

1. Find the gradient through (1,2) and (4,8).

2. For $x=2t+1$, find x at $t=3$.

3. Find the horizontal ground distance in the stated flight model.

4. Find the gradient of the line through $(-1,3)$ and $(5,-1)$. Give it to 3 significant figures.

5. Find the radius of $x^2+y^2-4x+2y-20=0$.

6. Perpendicular nonvertical lines have equal gradients.

☐ True ☐ False

7. Elimination can lose the domain and direction, so state the restrictions from the parameter separately.

☐ True ☐ False

8. The Cartesian flight curve is a physically valid model for every real x .

☐ True ☐ False

9. A vertical line $x=k$ has an undefined gradient and cannot be written as $y=mx+c$.

☐ True ☐ False

10. A line perpendicular to any radius is a tangent, wherever it crosses the plane.

☐ True ☐ False

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1. **2.0**

$$\text{Gradient} = (8-2)/(4-1) = 6/3 = 2.$$

2. **7.0**

$$x = 2 \times 3 + 1 = 7.$$

3. **24.0**

$$y = t(20 - 5t) = 0 \text{ gives } t = 4 \text{ after launch; } x = 6 \times 4 = 24 \text{ m.}$$

4. **-0.6666666666666666**

$$m = (-1 - 3)/(5 - (-1)) = -4/6 = -2/3.$$

5. **5.0**

$$\text{The completed equation has } r^2 = 4 + 1 + 20 = 25, \text{ hence } r = 5.$$

6. **False**

Perpendicular gradients multiply to -1 : a gradient of 2 needs $-1/2$. Parallel lines have equal gradients.

7. **True**

True. Elimination can lose the domain and direction, so state the restrictions from the parameter separately.

8. **False**

The model applies only while the object is in flight, between launch and landing.

9. **True**

True. A vertical line $x = k$ has an undefined gradient and cannot be written as $y = mx + c$.

10. **False**

A tangent must be perpendicular to the radius at the point where it touches the circle.