# Math 90
# Linear Relations Quiz

*Use the figures below to answer the following three question(s).*

Figure 1          Figure 2          Figure 3
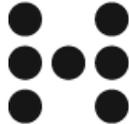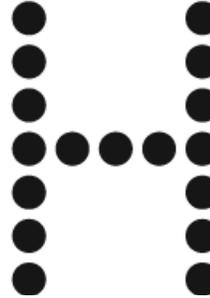


1.  Which linear equation represents the relationship between figure number (*f*) and the number of dots (*n*) in the figure?

    A   $f = 5n + 2$

    B   $n = 2f + 5$

    C   $n = 5f + 2$

    D   $n = f + 5$

2.  How many dots are in the sixth figure?

    A   11              B   32              C   17              D   35

3.  Following the pattern, which figure number will have 42 dots?

    A   8               B   37              C   18              D   212

4.  Which table of values represents a vertical line?

    A

    | x | y |
    |---|---|
    | 0 | 4 |
    | 1 | 3 |
    | 2 | 2 |
    | 4 | 0 |

    B

    | x | y |
    |---|---|
    | 1 | 4 |
    | 2 | 4 |
    | 3 | 4 |
    | 4 | 4 |

    C

    | x | y |
    |---|---|
    | 3 | 2 |
    | 3 | 4 |
    | 3 | 6 |
    | 3 | 12 |

    D

    | x | y |
    |---|---|
    | 0 | 0 |
    | 2 | 2 |
    | 4 | 4 |
    | 6 | 6 |

5. Which graph represents the table of values shown below?

| x | y |
|---|---|
| 0 | 6 |
| 2 | 8 |
| 4 | 10 |
| 6 | 12 |

A
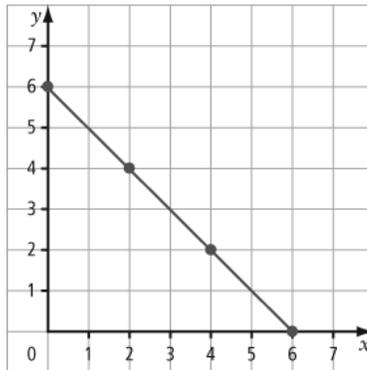
B
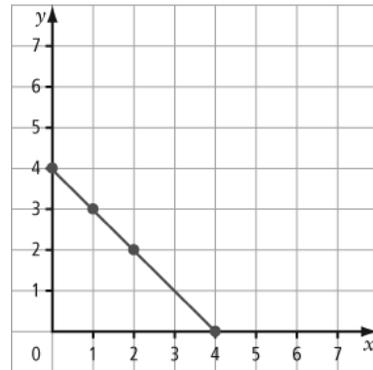
C
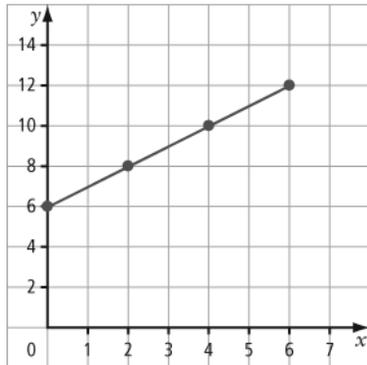
D
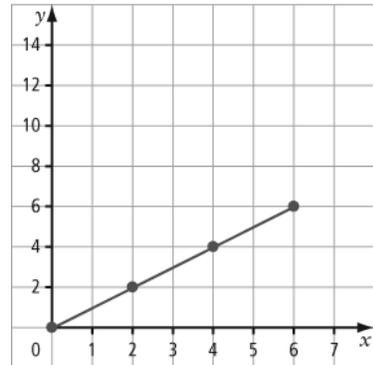
6. Which linear equation is represented by the following graph?

A   $y = -2x + 7$          B   $y = 7x - 2$

C   $y = -2x + 3.5$        D   $y = 2x - 7$
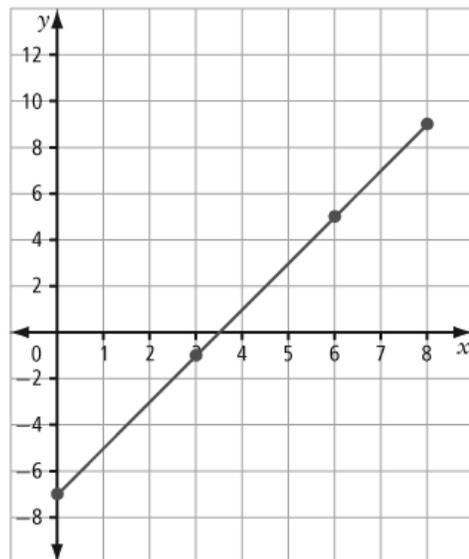
7. A theatre has 15 seats in the first row, 20 seats in the second row, 25 seats in the third row, and so on. What is the linear equation that represents the number of seats, $s$, in each row, $r$?

