

## Adaptations of AP problems: Answer Key

*2003 Calculus AB Form B question 5 for Middle Grades:*

1. 0, 4, and 6
2. 1 and 3
3. Between 0 and 4, and between 6 and 7
4. Between 4 and 6
5. Between 0 and 2, and between 5 and 7
6. Between 2 and 5
7. 4
8. 2
9. -1
10. 5
11. 8 square units. Check students' work.

*2003 Calculus AB Form B question 5 for Algebra 1:*

1. 0
2. 2
3.  $y = 2x$
4. Check students' work.
5.  $f(2) = 4$
6.  $x = 1$  and  $x = 3$
7. Between 0 and 4, and between 6 and 7
8. Between 0 and 2, and between 5 and 7
9. -2
10.  $y = -2x + 8$
11.  $\sqrt{20} = 2\sqrt{5} \approx 4.47$  units
12. See graph.
13. 10.5 square units

*2003 Calculus AB Form B question 5 for Geometry (1):*

1. 2
2. Check students' work.
3.  $\sqrt{20} = 2\sqrt{5} \approx 4.47$
4. See graph.
5. 2
6. The slopes and the lengths have not changed.
7.  $g(x) = f(x) - 2$
8. In any  $m(x) = f(x) + k$ , the new segments are parallel to the old ones, so they have the same slope. Their lengths have not been altered.
9.  $p(x) = f(x - 2)$

10. When a segment is translated vertically or horizontally, their slopes and lengths will not change.
11.  $x = 2$
12. Slope of  $\overline{OA} = 2$ ; slope of  $\overline{AB} = -2$
13. Slope of  $\overline{BC} = -1$ ; slope of  $\overline{CE} = 1$
14. The slopes will be opposites of each other.
15. See graph:  $k(x) = f(-x)$
16. See graph:  $m(x) = -f(x)$
17.  $4\sqrt{5} + 3\sqrt{2} \approx 13.2$  units
18. When a segment is reflected about a vertical line, the length does not change, but the slope becomes the opposite.
19. When a segment is reflected about a horizontal line, the length does not change, but the slope becomes the opposite.

2003 Calculus AB Form B question 5 for Algebra 2/Precalculus:

$$1. \quad f(x) = \begin{cases} 2x, & 0 \leq x \leq 2 \\ -2x + 8, & 2 \leq x \leq 4 \\ -x + 4, & 4 \leq x \leq 5 \\ x - 6, & 5 \leq x \leq 7 \end{cases}$$

2.  $\frac{1}{2}$ ,  $3\frac{1}{2}$ , and 7
3.  $0 < x < 2$  - check students' work.
4.  $0 < x < 2$  - check students' work.
5.  $g(x) = f(x) + 1$
6.  $g(x) = f(x) - 2$
7.  $g(x) = -f(x)$
8.  $g(x) = \frac{4}{5}[f(x) + 1]$
9. The graph will be shifted up by k units.
10. The graph will be shifted to the right by k units.
11. The graph will be stretched vertically by a factor of k.
12. The graph will be shrunk horizontally by a factor of k.

2003 Calculus AB/BC question 1 for Middle Grades:

1. See graph.
2. See graph.
3. 7 units. Check explanation.
4. See graph.
5. (8, 1)
6. No, it divides  $\overline{AB}$  into 2 unequal segments.

7. 4 units. Check explanation.
8. Scalene – no two sides have the same length.
9. 14 square units. Check students' work.

*2003 Calculus AB/BC question 1 for Algebra 1:*

1. See graph.
2. (8,5), (2,1) and (9,1). Check students' work.
3. See graph.
4.  $\sqrt{17}(\approx 4.12)$ ,  $\sqrt{52}(\approx 7.21)$ , and 7.
5. 14 square units
6. Answers will vary: one example is (0,0), (0,2), (7,0), and (7,2).
7. Check students' work.
8. Answers will vary: previous example yields  $y = 0, x = 0, x = 7,$  and  $y = 2.$

*2003 Statistics Form B question 5 for Middle Grades:*

1.  $\frac{1}{4}$
2.  $\frac{3}{4}$
3.  $\frac{1}{2}$
4. 0
5. 1
6.  $\frac{3}{4}$
7.  $\frac{1}{4}$
8.  $\frac{1}{16}$
9. Answers will vary.
10. Answers will vary.
11. 25% each.
12. Answers will vary.
13. \$200
14. Answers will vary.

*2003 Calculus AB Form B question 5 for Geometry (2):*

1. See graph.
2. Check students' work. Should describe dividing into simpler figures and adding areas.
3. 14.5 square units.
4. See graph.

5. Check students' work. Should describe dividing into simpler figures and adding areas.
6. 28.5 square units
7. The 7 by 2 rectangle at the bottom adds 14 square units.
8. 42.5 square units – check explanation.