

30. $14 = 1^2 + 2^2 + 3^2$, $21 = 1^2 + 2^2 + 4^2$, and $35 = 1^2 + 3^2 + 5^2$.
 A) 14 B) 21 C) 28 D) 35
31. 99 months from Jan. 1 is 3 months more than 8 years (96 months). That's April 1.
 A) March B) April C) May D) June
32. $1 + 2 + 4 + 8 + 16 + 32 = 63$.
 A) 5 B) 30 C) 32 D) 63
33. Jim has 12 socks: 4 red, 4 black, and 4 blue. Choosing in the dark, he wants at least one matching pair of socks that are *not* red. He could begin by choosing 4 red, 1 black, and 1 blue. The next one he chooses, the 7th one, must be either a black or blue sock.
 A) 2 B) 3 C) 6 D) 7
34. When a number less than 2 is multiplied by a number less than 1, the product remains less than 2.
 A) 0.25 B) 1 C) 1.75 D) 2.25
35. $2 \diamond 3 = (2 + 3) \times (3 - 2) = 5 \times 1 = 5$; $1 \diamond 5 = (1 + 5) \times (5 - 1) = 6 \times 4 = 24$.
 A) 35 B) 24 C) 2 D) 0
36. The sum of any 6 odd integers is always even.
 A) 108 B) 111 C) 333 D) 345
37. The first 8 flowers average 24 petals each. That's $8 \times 24 = 192$ petals total. The next 12 average 34 petals each, or $12 \times 34 = 408$ petals total. The average is $(192 + 408) \div 20 = 30$.
 A) 28 B) 29 C) 30 D) 31
38. Since $28 = 2^2 \times 7$, its prime factors are 2 and 7, so 2^2 and 7^2 are factors of the square.
 A) 784 B) 49 C) 20 D) 12
39. Harry sold \$7 on the 1st day; $\$(7 + 1 \times 3)$ on the 2nd day; $\$(7 + 2 \times 3)$ on the 3rd day; ...; $\$(7 + 30 \times 3)$ on the 31st day; and $\$(7 + 31 \times 3)$ on the 32nd day. Since he began on July 1, he first sold \$100 worth on August 1.
 A) July 30 B) July 31 C) August 1 D) August 2
40. Sixth powers are both squares and cubes. They always have at least 7 divisors. An example is $2^6 = 8^2 = 4^3$. Its 7 divisors are 1, 2, 2^2 , 2^3 , 2^4 , 2^5 , 2^6 .
 A) 7 B) 6 C) 5 D) 4



30. C
31. B
32. D
33. D
34. D
35. B
36. A
37. C
38. B
39. C
40. A

The end of the contest 8

Information & Solutions

2009-2010 Annual 8th Grade Contest

Tuesday, February 16 or 23, 2010

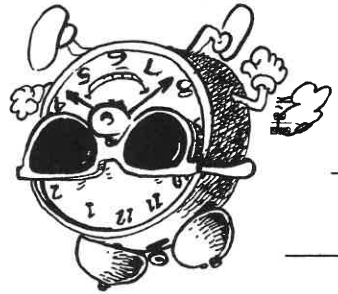
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Contest Information

- **Solutions** Turn the page for detailed contest solutions (written in the question boxes) and letter answers (written in the *Answer Column* to the right of each question).
- **Scores** Please remember that *this is a contest, and not a test*—there is no “passing” or “failing” score. Few students score as high as 30 points (75% correct); students with half that, 15 points, *deserve commendation!*
- **Answers and Rating Scales** Turn to page 146 for the letter answers to each question and the rating scale for this contest.



