## Graphing Application Practice

1. Nadia and Lisa both earn money by babysitting. The following graph shows their earnings compared to the number of hours they worked last week.
a) Lisa says: "If we both work less than 5 hours or more than 15 hours, I earn more than you do."

Label Lisa's line with her name.
Write Nadia's name next to the other line.

b) Describe what the graph shows about how each girl is paid.
c) Sana also offers babysitting. She charges a set fee of $\$ 15.00$ per week to cover the cost of her bus pass, plus an additional $\$ 4.00$ per hour. Include Sana's earnings on the graph. Label the line.
d) Your neighbour needs a new babysitter. Under what conditions would you recommend they hire each babysitter?
2. Sabine works for a photographer. Each day, she is paid a flat rate, plus an additional amount for each roll of film she develops. Her earnings are shown in the table below.

| Number of Rolls <br> of Film (r) | Total Amount <br> Paid (A) |
| :---: | :---: |
| 5 | 17.50 |
| 10 | 25.00 |
| 15 | 32.50 |
| 20 | 40.00 |

a) Graph the relationship on the grid provided.
b) Describe the details of how Sabine gets paid.

c) One day Sabine earns $\$ 37.00$. How many rolls of film did she develop that day? Justify your answer.
d) Describe how the graph would change if Sabine was only paid for the rolls of film she developed (no fixed cost).
e) Her boss proposes that Sabine be paid a flat rate of $\$ 50.00$ for each day's work, no matter how many rolls she develops. Should Sabine accept this offer? Justify your answer.

When Stretch Gordon signed a contract to play basketball for the Toronto Raptors, he received a one time signing bonus of $\$ 250,000$. His contract said that he would also receive $\$ 100,000$ for each game that he plays. The Raptors are scheduled to play 85 games this season.
a) Write an equation relating Stretch's earning (E) to the number of games he plays ( $n$ ).
b) Complete the following table of values.

| Number of <br> Games Played | Money Earned |
| :---: | :---: |
|  |  |
|  |  |
|  |  |
|  |  |

c) Create a scatter plot to show his earnings for the season. Include a line of best fit.
d) What is the maximum amount of money that Stretch can earn in one season? Show your work.
e) Stretch's twin brother, Rory, has been offered a different contract. His earnings (E) are shown by the equation $\mathbf{E}=95000 \mathrm{n}+\mathbf{4 5 0 0 0 0}$, where n is the number of games that Rory plays. Is this a better offer than Stretch's? Give reasons for your answer by comparing the two offers, reporting mathematical details about the comparison.

The following graph shows the relationship between the total cost and the minutes of use for three different Internet Service Providers. Tonisha wants to sign up with one of the companies and she wants to pay as little as possible.


Determine which company Tonisha should use. Include details about minutes of use in your explanation.

Alicia and Buster walked in front of a motion detector. The graph below shows the relationship between the distance from the detector, d , in metres, and time, t , in seconds.


When was Buster moving faster than Alicia? Give reasons for your answer.
7. Troy works as a mechanic at Quick Lube and performs oil changes on cars. His total pay for a day at work is given by the formula $\mathbf{T}=\mathbf{5 c + 2 5}$, where c is the number of oil changes he does that day.
a) Explain what the numbers 5 and 25 in the formula tell you about how Troy is paid.
b) Complete the chart and create a scatter plot on the grid provided.

| Number of Oil <br> Changes | Total Pay |
| :---: | :---: |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

c) Today, Troy needs to earn enough money to pay his $\$ 85.00$ phone bill. How many oil changes would he need to perform today? Show your work.

d) How would the graph change if Troy earned $\$ 6$ per oil change?
e) How would the graph change if Troy earned a $\$ 35$ starting fee?
f) If Troy's boss offered him a raise, would it be better to start earning $\$ 6$ per hour or to start earning a starting fee of $\$ 35$ ?

8 A group of 4 friends go bowling at Bowling Bonanza. Bowling Bonanza charges $\$ 2.50$ for each player to rent shoes, plus $\$ 20$ per hour for a group of 4 to bowl. The graph below represents the relationship between cost, C , in dollars, and time, t , in hours, for 4 players to bowl.
a) State the coordinates of point A on the graph.
b) Explain what the coordinates of the point A tell you about the cost of bowling.
c) Determine the equation of the graph.
d) This group of friends wants to spend $\$ 80$. How many
 hours can they bowl at Bowling Bonanza? Justify your answer.
e) William and his 3 friends are going bowling. He finds and advertisement in the newspaper for a new bowling alley, Super Bowl. William and his friends will play 6 games in 3 hours. Determine whether William and his friends should go bowling at Bowling Bonanza or Super Bowl. Justify your answer.

