MCV4U Unit 8 Practice Test MC

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. Which three points are on the line *L*: $\vec{r} = (2,-5) + s(2,1),\ s \in \mathbf{R}$?

a. $P(2,-5),\ Q(2,1),\ R(0,-6)$
b. $Q(2,1),\ Q(6,-3),\ R(2,-5)$
c. $P(1,7),\ Q(2,-5),\ R(6,-3)$
d. $P(2,-5),\ Q(6,-3),\ R(0,-6)$

____ 2. Which of the following equations determines a line with normal vector $\vec{n} = (4,3)$ going through the point $P(1,-1)$?

a. $4x + 3y - 1 = 0$
b. $4x + 3y + 1 = 0$
c. $3x + 4y - 1 = 0$
d. $3x + 4y + 1 = 0$

____ 3. Which pair of lines are parallel?

a. $2x + 2y + 2 = 0,\ \vec{r} = (1,2) + s(1,-1),\ s \in \mathbf{R}$
b. $x + 7y - 2 = 0,\ \vec{r} = (2,5) + s(1,7),\ s \in \mathbf{R}$
c. $3x - 4y - 2 = 0,\ \vec{r} = (1,4) + s(-3,4),\ s \in \mathbf{R}$
d. none of the above

____ 4. Determine which line is the same as the line with vector equation $\vec{r} = (2,3,5) + s(1,2,1),\ s \in \mathbf{R}$.

a. $\vec{t} = (1,1,4) + s(-2,-1,-2),\ s \in \mathbf{R}$
b. $\vec{t} = (1,0,3) + s(2,4,2),\ s \in \mathbf{R}$
c. $\vec{t} = (0,-1,3) + s(2,4,2),\ s \in \mathbf{R}$
d. $\vec{t} = (1,1,1) + s(1,2,1),\ s \in \mathbf{R}$

____ 5. Which of the following is not an equation for the line passing through the points $P(1,4,-3)$ and $Q(3,2,1)$?

a. $\vec{r} = (1,4,-3) + s(2,-2,4),\ s \in \mathbf{R}$
b. $x = -t + 3,\ y = t + 2,\ z = -2t + 1,\ t \in \mathbf{R}$
c. $\dfrac{x-3}{2} = \dfrac{y-2}{-2} = \dfrac{z+1}{4}$
d. $\vec{r} = (3,2,1) + s(1,-1,2),\ s \in \mathbf{R}$

____ 6. Determine the value of *k* that makes the lines $\dfrac{x+2}{4} = \dfrac{y+1}{5} = \dfrac{z-3}{3}$ and $\vec{r} = (1,3,6) + s(-2k,2,k),\ s \in \mathbf{R}$, perpendicular.

a. 1
b. 3
c. -3
d. none of the above

____ 7. Determine the parametric equation of the plane that contains the line $\frac{x+2}{5} = \frac{y-3}{3} = \frac{z-2}{2}$ and the point $P(2,5,3)$.

a. $x = 2 + 5s + 4t,\ y = 5 + 3s + 2t,\ z = 3 + 2s + t,\ s,t \in \mathbf{R}$
b. $x = 2 + 5s + 3t,\ y = 5 + 3s + 2t,\ z = 4 + 2s + t,\ s,t \in \mathbf{R}$
c. $x = -2 + 5s + 2t,\ y = 3 + 3s + 5t,\ z = 2 + 2s + 3t,\ s,t \in \mathbf{R}$
d. $x = 5 + 2s + 2t,\ y = 3 - 3s + 5t,\ z = 2 - 2s + 3t,\ s,t \in \mathbf{R}$

____ 8. Which line does not lie on the plane $\overrightarrow{r} = (1,5,0) + s(2,-3,1) + t(1,-1,4),\ s,t \in \mathbf{R}$?

a. $\overrightarrow{v} = (1,5,0) + s(2,-3,1),\ s \in \mathbf{R}$
b. $\overrightarrow{v} = (2,-3,1) + s(1,-1,4),\ s \in \mathbf{R}$
c. $\overrightarrow{v} = (3,2,1) + s(3,-4,5),\ s \in \mathbf{R}$
d. $\overrightarrow{v} = (1,5,0) + s(1,-2,-3),\ s \in \mathbf{R}$

____ 9. Which value of *k* will make the plane $\overrightarrow{r} = (k,3k,12) + s(2,2,3) + t(-1,1,3),\ s,t \in \mathbf{R}$, pass through the origin?

a. 2
b. 1
c. 0
d. -1

____ 10. The two planes $3x - 2y - 4z + 1 = 0$ and $2x - 5y - 3 = 0$ are:

a. perpendicular
b. coincident
c. parallel and distinct
d. none of the above

____ 11. What value of *k* will make the planes π_1: $2x - ky + 3z - 1 = 0$ and π_2: $2kx + 3y - 2z = 4$ perpendicular?

a. 2
b. 4
c. 6
d. 8

____ 12. Which of the following is the normal vector to the plane $z = 0$?

a. $\overrightarrow{n} = (1,1,0)$
b. $\overrightarrow{n} = (1,0,0)$
c. $\overrightarrow{n} = (0,1,0)$
d. $\overrightarrow{n} = (0,0,1)$

____ 13. Determine the value of *k* such that the planes $2x - 3y + kz = 4$ and $ky - z + 3 = 0$ are perpendicular and the value of *k* such that the planes are parallel.