1.	D	Factor: $2010 = 2 \times 3 \times 5 \times 67$, or use divisibility tests.
2.	A	28% is equal to $28/100 = 7/25$.
3.	A	2.8 B) $\frac{7}{25}$ C) 2800 D) 0.28 $\frac{4}{3} - \frac{5}{20} = \frac{16}{3} - \frac{5}{20} = \frac{20}{3} - \frac{5}{20} = \frac{13}{20}$ A) $\frac{1}{15}$ B) $\frac{15}{2}$ C) $\frac{13}{20}$ D) $\frac{65}{12}$
4.	B	June has 30 days. Al worked at the pool for $0.2 \times 30 = 6$ days. A) 3 B) 6 C) 9 D) 12
5.	C	Of choices, only 110° and 120° are obtuse angles; $120^\circ + 60^\circ = 180^\circ$ already, $110^\circ + 60^\circ + 10^\circ$ works. A) 30° B) 90° C) 110° D) 120°
6.	A	$0.8 = 8/10 = 4/5$. A) $\frac{5}{4}$ B) $\frac{4}{5}$ C) $\frac{8}{1}$ D) $\frac{100}{8}$
7.	B	6000 seconds = 100 minutes = 1 hour, 40 minutes. It is now 11:40 AM. A) 11:00 AM B) 11:40 AM C) 4:00 PM D) 10:00 PM
8.	D	$2 - 13 - (-7) = 2 - 13 + 7 = -11 + 7 = -4$. A) -18 B) -11 C) -8 D) -4
9.	A	$\sqrt{144} = 12$; 5 less than 12 is 7, and 5 less than 7 is $2 = \sqrt{4}$. A) $\sqrt{4}$ B) $\sqrt{25}$ C) $\sqrt{49}$ D) $\sqrt{134}$
10.	C	Try numbers: $100 \times 1000 = 100000$. This product has 6 digits. A) 12 B) 8 C) 6 D) 5
11.	A	At 2, the min. hand is 10 min. marks, or $10 \times 6^\circ$, away from the hr. hand. A) 2:00 B) 3:30 C) 6:00 D) 9:45
12.	B	The 4 primes are 29, 31, 37, and 41. A) 3 B) 4 C) 5 D) 6
13.	A	$\frac{6 \times 5 \times 5 \times 4 \times 5 \times 3 \times 5}{6 \times 5 \times 4 \times 3} = 5 \times 5 \times 5 \times 5 = 5^4$. A) 5^4 B) 5^3 C) 5^2 D) 5^1
14.	D	$0.3 \times 40 = 0.4 \times 30 = 40\%$ of 30. A) 200 B) 120 C) 60 D) 30
15.	C	The equilateral triangle has perimeter $3 \times 8 = 24$. The length of a side of the square is $24 \div 4 = 6$, so its area is 36. A) 16 B) 24 C) 36 D) 64



16.	D	$\frac{1}{3} \div \frac{2}{8} = \frac{1}{3} \times \frac{8}{2} = \frac{8}{3} = \frac{6}{3} + \frac{2}{3} = 2 + \frac{2}{3}$. A) $\frac{16}{3}$ B) $\frac{5}{2}$ C) $\frac{8}{5}$ D) $\frac{3}{4}$
17.	A	$3^4 + 3^4 + 3^4 = 3 \times 3^4 = 3^1 \times 3^4 = 3^5$. A) 3^5 B) 9^4 C) 3^{12} D) 9^{12}
18.	D	EH's goal was to lift 3.5 kg during his workout, but he was able to lift only 3 kg. EH lifted $3/3.5 = 6/7$ of his goal weight. A) $\frac{1}{1}$ B) $\frac{3}{2}$ C) $\frac{4}{3}$ D) $\frac{7}{6}$
19.	B	As shown below, choice B is the largest. A) 0.02 B) 0.05 C) 0.04 D) 0.03
20.	C	Choose any number as a side-length of A. If you choose 2, A's perimeter is 8, B's is 4, and B's side-length is 1. The areas are 4 and 1. A) $\frac{1}{1}$ B) 2 C) 4 D) 8
21.	B	Multiply through by 8: $13.25:1 = (13.25 \times 8):(1 \times 8) = 106:8$. A) 53 B) 106 C) 122 D) 150
22.	D	The larger a positive number is, the smaller its reciprocal is. A) $\frac{5}{2}$ B) $\frac{7}{3}$ C) $\frac{3}{4}$ D) $\frac{9}{4}$
23.	D	Since $165 \div 15 = 11$, we have 11 groups of 15 students. They'll need $11 \times 2 = 22$ teachers. A) 11 B) 13 C) 17 D) 22
24.	C	Since 4 oranges cost the same as 1 apple, replace 4 oranges with 1 apple to get 4 apples cost \$4. Thus 2 apples cost $\$4 \div 2 = \2 . A) \$1.00 B) \$1.50 C) \$2.00 D) \$2.50
25.	B	It's 1005 99s in a row, each div. by 11. A) 10 B) 11 C) 12 D) 15
26.	A	$250\% = 2.5$, and $2.5 \times 12 = 30$. A) 12 B) 45 C) 70 D) 75
27.	A	$2.01 \times 10^{2009} = 2.01 \times 10^3 \times 10^{2006} = 2010 \times 10^{2006}$. A) 10^{2006} B) 10^{2007} C) 10^{2012} D) 10^{2013}
28.	B	The only prime number that is divisible by 2 is 2 itself. A) zero B) one C) three D) ten
29.	D	The large circle's area is 16π , so its radius is 4. A radius of a small circle is 2. The area of each small circle is $2^2 \times \pi = 4\pi$. The shaded region's area is $16\pi - (4\pi + 4\pi) = 8\pi$. A) 4π B) 5π C) 6π D) 8π

