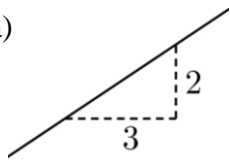


4.3 SLOPE

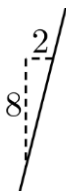
PART A

1) Use the given rise and run values to determine the slope of each line segment. Express your answers as fractions in lowest terms or, when appropriate, as integers.

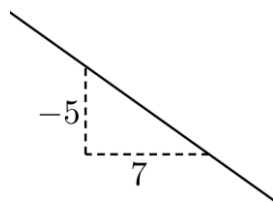
a)



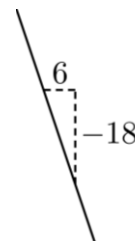
b)



c)



d)



2) Determine the slope of the line with each of the following rise and run values. Express your answers in decimal form.

a) rise = 3
run = 10

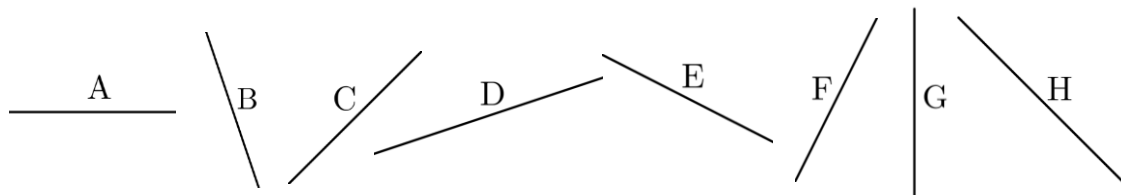
b) rise = -9
run = 8

c) rise = -4.25
run = 0.5

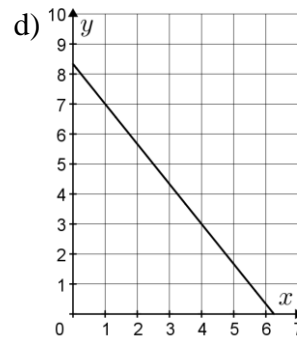
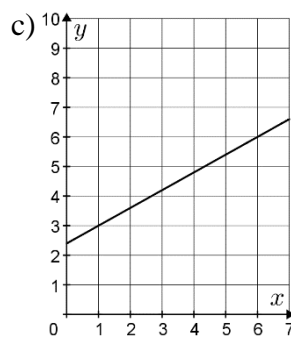
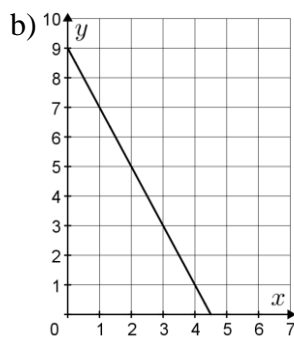
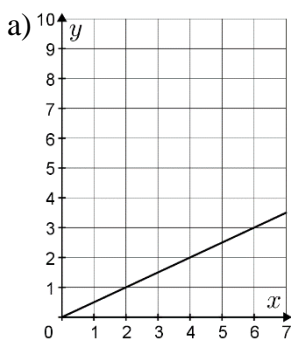
d) rise = 0
run = 17

3) Match each of the following slopes to the corresponding line segment.

Slopes: $\frac{1}{3}$, $-\frac{1}{2}$, 0, -3, undefined, 1, -1, 2



4) Determine the slope of each of the following lines.



5) Using a grid, draw a line with each of the following slopes (assume that each square on the grid has a length and width of 1 unit).

a) $\frac{5}{7}$

b) $-\frac{3}{4}$

c) 8

d) -4

e) -0.5

f) 0

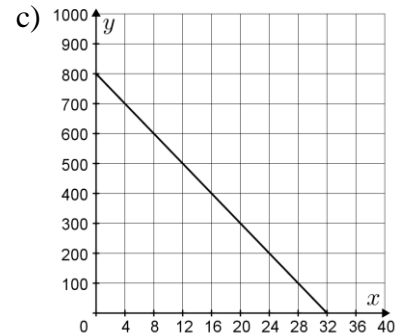
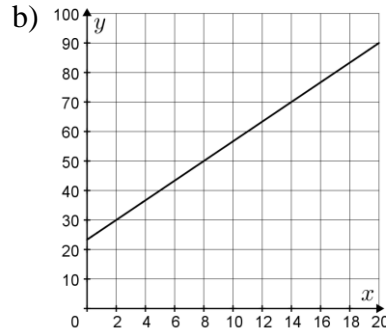
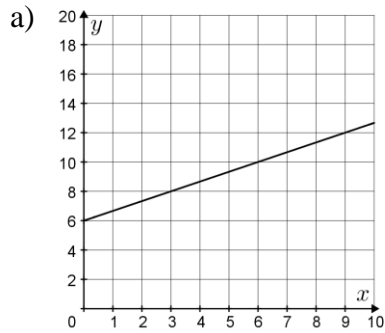
g) undefined