a. no such value, $k = 2$
b. $k = 2$, no such value
c. $k = 0$, no such value
d. no such value, $k = 0$

____ 14. Determine the value of *k* for which the planes $x - 2y + kz + 7 = 0$ and $x - 2y - 2 = 0$ have an angle of intersection of $60°$?

a. 3
b. -4
c. $\sqrt{10}$
d. $-\sqrt{15}$

____ 15. On which of the following planes could the point $P(2,3,-4)$ lie?

a. $x = 3$
b. $y = 3$
c. $z = 3$
d. none of the above

____ 16. Which of the following is the vector equation of the line of intersection between the plane $5x - 2y + 3z + 2 = 0$ and the *xz*-plane?

a. $\overrightarrow{r} = (-1, 0, 1) + s(3, 0, -5),\ s \in \mathbf{R}$

b. $\overrightarrow{r} = (-1, 0, 1) + s(5, 0, 3),\ s \in \mathbf{R}$

c. $\overrightarrow{r} = (-1, 0, 1) + s(1, 1, -1),\ s \in \mathbf{R}$

d. none of the above

____ 17. Which of the following best describes the intersection of the three planes $\pi_1: x = 2$, $\pi_2: y = 6$, and $\pi_3: z = -3$?

a. $\overrightarrow{v} = (2, 0, -3) + s(0, 6, 0),\ s \in \mathbf{R}$

b. $P(2, 6, -3)$

c. There is no intersection.

d. none of the above

____ 18. Which of the following would describe the sketch of the expression $xy + 2y - 3x - 6 = 0$?

a. the planes $x = -2$ and $y = 3$

b. the planes $x = 3$ and $y = -2$

c. the planes $x = 6$ and $y = 2$

d. the planes $x = 3$ and $y = 6$

____ 19. Which of the following planes is the equation for the plane with an *x*-intercept at $P(2, 0, 0)$, a *y*-intercept at $Q(0, -3, 0)$, and is parallel to the *z*-axis?

a. $3x - 2y - 6 = 0$

b. $2x - 3y + z - 6 = 0$

c. $3y - 2z - 6 = 0$

d. $z = -6$

____ 20. Which three points are on the plane $2x - 7y + 3z - 5 = 0$?

a. $P(1, 0, 1)$, $Q(3, 1, 2)$, and $R(4, 3, 6)$

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

c. $P(3, 1, 2)$, $Q(4, 3, 6)$, and $R(5, 0, -2)$

d. $P(4, 3, 6)$, $Q(0, 0, 0)$, and $R(3, 1, 2)$

MCV4U Unit 8 Practice Test MC
Answer Section

MULTIPLE CHOICE

1. ANS: D PTS: 1 REF: Knowledge and Understanding
   OBJ: 8.1 - Vector and Parametric Equations of a Line in R^2
2. ANS: A PTS: 1 REF: Thinking OBJ: 8.2 - Cartesian Equation of a Line
3. ANS: A PTS: 1 REF: Knowledge and Understanding
   OBJ: 8.2 - Cartesian Equation of a Line
4. ANS: C PTS: 1 REF: Thinking
   OBJ: 8.3 - Vector, Parametric, and Symmetric Equations of a Line in R^3
5. ANS: C PTS: 1 REF: Knowledge and Understanding
   OBJ: 8.3 - Vector, Parametric, and Symmetric Equations of a Line in R^3
6. ANS: D PTS: 1 REF: Knowledge and Understanding
   OBJ: 8.3 - Vector, Parametric, and Symmetric Equations of a Line in R^3
7. ANS: A PTS: 1 REF: Application
   OBJ: 8.4 - Vector and Parametric Equations of a Plane
8. ANS: B PTS: 1 REF: Knowledge and Understanding
   OBJ: 8.4 - Vector and Parametric Equations of a Plane
9. ANS: A PTS: 1 REF: Knowledge and Understanding
   OBJ: 8.4 - Vector and Parametric Equations of a Plane
10. ANS: D PTS: 1 REF: Knowledge and Understanding
    OBJ: 8.5 - The Cartesian Equation of a Plane
11. ANS: C PTS: 1 REF: Thinking
    OBJ: 8.5 - The Cartesian Equation of a Plane
12. ANS: D PTS: 1 REF: Knowledge and Understanding
    OBJ: 8.5 - The Cartesian Equation of a Plane
13. ANS: C PTS: 1 REF: Knowledge and Understanding
    OBJ: 8.5 - The Cartesian Equation of a Plane
14. ANS: D PTS: 1 REF: Thinking
    OBJ: 8.5 - The Cartesian Equation of a Plane
15. ANS: B PTS: 1 REF: Knowledge and Understanding
    OBJ: 8.6 - Sketching Planes in R^3
16. ANS: A PTS: 1 REF: Thinking OBJ: 8.6 - Sketching Planes in R^3
17. ANS: B PTS: 1 REF: Knowledge and Understanding
    OBJ: 8.6 - Sketching Planes in R^3
18. ANS: A PTS: 1 REF: Thinking OBJ: 8.6 - Sketching Planes in R^3
19. ANS: A PTS: 1 REF: Thinking OBJ: 8.6 - Sketching Planes in R^3
20. ANS: A PTS: 1 REF: Application OBJ: 8.6 - Sketching Planes in R^3