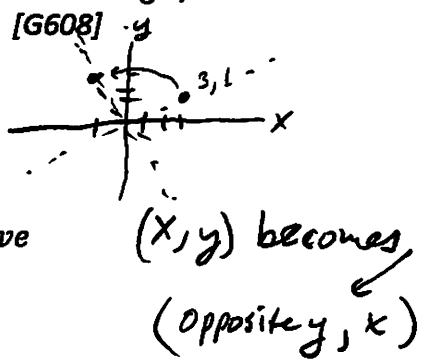
6. Sue is going to rent a chainsaw. There are two options for rental. One is $15 plus $5 per hour and the other is $25 plus $1 per hour. What amount of time would cause the rate to be the same under either plan? *[219-A604]*

   F. 3
   G. 2.5 *(circled)*
   H. 2
   J. 1.5
   K. 1

   $Cost = 25 + 1 \cdot h$
   $Cost = 15 + 5 \cdot h$
   wants costs to be equal
   $25 + h = 15 + 5h$
   $\underline{-15 \qquad -15}$
   $10 + h = 5h$ $10 = 4h$ $h = 2.5$

7. Find the LCM of 20, 25 and 30 *[220-N502]*

   A. 75
   B. 80
   C. 120
   D. 300 *(circled)*
   E. 500

   first used Lcm on calc
   $Lcm (20, 25) = 100$
   Then...
   $Lcm (100, 30) = 300$

8. In the complex number system it is understood that $i^2 = -1$. Given that, what is the product of 3+5i and 8-2i? *[221-N606]*

   F. 34+34i *(circled)*
   G. 34-34i
   H. 48i
   J. 14+34i
   K. 0

   $(3+5i)(8-2i)$
   FOIL
   $24 - 6i + 40i - 10i^2$
   $24 + 34i - 10(-1)$
   $34 + 34i$

9. How many diagonals does a hexagon have? *[230-G705]*

   A. 8
   B. 9 *(circled)*
   C. 10
   D. 11
   E. 12

   $n = number \, of \, sides$
   formula is $\frac{n(n-3)}{2}$
   So... $\frac{6(6-3)}{2}$
   $\frac{(6)(3)}{2} = \frac{18}{2} = 9$

10. The secret puzzle code is found by multiplying the following matrices. What is the secret?
   $\begin{bmatrix} 2 & 3 \\ 1 & 0 \end{bmatrix} \times \begin{bmatrix} 3 & -1 \\ 2 & 2 \end{bmatrix}$? *[N705]*

   F. $\begin{bmatrix} 6 & -3 \\ 2 & 0 \end{bmatrix}$
   G. $\begin{bmatrix} 12 & 4 \\ 3 & -1 \end{bmatrix}$ *(circled)*
   H. $\begin{bmatrix} 6 & -3 \\ -3 & 6 \end{bmatrix}$
   J. $\begin{bmatrix} 10 & 6 \\ 4 & 2 \end{bmatrix}$
   K. *none of the above*

   row times column
   $\begin{bmatrix} R_1C_1 & R_1C_2 \\ R_2C_1 & R_2C_2 \end{bmatrix}$
   $\begin{bmatrix} 2(3)+3(2) & 2(-1)+3(2) \\ 1(3)+0(2) & 1(-1)+0(2) \end{bmatrix}$
   $\begin{bmatrix} 12 & 4 \\ 3 & -1 \end{bmatrix}$

11. Jon has gotten the following test scores so far, 100, 97, 90, and 89. What does he need to get on his next test in order to average exactly a 95 [231-S401]

(handwritten):
$\frac{\begin{array}{r}100\\+97\\+90\\+89\end{array}}{376}$
$\begin{array}{r}95\\\times 5\\\hline 475\end{array}$

A. 101 $5_x \dfrac{100+97+90+89+n}{5} = 95 \times 5$

B. 100

C. 99 *(circled)*

$376+n = 475$
$\quad -376 \quad -376$
$\overline{\qquad}$
$n = 99$

D. 98

E. 97

12. What is the formula for the circle pictured below. [225-AF602]

(graph with circle, labeled (8,8), r=4, (4,4))
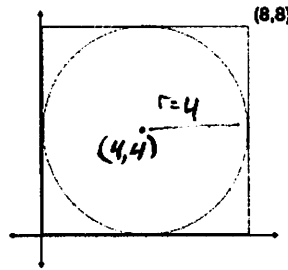
F. $(x+8)^2 - (y+8)^2 = 16$
G. $(x-4)^2 + (y-4)^2 = 64$
H. $(x+4)^2 + (y-4)^2 = 8$
J. $(x+4)^2 + (y-4)^2 = 16$
K. $(x-4)^2 + (y-4)^2 = 16$ *(circled)*

