

2006-07 Grade 10 CHAMP Math Contest

Part A: (5 credits each)

1. Using a calculator a student incorrectly multiplies by 10 instead of dividing by 10. The calculator displays an answer of 0.04. The correct answer is:

- a) 40 b) 4 c) 0.4 d) 0.004 e) 0.0004

2. If the diameter of a circle is π , the area of the circle will be:

- a) π^3 b) $\frac{\pi^3}{4}$ c) π^2 d) $2\pi^2$ e) none of the above

3. The value of $2 + \frac{2}{2 + \frac{2}{2 + 2}}$ is:

- a) 3 b) 7 c) $2\frac{2}{5}$ d) $2\frac{2}{3}$ e) $2\frac{4}{5}$

4. Peter's mean (average) is currently 80%. On his next test his mark is 87% and his average becomes 81%. How many tests has Peter written?

- a) 5 b) 6 c) 7 d) 8 e) 9

5. A sweater is on sale for 30% off. The total cost of the sweater, including 14% tax, is \$47.84. What is the original price of the sweater?

- a) \$38.18 b) \$58.77 c) \$59.95 d) \$70.90 e) \$92.71

6. The ratio of boys to girls in Ms. Frizzle's class is 3:5. If one boy is added to the class the ratio of boys to girls becomes 2:3. How many girls are in Ms. Frizzle's class?

- a) 3 b) 6 c) 9 d) 10 e) 15

7. A game is played on a Cartesian co-ordinate plane. On each move, a player who is at a point

(x,y) moves to the point $\left(\frac{y}{2}, -x\right)$. After 3 moves a player is at $(1,1)$. Where did he

start?

- a) $(1,1)$ b) $(-2,-2)$ c) $(-1,2)$ d) $(2,-4)$ e) none of the above

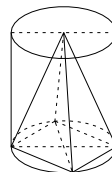
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8. The sum of $1 - 2 + 3 - 4 + 5 - 6 + \dots + 999 - 1000$ is:
a) 500 b) -500 c) 1000 d) -1 e) none of the above
9. The volume of a right circular cone whose height and diameter are equal is 100cm^3 . Find the minimum radius of the cylinder into which the cone will fit.
a) 2.5cm b) 3.2cm c) 3.6cm d) 3.7cm e) 4.6cm
10. A block measuring 4cm x 3cm x 2cm has its surface painted red. The block is then cut into cubes with each edge 1cm. The number of cubes having **exactly one** of its faces painted red is:
a) 0 b) 4 c) 8 d) 12 e) 24

Part B: (6 credits each)

11. If $3x + 7 = x^2 + h = 7x + 15$ then h equals
a) -45 b) -3 c) -2 d) 2 e) 25
12. Find the area of the triangle created by lines $y = 3x$, $x + 3y - 30 = 0$, and the x-axis.
a) 27 unit² b) 45 unit² c) 90 unit² d) 135 unit² e) 270 unit²
13. $\frac{216^{3x-5}}{36^{2x-7}}$ simplifies to
a) 6^{5x+1} b) 6^{5x-1} c) 6^{x+2} d) 6^{x-2} e) 6^{x-12}

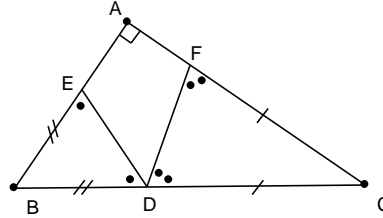
14. A square based pyramid just fits inside a cylinder with radius 4cm and height 12cm.
What percentage of the cylinder is air?



- a) 21% b) 33% c) 50% d) 67% e) 79%

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15. In the diagram provided, $\angle BAC = 90^\circ$, $BE = BD$, $CD = CF$, $\angle BED = \angle BDE$, and $\angle CDF = \angle CFD$. The measure of $\angle EDF$ is



- a) 30° b) 60° c) $52\frac{1}{2}^\circ$ d) 45° e) none of the above

16. A boy agreed to work one year for \$240 and a horse. At the end of seven months, he quit and received \$100 and the horse. What was the value of the horse?