   A  $s = 5r$ 

   B  $s = 5r + 10$

   C  $s = 5r + 5$ 

   D  $s = 5r + 15$

8. The next value in the number pattern 24, 21, 18, 15, ... is _____.

9. The equation $x = 4$ represents a _____ line.

10. The equation $y = 7$ represents a _____ line.

11. A long distance phone plan charges a flat fee of \$8 per month, plus \$0.10 per minute of call time.

   **a)** Write a linear equation to represent the relationship between the number of minutes of call time, $n$, and the total monthly cost, $c$.

   (1)

   **b)** Graph the linear relation using 0 min as the first point and 80 min as the last.
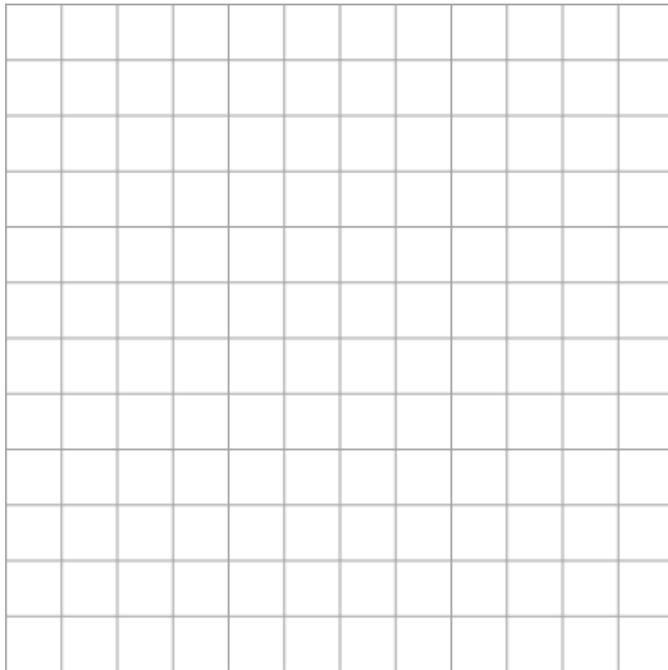
   (3)

   **c)** What is the total cost for a month where the call time is 75 min?

   (1)

12. The letter Z is constructed from dots. The first three diagrams are shown below.
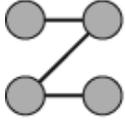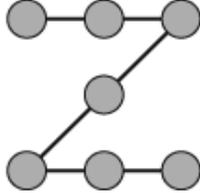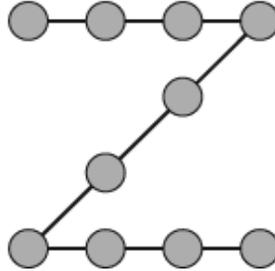
*Figure 1*          *Figure 2*          *Figure 3*          *Figure 4*

**a)** Draw the next diagram above.                                                                                   (1)

**b)** Create a table of values showing the relationship between the figure number, $f$, and the number of dots, $d$, for the first four figures.                                                                                   (1)

**c)** Graph the table of values **and** describe the relationship between the figure number and the number of dots.
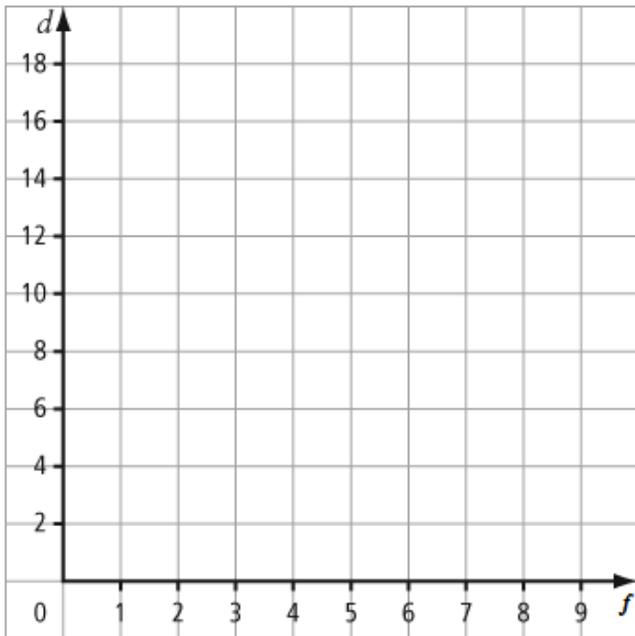


(3)

**d)** What is the equation that represents the relationship between the figure number, $f$, and the number of dots, $d$?                                                                                   (1)

**e)** How many dots would be in Figure 8?                                                                                   (1)

13. You can approximate the distance between you and a lightning bolt by counting the number of seconds that pass before you hear the thunder. For every kilometre of distance between you and the lightning, the time that passes before you hear the thunder increases by 3 s.

a) Complete the following table of values.

| Distance, $d$ (km) | Time, $t$ (s) |
|---|---|
| 0 | |
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |

(1)

b) Graph the linear relation represented by the table of values.

