ANSWER KEY

(**1**) B

(**2**) C

(**3**) B

(**4**) D

(**5**) D

(**6**) A

(**7**) A

(**8**) B

(**9**) C

(**10**) C

(**11**)

$$(2m + 3n)^3 = (2m + 3n)(2m + 3n)^2 = (2m + 3n)(4m^2 + 12mn + 9n^2)$$
$$= 4m^2(2m + 3n) + 12mn(2m + 3n) + 9n^2(2m + 3n)$$
$$= 8m^3 + 12m^2n + 24m^2n + 36mn^2 + 18mn^2 + 27n^3$$
$$= 8m^3 + 36m^2n + 54mn^2 + 27n^3$$

(**12**) if discriminant, $b^2 - 4ac$, is...

$$
\begin{aligned}
\text{positive} \quad &\ldots 2 \ \mathbb{R} \text{ solutions} \\
\text{zero} \quad &\ldots 1 \ \mathbb{R} \text{ solution} \\
\text{negative} \quad &\ldots 0 \ \mathbb{R} \text{ solutions}
\end{aligned}
$$

(**13**) Let $a_1 = 1$ (the first positive odd integer) and $n = n$. Because we are summing odd numbers only $d = 2$. Then

$$S_n = \frac{n}{2}(a_1 + a_n) = \frac{n}{2}[1 + (a_1 + (n - 1)d)]$$
$$= \frac{n}{2}[1 + 1 + (n - 1)2] = \frac{n}{2}(2 + 2n - 2)$$
$$S_n = \frac{n}{2}(2n) = n^2$$

(**14**)

(i) Supply = Demand $\Rightarrow$

$$\frac{x}{4} + 6 = \frac{1,240}{x}$$

$$x^2 + 24x = 4,960 \qquad \text{(multiplied both sides by LCD = 4x)}$$

$$x^2 + 24x - 4,960 = 0 \qquad \text{(solve using quadratic formula)}$$

$$x = \frac{-24 \pm \sqrt{24^2 - 4(-4,960)}}{2}$$

$$x = \frac{-24 \pm \sqrt{20,416}}{2} = \frac{-24 \pm 142.88457}{2}$$

$$x^* = 59.44, -83.44 \qquad \text{(choose positive units only)}$$

(ii)

$$p^* = \frac{1,240}{x^*} = \frac{1,240}{59.44} = \$20.86$$

GRADING SCALE

Raw Score	Final Score
30.5	100
30	99.375
28.5	97.5
28	96.875
27.5	96.25
27	95.625
26.5	95
26.25	94.6875
25.5	93.75
25	93.125
24.75	92.8125
24	91.875
23.5	91.25
22	89.375
21.25	88.4375
21	88.125
20.75	87.8125
20.5	87.5
20	86.875
19	85.625
17.5	83.75
17	83.125
16.5	82.5
16	81.875
15	80.625
14	79.375
13.75	79.0625
13.5	78.75
13	78.125
11	75.625
10.5	75
9.5	73.75
9	73.125
8.5	72.5
7	70.625
2	64.375