Ch. 7 & 2 Solutions

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EXTRA PRACTICE: p. 410 # 1–12
p. 126 # 1–21

Math 11 Pre-Calculus — ***Review 4: Chapters 7 & 2***

Chapter 7: Absolute Value and Reciprocal Functions

1. Order the values from least to greatest.

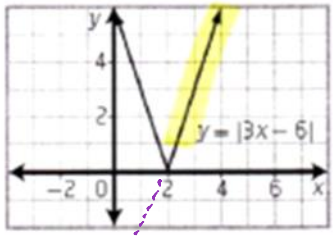
$|-5|, |4-6|, |2(-4)-5|, |8.4|$

$=5$ $=2$ $=13$ $=8.4$

② ① ④ ③

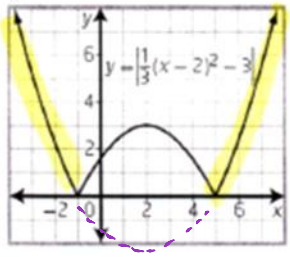
2. Write the piecewise function that represents each graph.

a)



$y = \begin{cases} 3x-6, & x \geq 2 \\ -3x+6, & x < 2 \end{cases}$

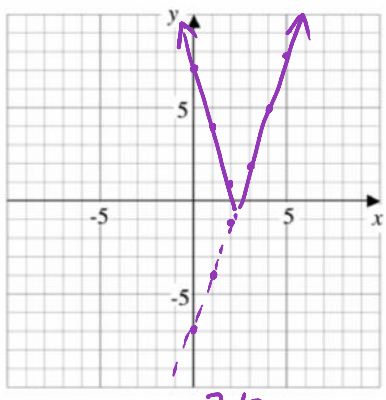
b)



$y = \begin{cases} \frac{1}{3}(x-2)^2-3, & x \geq 5,\ x \leq -1 \\ -\frac{1}{3}(x-2)^2+3, & -1 < x < 5 \end{cases}$

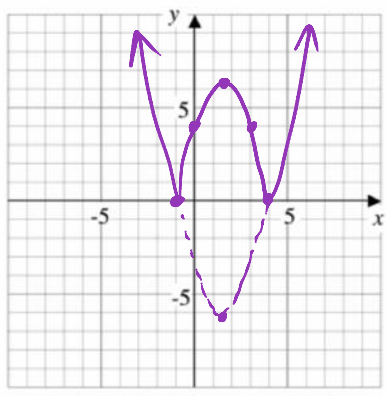
3. For each absolute value function,
i) sketch the graph, **ii)** determine the intercepts **iii)** determine the domain and range.

a) $y = |3x-7|$



$x\text{-int} = 7/3$
$y\text{-int} = 7$
$D: x \in \mathbb{R}$

b) $y = |x^2-3x-4| = |(x-4)(x+1)|$



vertex @ (1.5, −6.25)

$x\text{-int} = -1, 5$
$y\text{-int} = |0^2-3(0)-4| = 4$

y-int = 7
D: $x \in \mathbb{R}$
R: $y \geq 0$

x-int = $-1, 5$
y-int = $|0^2 - 3(0) - 4| = 4$
D: $x \in \mathbb{R}$
R: $y \geq 0$

1

4. Solve algebraically. Verify your solutions.

a) $|2x-1|=9$

Case +:
$2x-1=9$
$2x=10$
$x=5$

Case −:
$-2x+1=9$
$-2x=8$
$x=-4$

Check
$|2(5)-1|=9$ ✓
$|2(-4)-1|=9$ ✓

$x=5,-4$

b) $|2x^2-5|=13$

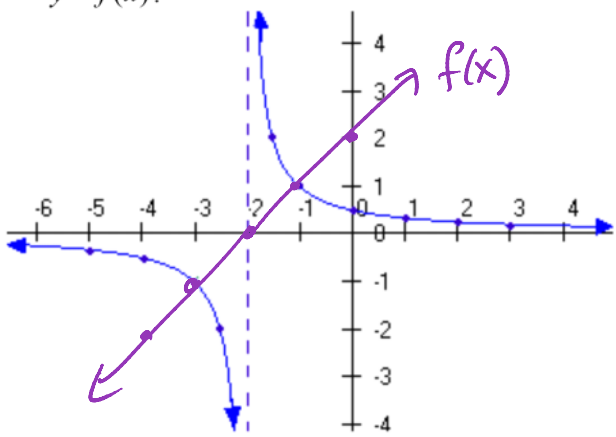
Case +:
$2x^2-5=13$
$2x^2=18$
$x^2=9$
$x=\pm 3$

Case −:
$-2x^2+5=13$
$-2x^2=8$
$x^2=-4$
→ No Solution

Check:
$|2(3)^2-5|=13$ ✓
$|2(-3)^2-5|=13$ ✓

$x=3,-3$

5. Sketch the graph of $y=f(x)$ given the graph of $y=\dfrac{1}{f(x)}$. What is the original function, $y=f(x)$?

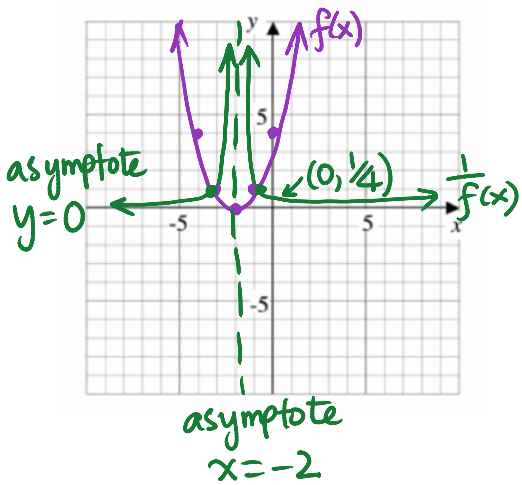


Asymptotes → $f(x)=0$

Invariant Points → $f(x)=\pm 1$

$f(x)=x+2$

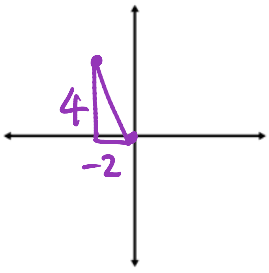
6. Sketch the graph of $y=\dfrac{1}{f(x)}$ given $f(x)=(x+2)^2$. Label the asymptotes, the invariant points, and the intercepts.