PART B

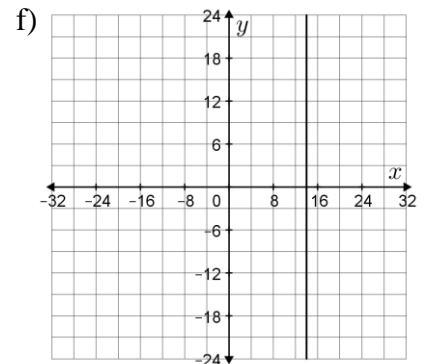
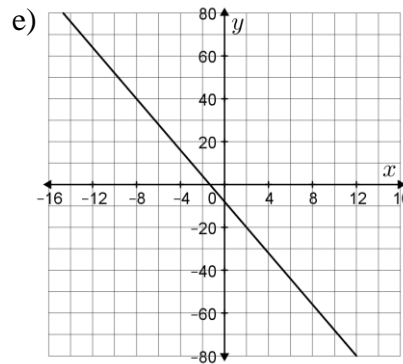
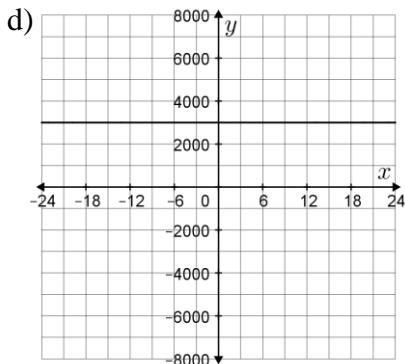
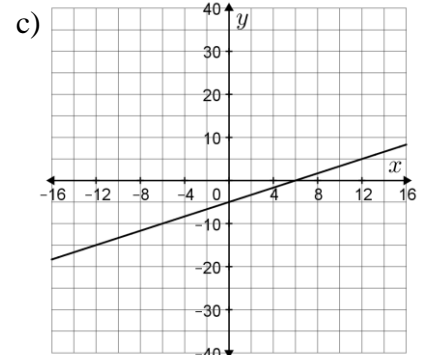
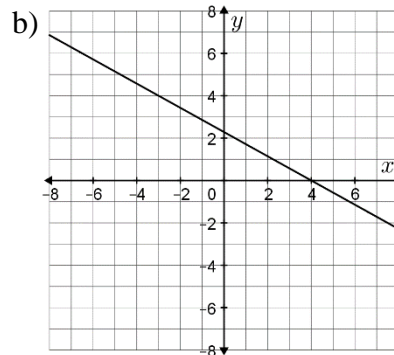
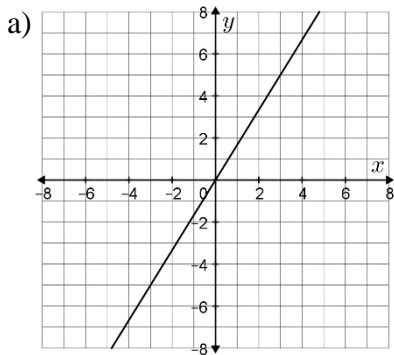
6) In order to be considered safe, a ladder leaned against a wall should not have a slope greater than 4. If the top of a ladder rests 9.6 feet up a wall and its base is 2.5 feet from the wall, can the ladder be safely used? Explain.



7) Determine the slope of each of the following lines.



8) Determine the slope of each of the following lines.