## Super Bowl

- Free bowling shoes
- Each player pays $\$ 3.00$ per game
Call 555-BOWL and book your lane today.


Graphing Application Problems

1. Nadia and Lisa both earn money by babysitting. The following graph shows their earnings compared to the number of hours they worked last week.
a) Lisa says: "If we both work less than 5 hours or more than 15 hours, I earn more than you do"

Label Lisa's line with her name. Write Nadia's name next to the other line.

Babysitting Earnings

b) Describe what the graph shows about how each girl is paid.

Lisa:
Flat rate of $\$ 30$ for 10 hours, then $\$ 12$ per hour!
Nadia:
No flat rate, but \$6/hour!
c) Sana also offers babysitting. She charges a set fee of $\$ 15.00$ per week to cover her bus pass, plus an additional $\$ 4.00$ per hour. Include Sana's earnings on the graph. Label your line.
$\frac{4.00}{1 \text { hour }}=\frac{\$ 40}{10 \text { hours }}$ start her line at $\$ 15$ on $y$-axis.
count up $\$ 40$ to $\$ 55$ then across 10 hours (because of rate of change!)
d) Your neighbour needs a new babysitter. Under what conditions would you recommend they hire each babysitter?
Less than 5 hours? Use Nadia (cheaper)
Between 5-13 hours? Use Lisa (cheaper)
More than 13 hours? Use Sana (cheaper)
2. Sabine works for a photographer. Each day, she is paid a flat rate, plus an additional amount for each roll of film she develops. Her earnings are shown in the table below.

| 0 | 10 |
| :---: | :---: |
| Number of Rolls <br> of Film (r) | Total Amount <br> Paid (A) |
| 5 | 17.50 |
| 10 | 25.00 |
| 15 | 32.50 |
| 20 | 40.00 |

a) Graph the relationship on the grid provided. (Don't try plotting 17.50! foo hood)
b) Describe the details of how Sabine gets paid.
she charges a \$10 flat rate, plur $\$ 1.50$ per roll of Film.

c) One day Sabine earns $\$ 37.00$. How many rolls of film did she develop that day? Justify your answer.

$$
\begin{aligned}
E & =10+1.50 n \\
(37) & =10+1.50 n \\
27 & =1.50 n \\
18 & =n
\end{aligned}
$$

d) Describe how the graph would change if Sabine was only paid for the rolls of film she developed (no flat rate).
The graph would shift down, and start at 0 .
e) Her boss proposes that Sabine be paid a flat rate of $\$ 50.00$ for each day's work, no matter how many rolls she develops. Should Sabine accept this offer? Justify your answer Depends! If she thinks her jobs will require more than about 28 rolls of film, she would mate more money with her current plan!
3. When Stretch Gordon signed a contract to play basketball for the Toronto Raptors, he received a one time signing bonus of $\$ 250,000$. His contract said that he would also receive $\$ 100,000$ for each game that he plays. The Raptors are scheduled to play 85 games this season.
a) Write an equation relating Stretch's earning (E) to the number of games he plays ( n ).

$$
E=250000+100000 \mathrm{n}
$$

b) Complete the following table of values.

| Number of <br> Games Played | Money Earned |
| :---: | :---: |
| 10 | 1250000 |
| 20 | 2250000 |
| 30 | 3250000 |
| 40 | 4250000 |
| 50 | 5250000 |

c) Create a scatter plot to show his earnings for the season. Use a suitable scale. Change the money values in your table to millions of dollars before
 starting.
d) What is the maximum amount of money that Stretch can earn in one season? Show your work.

85 games:

$$
\begin{aligned}
E & =250000+100000(85) \quad \therefore \text { The max amount he can } \\
& =\$ 8,750,000 \quad \text { earn is } \$ 8750000 .
\end{aligned}
$$

e) Stretch's twin brother, Rory, has been offered a different contract. His earnings (E) are shown by the equation $\mathbb{E}=95000 \mathrm{n}+450000$, where n is the number of games that Rory plays. Is this a better offer than Stretch's? Give reasons for your answer by comparing the two offers, reporting mathematical details about the comparison.


Since they both make the same amount after playing 40 games, Stretch's offer is actually better over an 85 game season!
(stretch would make $\$ 225000$ more than Rory over 85 games)
4. The following graph shows the relationship between the total cost and the minutes of use for three different Internet Service Providers. Tonisha wants to sign up with one of the companies and she wants to pay as little as possible.


