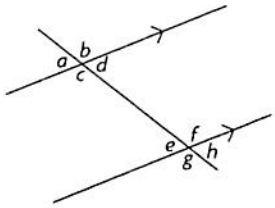
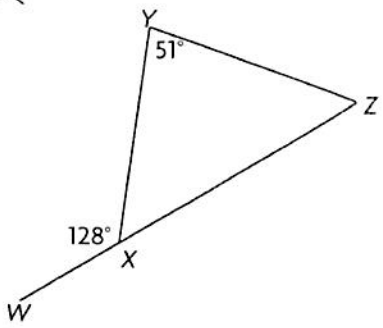
FM -11 **Jan. 2021 Exam Review**

D 1. Which pairs of angles are equal in this diagram?



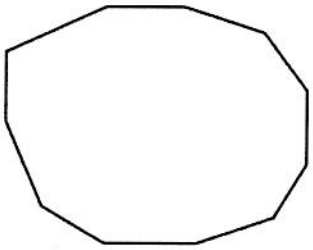
a. $b \neq e$, $c = h$, and $d = g$
b. $b \neq a$, $c = e$, and $d = f$
c. $b = c$, $e \neq g$, and $f = h$
d. $b = f$, $c = g$, and $d = h$

A 2. Which are the correct measures for $<YXZ$ and $<XZY$?



a. $<YXZ = 52°$, $<XZY = 77°$
b. $<YXZ = 52°$, $<XZY = 87°$
c. $<YXZ = 62°$, $<XZY = 77°$
d. $<YXZ = 62°$, $<XZY = 87°$

C 3. Determine the sum of the measures of the interior angles of this polygon.



11 sides

a. 1080°
b. 1260°
c. 1620°
d. 1440°

$S(n) = 180(n-2)$
$S(11) = 180(9)$

A 4. Each interior angle of a regular convex polygon measures 144°.
How many sides does the polygon have?
a. 10
b. 11
c. 8
d. 9

D 5. Each interior angle of a regular convex polygon measures 162°.
How many sides does the polygon have?
a. 16
b. 19
c. 18
d. 20

C 6. The sum of the measures of the interior angles of a convex polygon is S.
Which expression results in the number of sides of the polygons?
a. $\frac{S+2}{180°}$
b. $\frac{S}{180°} + 2$

c. $\frac{180°(S-2)}{S}$

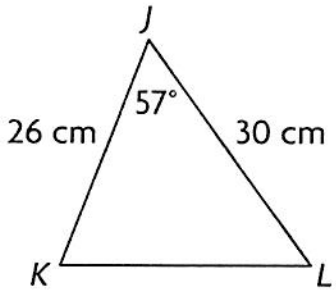
d. $180°(S-2)$

A 7. What information do you need to know about an acute triangle to use the sine law?

a. two angles and any side
b. two sides and any angle
c. all the angles
d. all the sides

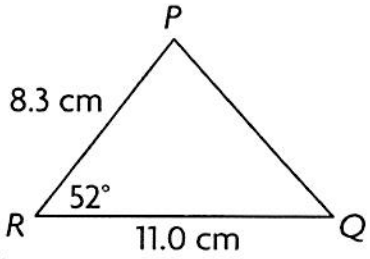
A 8. Determine the length of KL to the nearest centimetre.

a. 27 cm
b. 26 cm
c. 34 cm
d. 33 cm



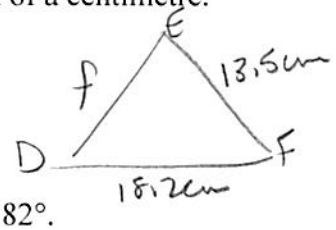
D 9. Determine the length of PQ to the nearest tenth of a centimetre.