Invariant Points: $(-1,1),(-3,1)$

Chapter 2: Trigonometry

1. Determine the exact distance, in simplified form, from the origin to a point P (-2, 4) on the terminal arm of an angle.



$(-2)^2+(4)^2=c^2$

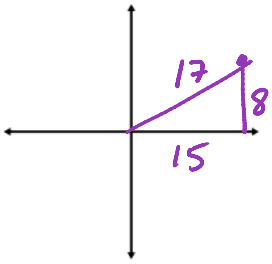
$20=c^2$

$c=\sqrt{20}=2\sqrt{5}$

4 5 22

Distance $=2\sqrt{5}$

2. Point P (15,8) is on the terminal arm of angle θ. Determine the exact values for $\sin\theta$, $\cos\theta$ and $\tan\theta$.



$15^2+8^2=c^2$

$289=c^2$

$17=c$

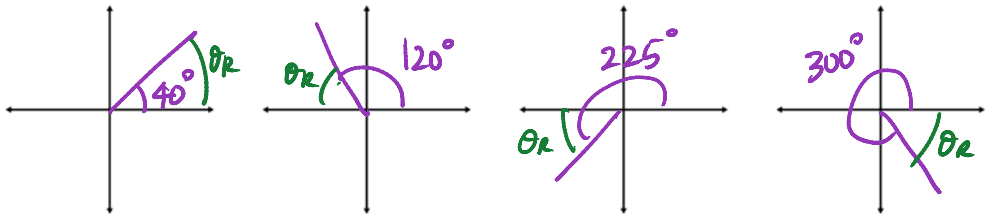
$\sin\theta=8/17$

$\cos\theta=15/17$

$\tan\theta=8/15$

3. Sketch each angle in standard position and determine the measure of the reference angle.

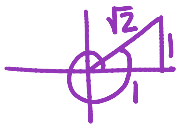
a) 40° **b)** 120° **c)** 225° **d)** 300°



$\theta_R=40°$ $\theta_R=60°$ $\theta_R=45°$ $\theta_R=60°$

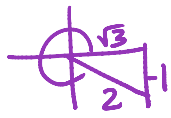
4. Determine the **exact** value of each trigonometric ratio.

a) $\sin 405°$ $=360°+45°$

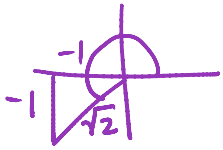


$=\frac{1}{\sqrt{2}}\times\frac{\sqrt{2}}{\sqrt{2}}$ or $\frac{\sqrt{2}}{2}$

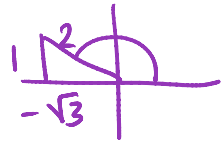
b) $\cos 330°=\frac{\sqrt{3}}{2}$



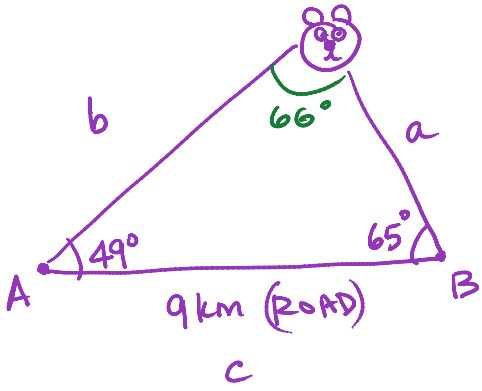
c) $\tan 225°=\frac{-1}{-1}=1$



d) $\cos 150°=-\frac{\sqrt{3}}{2}$



5. Radio collars are used to track polar bears by sending signals via GPS to receiving stations. Two receiving stations are 9 km apart along a straight road. At station A, the signal from one of the collars comes from a direction of 49° from the road. At station B, the signal from the same collar comes from a direction of 65° from the road. Determine the distance the polar bear is from each of the stations.



$\angle C = 180° - 49° - 65°$
$= 66°$
→ Know 'pair' (Sine Law)

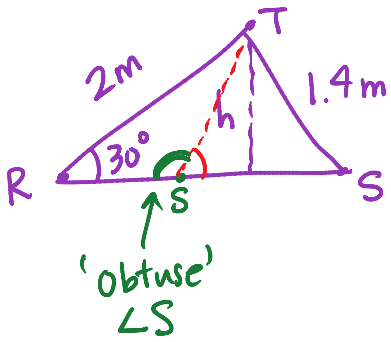
$\frac{a}{\sin 49°} = \frac{9}{\sin 66°}$

$a = 7.4\text{ km}$

$\frac{b}{\sin 65°} = \frac{9}{\sin 66°}$

$b = 8.9\text{ km}$

6. In ΔRST, RT = 2 m, ST = 1.4 m, and $\angle R = 30°$. Determine the measure of obtuse $\angle S$ to the nearest tenth of a degree.



→ Given A.S.S. (Check ambiguous case!)

$\sin 30° = \frac{h}{2}$

$h = 1$ → 2 Triangles!

$\frac{\sin 30°}{1.4} = \frac{\sin S}{2}$

$\sin S = 0.714$

$S = \sin^{-1}(0.714)$

$= 45.6°$

Obtuse $\angle S = 134.4°$