



CAMI Mathematics: Grade 11

GRADE 11 Analytical Geometry

11.8 Parallel and perpendicular lines

1. Parallel and perpendicular lines.

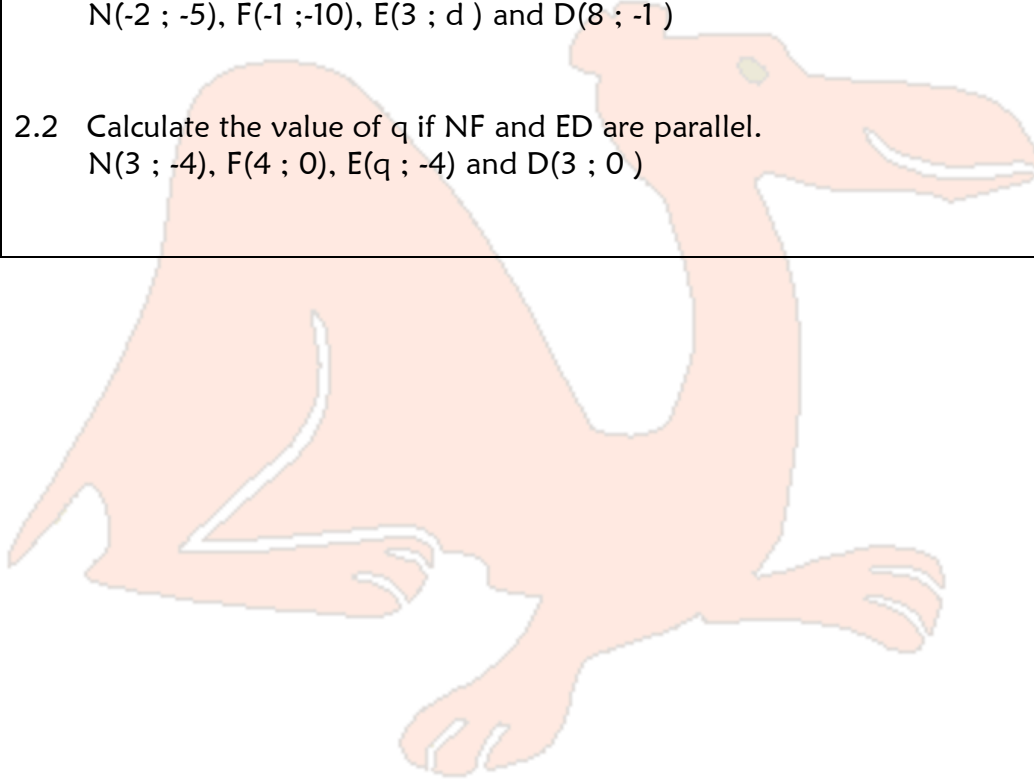
1.1 Calculate the gradient of BC and DE and state whether they are parallel or perpendicular if $B(-3;3)$, $C(1;5)$, $D(2;3)$ and $E(0;-1)$ are given.

1.2 Calculate the gradient of AB and CD and state whether they are parallel or perpendicular if $A(-1;3)$, $B(2;7)$, $C(4;-5)$ and $D(8;-8)$ are given.

2. Determine variables when lines are perpendicular or parallel.

2.1 Calculate the value of d if NF and ED are perpendicular.
 $N(-2 ; -5)$, $F(-1 ; -10)$, $E(3 ; d)$ and $D(8 ; -1)$

2.2 Calculate the value of q if NF and ED are parallel.
 $N(3 ; -4)$, $F(4 ; 0)$, $E(q ; -4)$ and $D(3 ; 0)$





Memo

1. Parallel and perpendicular lines. [8.8.4.1]

$$1.1 \quad m_{BC} = \frac{2}{4} = \frac{1}{2} \quad \text{and} \quad m_{DE} = \frac{-4}{-2} = 2$$

$$m_{BC} \neq m_{DE}$$

BC not parallel to DE

$$m_{BC} \times m_{DE} \neq -1$$

BC not perpendicular to DE.

$$1.2 \quad m_{AB} = \frac{4}{3} \quad \text{and} \quad m_{CD} = \frac{-3}{4}$$

$$m_{AB} \neq m_{CD}$$

AB not parallel to CD

$$m_{AB} \times m_{CD} = \frac{4}{3} \times \frac{-3}{4} = -1$$

AB \perp CD

2. Determine variables when lines are perpendicular or parallel. [8.8.4.2]

$$2.1 \quad N(-2 ; -5), F(-1 ; -10), E(3 ; d) \text{ and } D(8 ; -1)$$

$$m_{NF} = \frac{-5}{1} = -5 \quad \text{and} \quad m_{ED} = \frac{1}{5}$$

$$\frac{1}{5} = \frac{-1-d}{8-3}$$

$$-1-d=1$$

$$\therefore d = -2$$

$$2.2 \quad N(3 ; -4), F(4 ; 0), E(q ; -4) \text{ and } D(3 ; 0)$$

$$m_{NF} = \frac{4}{1} = 4 \quad \text{and} \quad m_{ED} = 4$$



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$$4 = \frac{0+4}{3-q}$$

$$12 - 4q = 4$$

$$\therefore q = 2$$