a. 9.4 cm
b. 9.1 cm
c. 8.5 cm
d. 8.8 cm



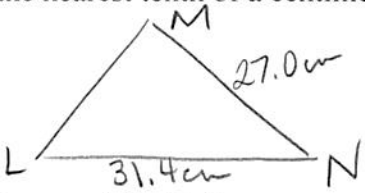
B 10. In $<DEF$, $d = 13.5$ cm, $e = 18.2$ cm, and $<F = 60°$.
Determine the measure of f to the nearest tenth of a centimetre.

a. 17.0 cm
b. 16.4 cm
c. 16.6 cm
d. 16.8 cm



B 11. In $<LMN$, $l = 27.0$ cm, $m = 31.4$ cm, and $<N = 82°$.
Determine the measure of n to the nearest tenth of a centimetre.

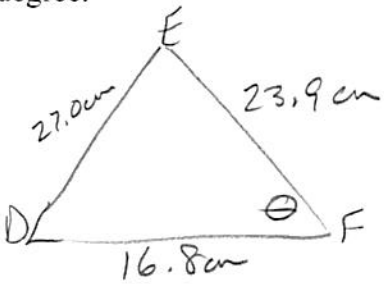
a. 39.0 cm
b. 38.5 cm
c. 39.5 cm
d. 38.0 cm



D 12. In $<DEF$, $d = 23.9$ cm, $e = 16.8$ cm, and $f = 27.0$ cm.
Determine the measure of $<F$ to the nearest degree.

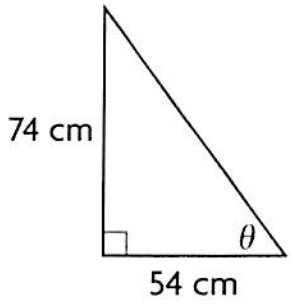
a. 82°
b. 80°
c. 83°
d. 81°

$\cos F = \frac{e^2 + d^2 - f^2}{2ed}$



C 13. How you would determine the indicated angle measure, if it is possible?

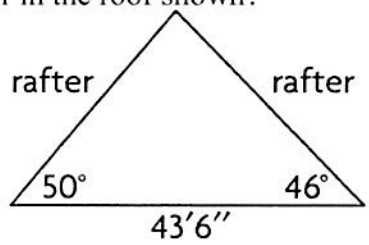
a. the sine law
b. not possible
c. primary trigonometric ratios
d. the cosine law



B 14. How long, to the nearest inch, is the left rafter in the roof shown?

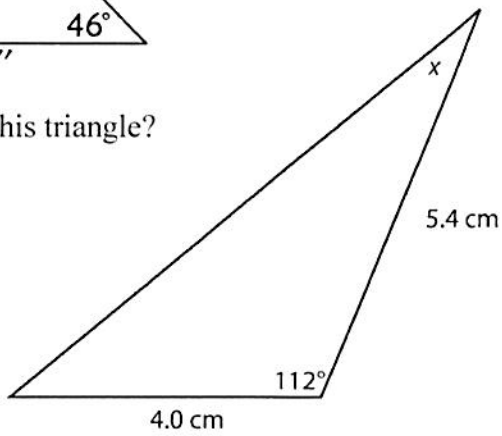
a. 30'6"
b. 31'6"
c. 31'
d. 30'

$\frac{rafter}{\sin 46} = \frac{43.5}{\sin 84}$



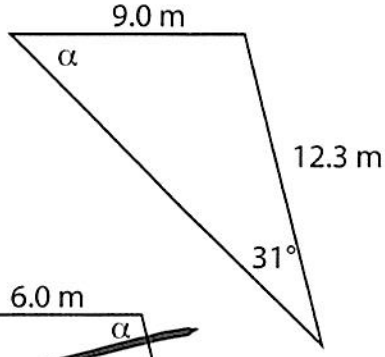
C 15. Which law could you use to determine the unknown angle in this triangle?

a. neither the sine law nor the cosine law
b. the cosine law only
c. the sine law and the cosine law
d. the sine law only



B 16. Which would you use to determine the indicated angle measure?