- a) \$96 b) \$100 c) \$160 d) \$240 e) \$436

17. In the diagram at the right, all triangles are equilateral (all sides are equal). What fraction of the big triangle is white?



- a) $\frac{1}{2}$ b) $\frac{5}{16}$ c) $\frac{9}{16}$ d) $\frac{7}{16}$ e) $\frac{1}{4} + \frac{1}{3}$

18. Anna's phone number is *** - ****, where "*" can be any digit from 0 to 9. Here are some clues Anna uses to remember her telephone number:

If you add the first two digits you get the third one.
 The first two digits are consecutive.
 The sixth digit is 2 less than the seventh digit.
 The third and the sixth digit are the same.
 If the fourth digit is the side of a square, the fifth one is its area.
 The fourth digit is a prime and even number.
 The last digit is 9.

Anna's phone number is:

- a) 235 - 2459 b) 347 - 2479 c) 347 - 3979 d) 459 - 1279 e) none of the above

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19. If $a \nabla b = (a + b)^2$, what is the value of
 $(((((1 \nabla - 2) \nabla - 2) \nabla - 2) \nabla - 2) \nabla - 2)$

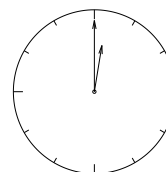
- a) 1 b) -1 c) 2 d) -2 e) none of the above

20. What is the **maximum** number of points of intersection of 6 distinct lines?

- a) 10 b) 15 c) 6 d) 3 e) 1

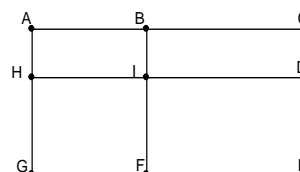
Part C: (8 credits each)

21. The clock you see at the right lost all its numbers and stopped working when it crashed to the ground.
 At what time did this happen?



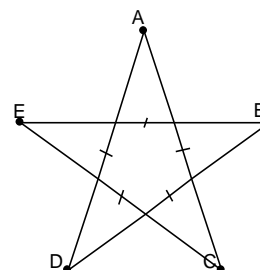
- a) 12:00 b) 1:00 c) 3:15 d) 6:30 e) 9:45

22. In the diagram, the lengths of all line segments are **whole numbers** and all angles are **right angles**. The area of rectangle ABIH is 6 and the area of rectangle IDEF is 15. Determine the **largest** possible area for rectangle ACEG
 (Note: The diagram is not drawn to scale)



- a) 112 b) 44 c) 54 d) 108 e) 128

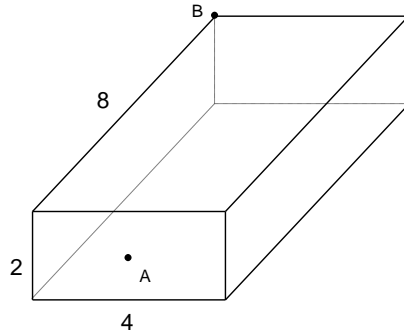
23. For the following figure, find the sum of angles A, B, C, D, and E.



- a) 36° b) 72° c) 108° d) 180° e) 540°

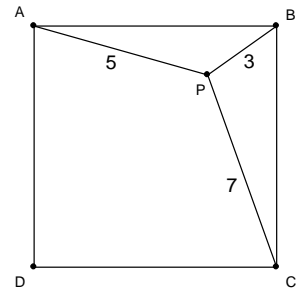
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24. An ant wishes to travel from A to B on the surface of a wooden block with dimensions $2 \times 4 \times 8$ as shown. A is the centre of the front face of the block. The shortest distance the ant can walk is:



- a) $\sqrt{68}$ b) $\sqrt{85}$ c) $1 + \sqrt{68}$ d) $8 + \sqrt{5}$ e) 11

25. P is a point inside square ABCD such that $PA = 5$, $PB = 3$, and $PC = 7$. What is the length of the side of the square?



- a) $\sqrt{30}$ b) $\sqrt{45}$ c) $\sqrt{58}$ d) $\sqrt{75}$ e) $\sqrt{90}$