(3)

c) Interpolate to determine how much time passes before you hear the thunder at a distance of 4.5 km from the lightning strike.

(1)

d) How far away are you if you hear the thunder in 6.5 s?

(1)

14. For safety reasons, divers need to be aware of the pressure as they dive. At a depth of 4 m, the pressure is approximately 140 kPa (kilopascals) and at 9 m it is approximately 190 kPa. At what depth is the pressure double that of the pressure at 0 m?  You may choose any of the methods we have discussed to solve this problem but you must **explain your reasoning**.
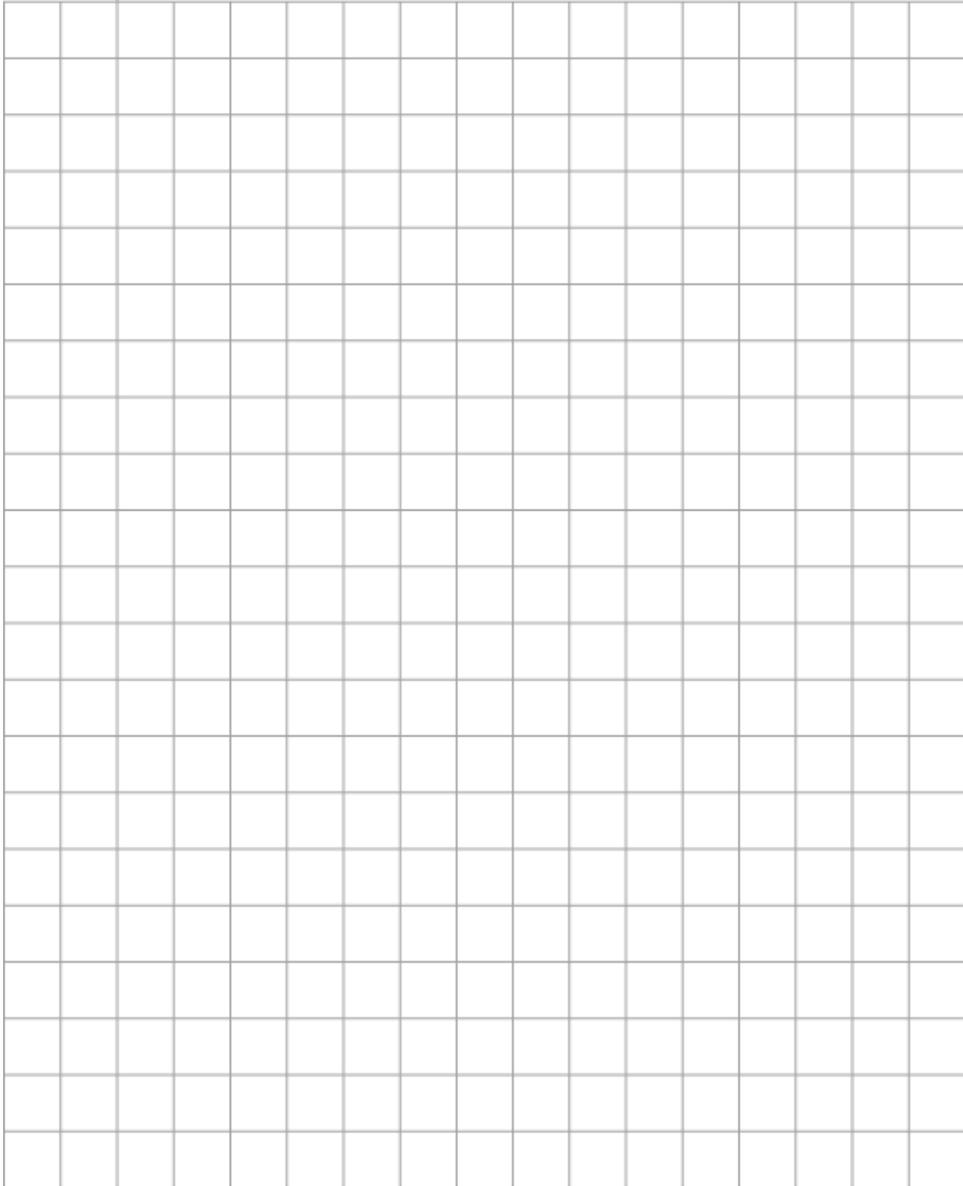
(3)