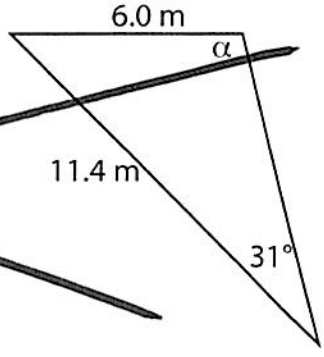
a. primary trigonometric ratios
b. the sine law only
c. the cosine law only
d. the sine law or the cosine law



OMIT 17. Determine the indicated angle measure to the nearest degree.

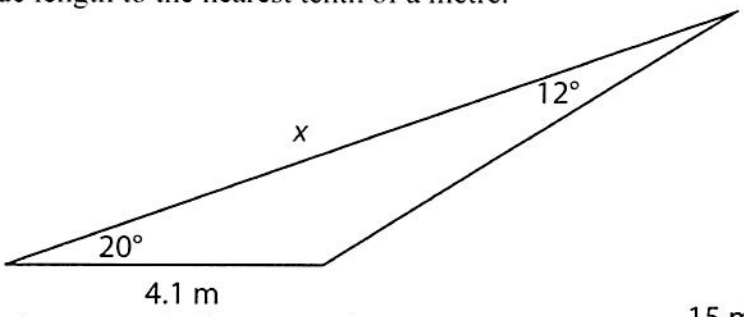
a. 98°
b. 100°
c. 102°
d. cannot be determined

$\frac{\sin x}{11.4} = \frac{\sin 31}{6.0m}$



C 18. Determine the indicated side length to the nearest tenth of a metre.

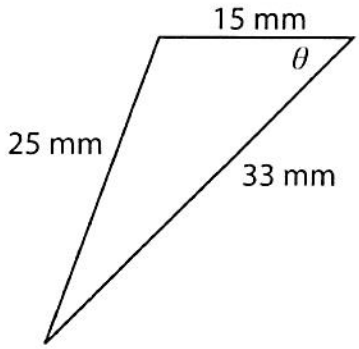
a. 6.2 m
b. 9.6 m
c. 10.4 m
d. cannot be determined



D 19. Determine the indicated angle measure to the nearest degree.

a. 40°
b. 42°
c. 44°
d. 46°

$\cos C = \frac{a^2 + b^2 - c^2}{2ab}$



B 20. Which test point is in the solution set for the linear inequality $\{(x, y) \mid 7x + 5y \leq 0, x \in I, y \in I\}$?

a. (2, 2)
b. (–1, –1)
c. (1, 1)
d. (2, –2)

D 21. Identify the point of intersection for the following system of linear inequalities.
$\{y \geq 2 + x, x + y \geq 0, x \in R, y \in R\}$

a. (1, –1)
b. (3, –3)
c. (–3, 3)
d. (–1, 1)

$y = 2 + x$ $\quad x + y = 0$
$x = -y$
$x = -1$

C 22. The following model represents an optimization problem. Determine the maximum solution.

Restrictions:
$x \in R$
$y \in R$

Constraints:
$x \geq 4$
$x - y \leq 12$
$x + 3y \leq 24$

Objective function:
$G = x - 2y$

$G = 4 - 2(-2)$ $\quad G = 8 - 2(-2)$
$G = 4 + 4$ $\quad G = 8 + 4$
$G = 8$ $\quad G = 12$

$G = 4 - 2(-8)$ $\quad G = 12 - 2(0)$
$G = 4 + 16$ $\quad G = 12$
$G = 20$

a. (4, –2)
b. (8, –2)
c. (4, –8)
d. (12, 0)

A 23. Audrey notices the number of people and dogs in a dog park.
- There are more people than dogs.
- There are at least 12 dogs.
- There are no more than 40 people and dogs, in total.
- All the dogs have four legs and all the people have two legs.