9) Determine the slope of the line that passes through each of the following pairs of points.

a) (2, 4) and (5, 10)

b) (5, 7) and (8, -2)

c) (-1, 0) and (12, 5)

d) (5, 17) and (8, 5)

e) (10, -3) and (-14, -21)

f) (15, 17) and (9, 17)

g) (0.5, -2) and (0, 4.5)

h) (-40, 54) and (-40, 38)

i) (-1.8, 1.4) and (3.4, 2.5)

10) Sketch a line that passes through the point (4, 5) and has a slope of $\frac{2}{3}$.

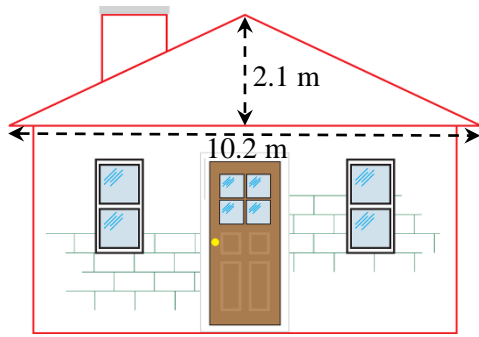
11) Sarah and Alessandro both drew a line through the point (7, 4) with a slope of -9. Did they necessarily draw the same line? Explain.



12) The *grade* of a road is its slope expressed as a percentage. For example, a grade of 10% indicates the road rises by 10 units for every 100 units of run, since $10\% = \frac{10}{100}$. Determine the grade for a section of road that rises 24 m over a run of 400 m.

13) By code, the maximum slope of a wheel chair ramp is $\frac{1}{12}$. If a ramp is to be constructed for a height of 60 cm, what is the minimum horizontal distance over which the ramp must be built? Express your answer in metres.





- 14) The slope of a roof is referred to as its *pitch*. Pitch is expressed as a fraction with a denominator of 12, since there are 12 inches in one foot. For example, a pitch of $\frac{7}{12}$ indicates the roof rises 7 inches for every foot (12 inches) of run. Approximately what pitch is the roof shown in the illustration on the left?

- 15) For each of the following tables of values, the data creates a straight line when plotted on a graph. Determine the slope of the line in each case.

a)

x	y
0	10
1	14
2	18
3	22
4	26

b)

x	y
0	60
2	50
4	40
6	30
8	20

c)

x	y
5	6
15	20
25	34
30	41
55	76

d)

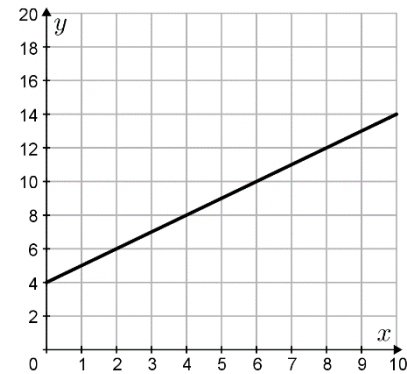
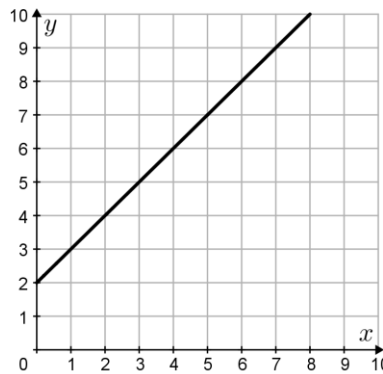
x	y
20	154
68	46
44	100
80	19
24	145

- 16) For each of the following, a line with the given slope passes through the given point. Determine another point on the line in each case.

a) slope $\frac{5}{6}$, point (4,1)

b) slope -3 , point $(-5,4)$

c) slope 0, point (3,3)



- 17) Yindi stated that the two lines shown on the right have the same slope, even though one looks steeper than the other. Is Yindi's claim correct? Explain.

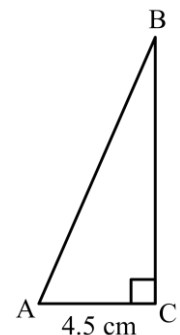
PART C

- 18) a) Does tripling both the rise and the run also triple the slope? Explain.
 b) What effect does doubling the rise have on the slope? Explain.
 c) What effect does doubling the run have on the slope? Explain.

- 19) A line that passes through the points $(3, -7)$ and $(14, k)$ has a slope of $\frac{5}{6}$.

Determine the exact value of k .

- 20) The triangle on the right has horizontal side AC and vertical side BC. If the line segment AB has a slope of $\frac{11}{5}$, determine the area of $\triangle ABC$ to the nearest tenth of a square centimetre.