13. None of the lines below are parallel. Which of the following combinations is NOT equal to 180° ? [226-G501]

A. $a+b$
B. $h+g$
C. $d+e+f$
D. $a+c$ *(circled)*
E. none of the above
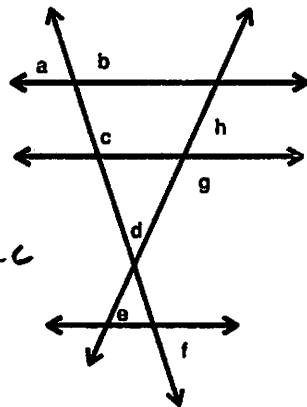
(handwritten): only if the Two lines are parallel will a+c be Supplementary.

(diagram of lines with labels a, b, c, h, g, d, e, f)

14. If you multiply a number by two and subtract 4 it is the same result as if you had tripled the number and subtracted 16. What is the number? [227-AF502]

F. 12 *(circled)*
G. 13
H. 14
J. 15
K. 16

(handwritten):
$2 \cdot n - 4 = 3 \cdot n - 16$
$\underline{-2n \qquad\qquad -2n}$
$\qquad -4 = n - 16$
$\underline{+16 \qquad +16}$
$\qquad 12 = n$

15. Which of the following are equal to $10x^3y^3z^5 + 25x^3y^4z^7 - 20x^2y^6z^9$ [A601]

A. $5(2x^3y^3z^5 + 5x^3y^4z^7 - 10x^2y^6z^9)$
B. $5x^3y^3z^5(2 + 5y^1z^2 - 4y^6z^9)$
C. $5x^2(10x^1y^3z^5 + 5x^1y^2z^7 - 4y^6z^9)$
D. $5x^2y^3z^5(2xyz^4 + 5xy^1z^6 - 4y^3z^8)$
E. $5x^2y^3z^5(2x + 5xyz^2 - 4y^3z^4)$ *(circled)*
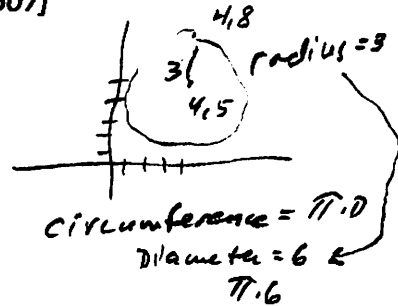
(handwritten): when foiled out It equals

16. The inequality $|x - 5| \le 6$ yields which of the following solution sets? [A-701]

A. $x \le 11$
B. $x \le 1$
C. $x \ge 11$ and $x \le -1$
D. $x \le -1$
E. $-1 \le x \le 11$ *(circled)*

(handwritten): NOTE
$x - 5 \le 6$ or $x - 5 \ge -6$
$\quad +5 \quad +5 \qquad\qquad +5 \quad +5$
$x \le 11 \qquad\qquad x \ge -1$
Combine
$-1 \le x \le 11$

17. Find the circumference and area of a circle when it's center is at (4,5) and a point on the circle is at 4,8. [G507]

F. 6
G. 9
H. 3π
J. 6π *(circled)*
K. $\pi(3)^2$

(handwritten): 4,8 radius = 3 4,5
Circumference = $\pi \cdot D$
Diameter = 6
$\pi \cdot 6$

18. Which of the following equations could be the line perpendicular to $y = -2x - 5$? [G606]

A. $y = -\frac{1}{2}x + 4$
B. $y = \frac{1}{2}x$ *(circled)*
C. $y = -\frac{1}{2}x - 5$
D. $y = -\frac{2}{5}x$
E. $y = 2x - 5$

(handwritten): slope is -2 perp to (-2) means opposite recriprocal pos $\frac{1}{2}$

19. If a is put to the $\frac{2}{3}$ power it will be equal to which of the following? [N605]

F. $\sqrt{a}$
G. $\sqrt[2]{a}$
H. $\sqrt[3]{a^2}$ *(circled)*
J. $\sqrt[2]{a^3}$
K. $\sqrt[3]{a^{-6}}$

(handwritten): $a^{\frac{2}{3}}$ 2 ← power 3 ← root Third root of a, Squared.

20. When using prime factorization to find the least common multiple, Jose had prime factored 28 when he erased the biggest prime factor. What did he erase? [N601]

A. 2
B. 4
C. 7 *(circled)*
D. 14
E. 28

(handwritten):
28
/\
2 14
   /\
  2 7   biggest one
$2 \cdot 2 \cdot 7$