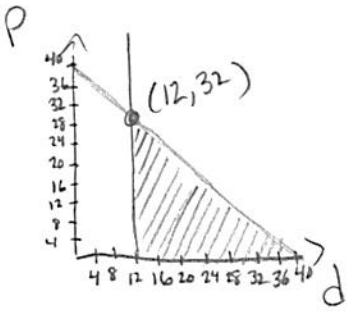
What is the maximum number of legs at the park?

a. 118
b. 136
c. 160
d. 104

p = people
d = dogs

$p > d$
$d \geq 12$
$p + d \leq 40$
#Legs = $2p + 4d$

p	d	
21	19	→ 118
22	18	→ 116
23	17	→ 114



A 24. Solve $25x^2 - 36 = 0$ by factoring.

a. $x = \frac{6}{5}, x = -\frac{6}{5}$ $(5x-6)(5x+6)$
b. $x = -6, x = 5$
c. $x = 6, x = -6$
d. $x = \frac{5}{6}, x = -\frac{5}{6}$

B 25. Solve $15z^2 - 6 = z$ by factoring. $15z^2 - z - 6$

$(5z + 3)(3z - 2)$

$5z + 3 = 0$
$5z = -3$
$z = -\frac{3}{5}$

$3z - 2 = 0$
$3z = 2$
$z = \frac{2}{3}$

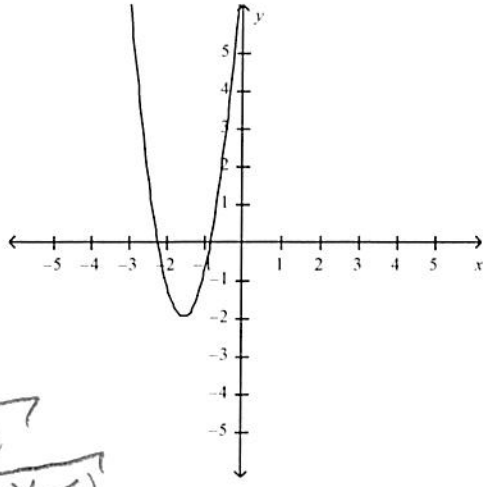
a. $z = \frac{3}{5}, z = -\frac{2}{3}$
b. $z = -\frac{3}{5}, z = \frac{2}{3}$
c. $z = \frac{3}{5}, z = \frac{2}{3}$
d. $z = -\frac{3}{5}, z = -\frac{2}{3}$

B 26. Which set of data is correct for the quadratic relation $f(x) = -2(x - 12)^2 + 15$?

	Direction parabola opens	Vertex	Axis of Symmetry
A.	downward	(15, –12)	$x = 15$
B.	downward	(12, 15)	$x = 12$
C.	upward	(–12, 15)	$x = -12$
D.	upward	(15, 12)	$x = 15$

a. Set D.
b. Set B.
c. Set A.
d. Set C.

C 27. Which quadratic function represents this parabola?



a. $f(x) = -4(x + 1.5)^2 + 2$
b. $f(x) = 4(x - 1.5)^2 - 2$
c. $f(x) = 4(x + 1.5)^2 - 2$
d. $f(x) = 4(x + 1.5)^2 + 2$

D 28. Solve $4x^2 + 4x - 5 = 0$ using the quadratic formula.

a. $x = \frac{1+\sqrt{6}}{2}, x = \frac{1-\sqrt{6}}{2}$
b. $x = \frac{4+4\sqrt{6}}{2}, x = \frac{4-4\sqrt{6}}{2}$
c. $x = \frac{-4+4\sqrt{6}}{2}, x = \frac{-4-4\sqrt{6}}{2}$
d. $x = \frac{-1+\sqrt{6}}{2}, x = \frac{-1-\sqrt{6}}{2}$

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

$x = \frac{-4 \pm \sqrt{4^2-4(4)(-5)}}{2(4)}$

$x = \frac{-4 \pm \sqrt{16+80}}{8}$

$x = \frac{-4 \pm 4\sqrt{6}}{8}$

$x = -1 \pm \sqrt{6}$

C 29. Solve $5x^2 + 3x + 1 = 10 - 3x - 3x^2$ using the quadratic formula.

