



2005 OCTM CONTEST ANSWER SHEET

SCORE: ****KEY****

Student's High School _____ Student's Name _____
 (First name) (Last name — **PRINT**)
 E-mail address _____ Student Grade _____
 (print legibly) (9,10,11,12)

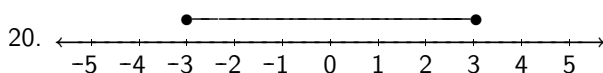
Please give HOME e-mail and contact information (so that you can be notified for OHMIO and/or scholarship offers):

STREET _____ CITY _____ STATE _____ ZIP _____ TELEPHONE (area code) _____ Gender _____
 (M,F)

Answers for questions 1–20 must be exact and in simplest form.

Answers for questions 21–40 may be exact OR correctly rounded to four decimal places.

1. 2005
2. 5
3. diagonal
4. 101
5. B
6. $\frac{3}{7}$
7. Tuesday
8. A
9. $46\frac{10}{27}$ **or** $\frac{1252}{27}$ **or** $46.\overline{370}$
10. A
11. 96 seconds
12. 45 or 24 units *need both*
13. (0,11) **or** 11
14. 50
15. B
16. $y = -2\sin(x - \frac{\pi}{2}) + 1$ **or** $y = 2\sin(x + \frac{\pi}{2}) + 1$
17. 8
18. $x = 1$ *must be the equation "x = 1"*
19. i. B ii. D iii. A



21. \$24,060
22. $h = \frac{3V}{s^2}$ **or** $h = \frac{V}{(1/3)s^2}$
23. 1037,1716,2005 **or** 1357,1476,2005 **or** 2005,4812,5213 **or** 1203,1604,2005 **or** 200,1995,2005 **or** 2005,80388,80413 **or** 2005,402000,402005 **or** 2005,2010012,2010013
24. a) (200, -5) b) (5, 200)
25. 1
26. $5 + 3\sqrt{5} + \sqrt{10}$ **or** 14.8705 cm
27. 27.2614° or 332.7386°
need both; "°" optional; "x =" acceptable
28. $k = -\frac{1}{6}$ **or** -0.1667 **or** $-0.\overline{16}$
29. 13π **or** 40.8407 cm²
30. -17 **or** -16.5
31. 2 or 16 *need both; "x =" acceptable*
32. -4 or 1 *need both; "a =" acceptable*
33. 586.8127 **or** $4\pi \left(\frac{2005}{2\pi}\right)^{2/3}$ **or** $2(2\pi)^{1/3}2005^{2/3}$ cm²
34. 12
35. $\frac{2}{3}$
36. $\sqrt{5}$ **or** 2.2361 *"x =" acceptable*
37. B
38. catenary **or** hyperbolic cosine
39. $\frac{1}{8}(5m + 3n)$ **or** $\frac{5}{8}m + \frac{3}{8}n$ **or** $\frac{5m + 3n}{8}$
40. $56\frac{2}{3}$ **or** 56.6667 **or** $56.\overline{6}$ mph