Name_____ Sec_____

MATH 251/253   Quiz 2   Spring 2008

Section 508/200,501,502   P. Yasskin

1-4	/20
5	/10
Total	/30

Multiple Choice: (5 points each)

1. A triangle has vertices $P = (-1,2,-3)$, $Q=(3,2,1)$, and $R = (-1,-1,0)$.

Find a vector perpendicular to the plane of the triangle.

   a. $(1,-1,-1)$

   b. $(1,1,-1)$

   c. $(-1,-1,-1)$

   d. $(1,-1,1)$

   e. $(15,-8,-12)$

2. A triangle has vertices $P = (-1,2,-3)$, $Q=(3,2,1)$, and $R = (-1,-1,0)$. Find its area.

   a. 3

   b. 18

   c. 36

   d. $6\sqrt{3}$

   e. $12\sqrt{3}$

3. Find an equation of the plane containing the triangle with vertices

   $P = (-1,2,-3)$, $Q=(3,2,1)$, and $R = (-1,-1,0)$.

   a. $x - y - z = 1$

   b. $x + y - z = 1$

   c. $x - y - z = 0$

   d. $x + y - z = 0$

   e. $x + y - z = -1$

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4. Find the point where the line $(x,y,z) = (3,2,1) + t(1,2,3)$ intersects the plane $x - y + z = -2$.

    a. $(5,14,7)$

    b. $(5,6,7)$

    c. $(1,2,-1)$

    d. $(1,2,-5)$

    e. $(1,-2,-5)$

5. (10 points)   Consider the quadratic equation $x^2 - y^2 + 4z^2 + 2x - 6y - 8z = 8$

    a. Complete the squares and bring the equation into standard form.

    b. Identify the equation as one of the following and find the indicated quantities:
- sphere: center, radius
- ellipsoid: center, radii
- hyperboloid: center, axis (x, y or z), 1-sheet or 2-sheets, asymptotic cone
- cone: vertex, axis (x, y or z)
- elliptic paraboloid: vertex, direction it opens ($+x$, $-x$, $+y$, $-y$, $+z$ or $-z$)
- hyperbolic paraboloid: vertex, axis (x, y or z)
- cylinder: type (circular, elliptic, hyperbolic, parabolic), axis (x, y or z)