$8x^2 + 6x - 9 = 0$

a. $x = \frac{3}{4}, x = \frac{1}{2}$
b. $x = \frac{3}{4}, x = -\frac{1}{2}$
c. $x = \frac{3}{4}, x = -\frac{3}{2}$
d. $x = \frac{3}{4}, x = -\frac{3}{4}$

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

$x = \frac{-6 \pm \sqrt{6^2-4(8)(-9)}}{2(8)}$

$x = \frac{-6 \pm \sqrt{36+288}}{16}$

$x = \frac{-6 \pm 18}{16}$

omit 30. Solve $-h^2 + 17h + 1 = -5h^2 + h - 16$ using the quadratic formula.

a. $h = \frac{1+\sqrt{2}}{3}, h = \frac{1-\sqrt{2}}{3}$
b. $h = \frac{\sqrt{2}}{3}, h = \frac{1+\sqrt{2}}{3}$
c. $h = -\frac{1+\sqrt{2}}{3}, h = -\frac{1-\sqrt{2}}{3}$
d. $h = \frac{\sqrt{2}}{3}, h = \frac{\sqrt{2}}{3}$

#31 #MM. $\angle RQT = 86°$

#32 #M $S(7) = 180(7-2)$

$S(7) = 180(5)$

$\boxed{S(7) = 900°}$

*Sum of the angles formula

$S(n) = 180(n-$

#33 #MM $\frac{S(n)}{n} = \frac{180(n-2)}{n}$

$\frac{S(n)}{n} = 156°$

$156° = \frac{180(n-2)}{n}$

$156n = 180n - 360$

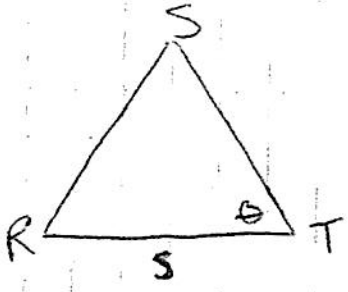
$360 = 180n - 156n$

$360 = 24n$

$\boxed{15 = n}$

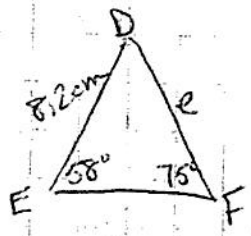
The polygon has 15 sides.

#34



To use the sine law you would either need the side length of "t" or ∠S.