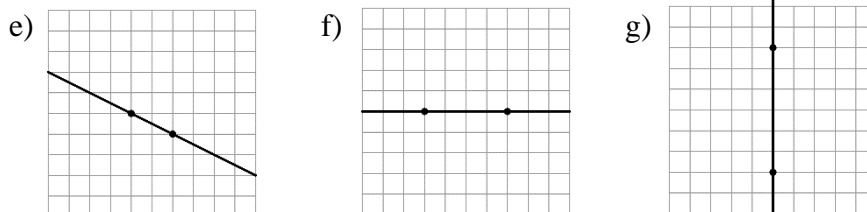
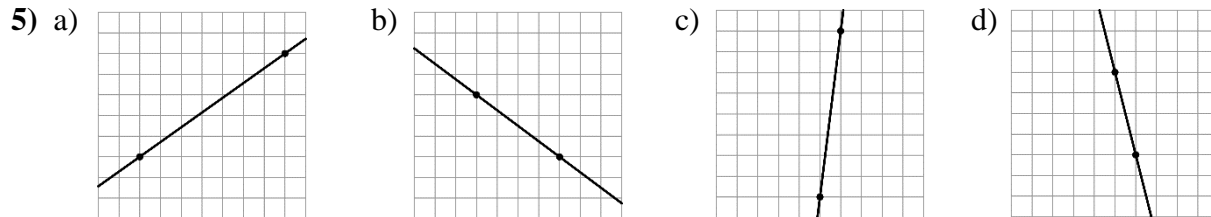
- 21) A line with slope $\frac{3}{7}$ passes through the point $(4, 2)$. Is the point $(-130, -57)$ on this line? Explain.

ANSWERS

1) a) $\frac{2}{3}$ b) 4 c) $-\frac{5}{7}$ d) -3 2) a) $\frac{3}{10}$ b) $-\frac{9}{8}$ c) -8.5 d) 0

3) A, 0; B, -3; C, 1; D, $\frac{1}{3}$; E, $-\frac{1}{2}$; F, 2; G, undefined; H, -1

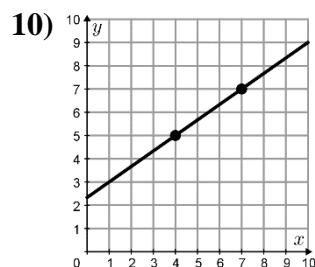
4) a) $\frac{1}{2}$ b) -2 c) $\frac{3}{5}$ d) $-\frac{4}{3}$



6) Yes, the ladder can be safely used. Its slope is 3.84, which is less than 4.

7) a) $\frac{2}{3}$ b) $\frac{10}{3}$ c) -25 8) a) $\frac{5}{3}$ b) $-\frac{4}{7}$ c) $\frac{1}{3}$ d) 0 e) $-\frac{6}{5}$ f) undefined

9) a) 2 b) -3 c) $\frac{5}{13}$ d) -4 e) $\frac{3}{4}$ f) 0 g) -13 h) undefined i) $\frac{11}{52}$



11) Yes. Although there are infinitely many lines that pass through the point (7, 4) in the 2-dimensional plane, only one of them has a slope of -9.

12) 6% 13) 7.2 m 14) $\frac{5}{12}$

15) a) 4 b) -5 c) $\frac{7}{5}$ d) $-\frac{9}{4}$

16) a) Answers will vary. Example: (10, 6) b) Answers will vary. Example: (-5, 1)

c) Answers will vary. Example: (7, 3)

17) Yindi's claim is correct. Both lines have a slope of 1, but they appear to have different slopes due to the different scales being used on the y-axes.

18) a) No. Tripling both the numerator and denominator of a fraction results in an equivalent fraction. Therefore, tripling both the rise and the run will result in the same slope.

b) Doubling the rise will double the slope, since doubling the numerator of a fraction is equivalent to doubling the fraction's value.

c) Doubling the run will half the slope, since doubling the denominator of a fraction is equivalent to dividing the fraction's value by 2.

19) $\frac{13}{6}$ 20) 22.3 cm^2

21) No. The slope of the line through the points (-130, -57) and (4, 2) is $\frac{59}{134}$, not $\frac{3}{7}$.