15. Jada is considering two different payment plans for her gym membership.
Plan A charges a flat fee of $40.00 each month.
Plan B charges a flat fee of $20.00 each month plus $2.00 per visit.
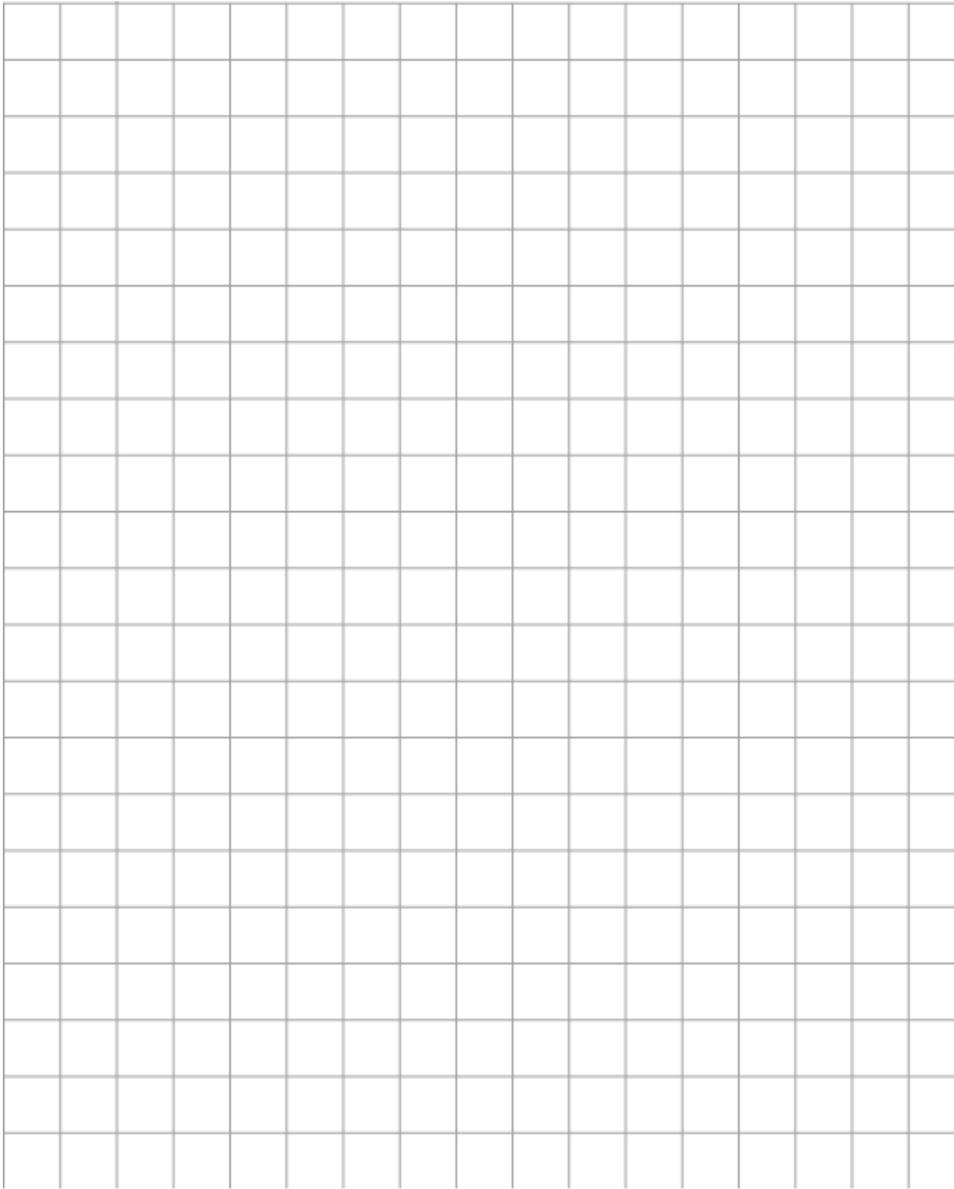
a) Write a linear equation to represent each plan.

(1)

b) Graph the two linear relations.

(3)

c) Use the graph to help you identify when the two plans would have the same monthly cost.

(1)

d) If Jada planned to visit the gym 12 times per month, which plan would cost less?

(1)