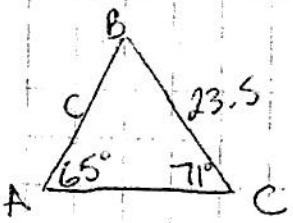
#35



$$\frac{e}{\sin 58} = \frac{8.2}{\sin 75°}$$

$$\boxed{e = 7.2\text{cm}}$$

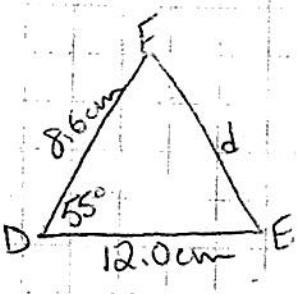
#36



$$\frac{c}{\sin 71} = \frac{23.5}{\sin 65°}$$

$$\boxed{c = 24.5\text{cm}}$$

#37

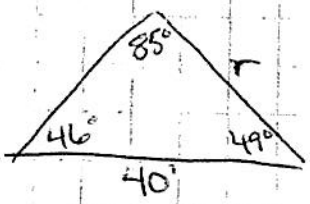


$$d^2 = 8.6^2 + 12^2 - 2(8.6)(12)\cos 55$$

$$d = 9.97866\ldots$$

$$\boxed{d = 10.0\text{ cm}}$$

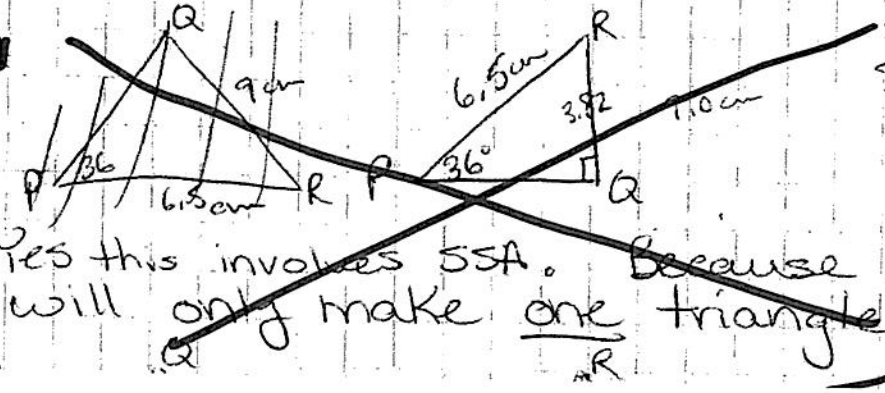
#38



$$\frac{r}{\sin 46°} = \frac{40}{\sin 85}$$

$$\boxed{r = 28.9'}$$

#39 (omit)



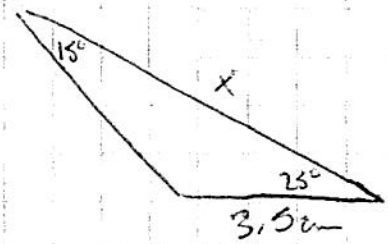
$$\sin 36 = \frac{o}{6.5}$$

$$o = 3.82$$

Yes this involves SSA. Because p > q it will only make one triangle!

Q R

#40



1st - Use sum of the angles in a triangle (180°) to find the missing angle.

2nd - Use the ~~Sine~~ Sine law to find "x".

#41

Because the point (0,0) is on the inequality, check another point

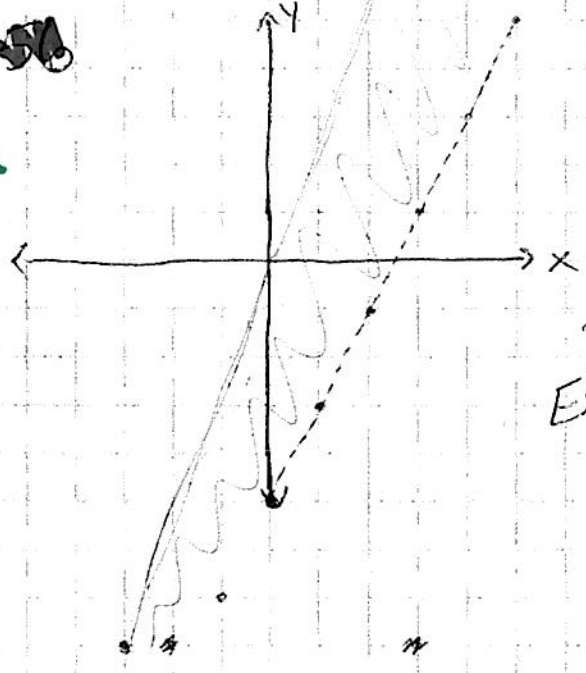
(1,1) $5(1)+3(1) \leq 0$

$5+3 \leq 0$

$8 \not\leq 0$

∴ The solution set is below the line.