Determine which company Tonisha should use. Include details about minutes of use in your explanation.
If she uses less than 50 miss, go with surfnet.
If she uses between $50-100$ ming, go with Intercom.
If " " more than loomins, go with Echo Tech.
6. Alicia and Buster walked in front of a motion detector. The graph below shows the relationship between the distance from the detector, d , in metres, and time, t , in seconds.


When was Buster moving faster than Alicia? Give reasons for your answer.
From 8-10 seconds, Buster was moving faster.
It is a steeper graph, which mean the rate of change (speed) is greater!

$$
\frac{\text { Buster }}{\left.\frac{\Delta y}{\Delta x}=\frac{-6}{2}=-3 \mathrm{~m} / \mathrm{s}\right)} \frac{\text { Alicia }}{\begin{array}{c}
\text { winner! } \\
\text { (faster) }
\end{array}}
$$

7. Troy works as a mechanic at Quick Lube and performs oil changes on cars. His total pay for a day at work is given by the formula $\mathbb{T}=\mathbf{5 c}+\mathbf{2 5}$, where c is the number of oil changes he does that day.
a) Explain what the numbers 5 and 25 in the formula tell you about how Troy is paid.

5 means \$5 per oil change
25 is a fixed rate.
b) Complete the chart and create a scatter plot on the grid provided.

| Number of Oil <br> Changes | Total Pay |
| :---: | :---: |
| 0 | 25 |
| 5 | 50 |
| 10 | 75 |
| 15 | 100 |
| 20 | 125 |

c) Today, Troy needs to earn enough money to pay his $\$ 85.00$ phone bill. How many oil changes would he need to perform today? Show your work.

$$
\begin{aligned}
85 & =5 c+25 \\
60 & =5 c \\
c & =12 \quad \therefore \quad \text { He needsal } 12 \text { oil changes } \\
& \quad \text { to make } 85 \text { to pang the bill! }
\end{aligned}
$$

d) How would the graph change if Troy earned $\$ 6$ per oil change?
It would start at $\$ 25$ still. It would be steeper
e) How would the graph change if Troy earned a $\$ 35$ starting fee? The whole graph would shift up and start at $\$ 35$, but the steepness would not change!
f) If Troy's boss offered him a raise, would it be better to start earning $\$ 6$ per hour or to start earning a starting fee of $\$ 35$ ?

$$
E=6 c+25
$$

$$
\begin{aligned}
& E=5 c+35 \\
& \text { let } c=20 \\
& E=\$ 135
\end{aligned}
$$

$$
\therefore \$ 6 / h o u r \text { is much }
$$

$$
\text { let } c=20:
$$

$$
E=\$ 145
$$

better, as he is already making more
money after only 20 money after only 20 oil changes.
8. A group of 4 friends go bowling at Bowling Bonanza. Bowling Bonanza charges $\$ 2.50$ for each player to rent shoes, plus $\$ 20$ per hour for a group of 4 to bowl. The graph below represents the relationship between cost, C , in dollars, and time, t , in hours, for 4 players to bowl.
a) State the coordinates of point A on the graph.

$$
(4,90)
$$

b) Explain what the coordinates of the point tell you about the cost of bowling.
If costs $\$ 90$ for 4 hours of bowling (for 4 people)
c) Determine the equation of the graph.

$$
\frac{80}{4}=20 \quad C=10+20 n
$$

d) This group of friends wants to spend $\$ 80$. How many hours can they bowl at Bowling Bonanza? Justify your

Cost for 4 Players vs. Time
 answer.

$$
\begin{aligned}
80 & =10+20 n \\
n & =3.5 \quad \therefore 3.5 \text { hours. }
\end{aligned}
$$

e) William and his 3 friends are going bowling. He finds and advertisement in the newspaper for a new bowling alley, Super Bowl. William and his friends will play 6 games in 3 hours. Determine whether William and his friends should go bowling at Bowling Bonanza or Super Bowl. Justify your answer.
4 players $\times \$ 3.00$ per game $\times 6$ games
$=\$ 72$

$$
\begin{aligned}
C & =10+20(3) \\
& =\$ 70
\end{aligned}
$$

Super Bowl

- Free bowing shoes
- Each player pays $\$ 3.00$ per game your lane today.

$\therefore$ It would be cheaper to bowl at Bowling Bonanza.

