1. [Example 2 p: 702]
The curve represented by the parametric equations

$$x = \frac{1}{\sqrt{t+1}} \text{ and } y = \frac{t}{t+1}; \quad -1 < t \leq 0$$

is given by the rectangular equation

(a) $y = 1 - x^2, \quad x \geq 1$ (correct)

(b) $y = 1 - x^2, \quad 0 \leq x \leq 1$

(c) $y = x^2 - 1, \quad x > 0$

(d) $y = -1 - x^2, \quad 0 < x < 1$

(e) $y = \dfrac{x}{1+x}, \quad -1 < x \leq 0$

2. [Question #43 p: 707]
A possible set of parametric equations for the line through $(0,0)$ and $(4,-7)$ is

(a) $x = 4 + 4t, \quad y = -7 - 7t$ (correct)

(b) $x = 1 - 4t, \quad y = 1 + 7t$

(c) $x = -4 + 4t, \quad y = -7t$

(d) $x = 4 - 4t, \quad y = 7 - 7t$

(e) $x = -7t, \quad y = 4t$

3. [Question # 38 p: 715]

Let C be the curve given by the parametric equations

$$x = \cos\theta,\ y = 2\sin 2\theta \text{ on } [0, 2\pi)$$

Let m be the number of **points** on the curve at which the tangent line is horizontal, and n be the number of **points** on the curve at which the tangent line is vertical. Then

(a) $m = 4$ and $n = 2$ (correct)

(b) $m = 4$ and $n = 0$

(c) $m = 2$ and $n = 0$

(d) $m = 2$ and $n = 4$

(e) $m = 0$ and $n = 4$

4. [Question # 45 p: 716]

The parametric curve given by

$$x = 2t + \ln t,\ \text{and } y = 2t - \ln t$$

is

(a) concave upward when $t > 0$ (correct)

(b) concave downward when $t > 0$

(c) concave upward when $0 < t < \frac{1}{2}$ and downward when $t > \frac{1}{2}$

(d) concave downward when $0 < t < \frac{1}{2}$ and upward when $t > \frac{1}{2}$

(e) concave downward when $0 < t < \frac{1}{4}$

5. [Similar to Example # 4 p: 722]
An interval of θ over which the rose curve represented by the polar equation $r = \sin 3\theta$ is traced only once is

(a) $[0, \pi)$ (correct)

(b) $[0, \frac{2\pi}{3})$

(c) $[\frac{\pi}{3}, \frac{2\pi}{3})$

(d) $[\frac{\pi}{3}, \pi)$

(e) $[0, 2\pi)$

6. [Question # 64 p: 727]
The slope of the tangent line to the graph of $r = 2 + 3\sin\theta$ at $\theta = \pi$, is

(a) $-\frac{2}{3}$ (correct)

(b) $\frac{2}{3}$

(c) $-\frac{1}{2}$

(d) $\frac{1}{2}$

(e) 0

7. [Similar to Question # 13 p: 735]
The area of the region interior of $r = 2 + \sin\theta$ and below the polar axis is

(a) $\dfrac{9\pi}{4} - 4$ (correct)

(b) $\dfrac{9\pi}{2}$

(c) $\dfrac{9\pi}{4}$

(d) $\dfrac{9\pi}{2} - 4$

(e) $\dfrac{9\pi}{4} - 8$

8. [Question # 45 p: 736]
The area of the region that lies inside $r = 1 + \cos\theta$ and outside $r = \cos\theta$ is

(a) $\dfrac{5\pi}{4}$ (correct)

(b) π

(c) $\dfrac{\pi}{3}$

(d) $\dfrac{7\pi}{4}$

(e) $\dfrac{5\pi}{2}$

9. [Question # 47 p: 760]
Let $\vec{v} = \langle a, b \rangle$ be the vector of magnitude 5 and in the same direction as the vector $\langle -1, 2 \rangle$. Then $a + b =$

(a) $\sqrt{5}$ (correct)

(b) 5

(c) $2\sqrt{5}$

(d) $-\sqrt{5}$

(e) $3\sqrt{5}$

10. [Question # 71 p:768]
The four vertices of a parallelogram $ABCD$ taken in order are $A(2, 9, 1)$, $B(3, 11, 4)$, $C(1, 12, a)$ and $D(0, b, 2)$. Then $a + b =$

(a) 15 (correct)

(b) 5

(c) 20

(d) -15

(e) 6

11. [Question # 28 p: 777]
The triangle with vertices $(-3, 0, 0)$, $(0, 0, 0)$ and $(1, 2, 3)$

(a) is obtuse (correct)

(b) is acute

(c) is right

(d) is equilateral

(e) has zero area

12. [Question # 44 p:777]
The vector component of $\vec{u} = \langle 5, -1, -1 \rangle$ **orthogonal** to $\vec{v} = \langle -1, 5, 8 \rangle$ is

(a) $\vec{u} + \frac{1}{5}\vec{v}$ (correct)

(b) $\vec{u} - \frac{1}{5}\vec{v}$

(c) $-\vec{u} + \frac{1}{5}\vec{v}$

(d) $\vec{u} + \frac{6}{\sqrt{10}}\vec{v}$

(e) $\vec{0}$

13. [Question # 26 p: 785]
The area of the triangle with vertices $A(2, -3, 4)$, $B(0, 1, 2)$ and $C(-1, 2, 0)$ is

(a) $\sqrt{11}$ (correct)
(b) $\sqrt{13}$
(c) $\sqrt{7}$
(d) $\sqrt{5}$
(e) $\sqrt{3}$

14. [Similar to Example# 5 p: 784]
Consider the three vectors $\vec{u} = \langle 1, 3, 1 \rangle$, $\vec{v} = \langle 0, 6, 6 \rangle$ and $\vec{w} = \langle -4, 0, -4 \rangle$. Then $\vec{u} \cdot (\vec{v} \times \vec{w}) =$

(a) -72 (correct)
(b) 64
(c) 72
(d) 24
(e) -64

15. [Question # 41 p: 767]
If the standard equation of the sphere with center $(-7, 7, 6)$ and tangent to the xy- plane is $(x-a)^2 + (y-b)^2 + (z-c)^2 = r^2$, then $a+b+c+r^2 =$

(a) 42 (correct)

(b) 6

(c) 12

(d) 14

(e) 26