#42



$3y-8x \leq 0$

$3y = 8x$

$y = \frac{8}{3}x$

$y > 2x-5$

$1 > 2(1)-5$

$1 > 2-5$

$1 > -3$ ✓

Two valid points

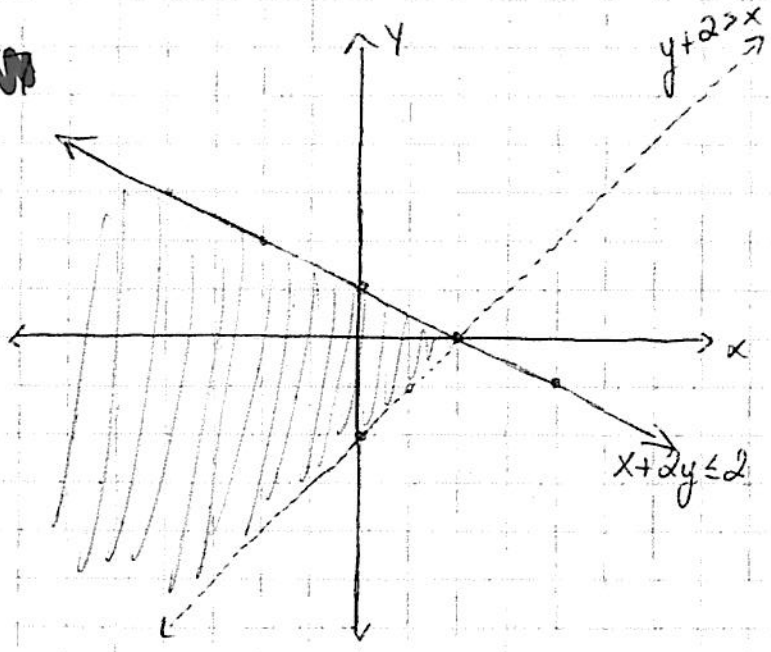
Examples: (1,0)

(1,1)

(2,0)

(2,1)

#43



$x+2y \leq 2$

$2y \leq 2-x$

$y = -\frac{1}{2}x + 1$

Check

$0+2(0) \leq 2$

$0 \leq 2$ ✓

$y+2>x$

$y = x-$

Check

$0+2>$

$2>0$

#44

$c+b \leq 800$

$b \geq 4c$

Let P = Profit

$P = 420c + 120b$

#45

$x \leq 8$

$y > 4$

$0.25x + 0.4y \leq 6$

#46 "a" would be positive.

#47

y-int : $y = -8$

x-int(s) : $x = -4$ and $x = 2$

A of S : $x = -1$

Vertex : $(-1, -9)$

Domain : $D: \{x \mid x \in R\}$

Range : $R: \{y \mid y \geq -9, y \in R\}$

#48

$2x^2 - 14x + 20 = 0$

$2(x^2 - 7x + 10) = 0$

$2(x-5)(x-2) = 0$

$x = 5$ $\quad$ $x = 2$

#49

$x^2 + 3x = -4x - 12$

$x^2 + 7x + 12 = 0$

$a = 1$
$b = 7$
$c = 12$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-(7) \pm \sqrt{7^2 - 4(1)(12)}}{2(1)}$$

$$x = \frac{-7 \pm \sqrt{49 - 48}}{2}$$

$$x = \frac{-7 \pm \sqrt{1}}{2}$$

$$x = \frac{-7 \pm 1}{2}$$

$+$: $\frac{-7+1}{2} = \frac{-6}{2} = -3$

$-$: $\frac{-7-1}{2} = \frac{-8}{2} = -4$

Roots
$x = -3$
$x = -4$

#50

$x^2 - 3x - 1 = 0$

$a = 1$
$b = -3$
$c = -1$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(1)(-1)}}{2(1)}$$

$$x = \frac{3 \pm \sqrt{9 + 4}}{2}$$

$$x = \frac{3 \pm \sqrt{13}}{2}$$

$+$: $\frac{3+\sqrt{13}}{2}$

$-$: $\frac{3-\sqrt{13}}{2}$

Roots
$x = \frac{3+\sqrt{13}}{2}$
$x = \frac{3-\sqrt{13}}{2}$

#51

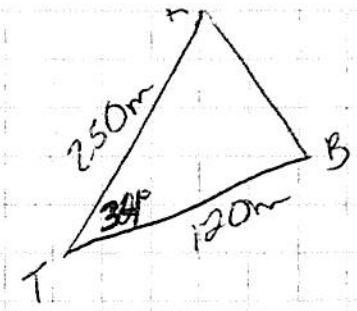
Prove $TV \parallel WX$ ← means parallel

Given $\angle UWX = \angle WYZ$
Then $\angle UWX = 37°$

Interior Angles (Z-Theorum) can only happen if the lines are parallel. Because $\angle TUW = \angle UWX$ then $TV \parallel WX$
(37°) (37°)

$\parallel$ is parallel to

#52



$t^2 = 250^2 + 120^2 - 2(250)(120)\cos 34°$

$t^2 = 27157.74...$

$t = 164.8$

$t \approx 165m$

Her ball is approx. 165m to the hole.

#53

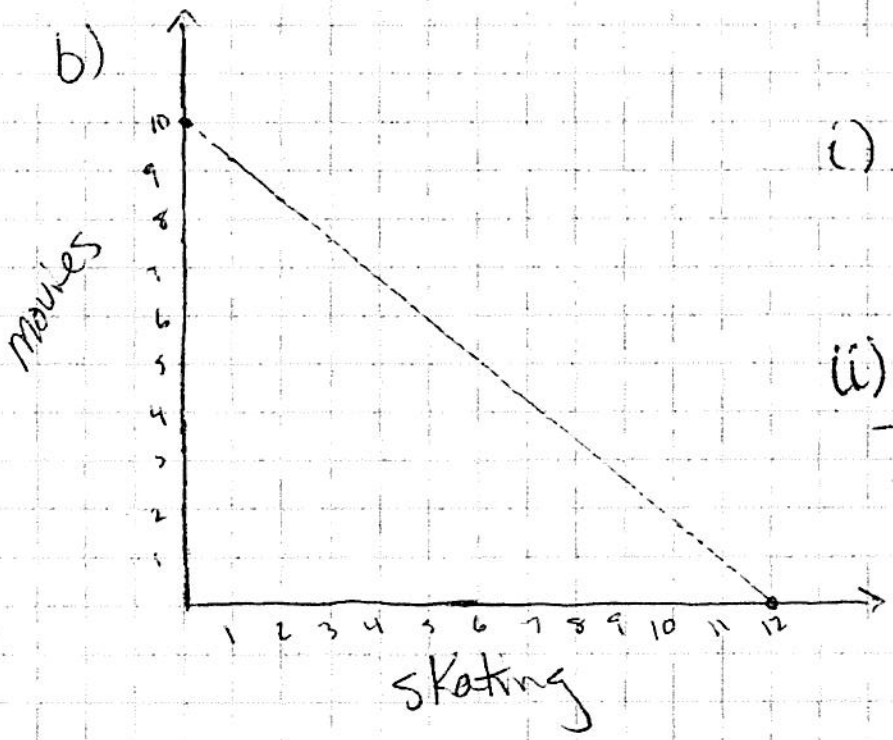
a) Let m = movie
s = skating

$12m + 10s + {}^{*}50 \leq {}^{*}180$

↑ student bus pass

$12m + 10s \leq {}^{*}120$

b)



i) (6,5)
(0,10)
(12,0)

ii) many examples
-anything above the line.

54.

9+ 2	3	4	2− 1
2÷ 4	2	6× 1	3
5+ 1	4	3	2
3 3	8× 1	2	4

55.

3	1	2	7	8	4	9	6	5
9	7	4	2	6	5	1	3	8
8	6	5	3	1	9	2	7	4
7	3	6	8	5	2	4	9	1
5	2	9	4	3	1	6	8	7
1	4	8	9	7	6	3	5	2
6	9	1	5	2	8	7	4	3
2	8	3	6	4	7	5	1	9
4	5	7	1	9	3	8	2	6