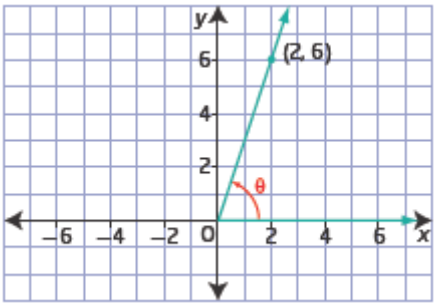
b) To get a longer hit Daria should increase the angle of hit. An angle of 45° gives the greatest distance in the formula for d.

c) An angle of elevation of 45° will probably produce the hit that travels the greatest distance. For this angle sine and cosine are both the same, so their effect on the formula will be balanced.

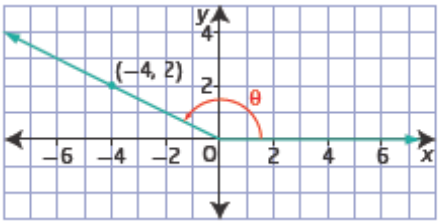
2.2 Trigonometric Ratios of Any Angle

Section 2.2 Page 96 Question 1

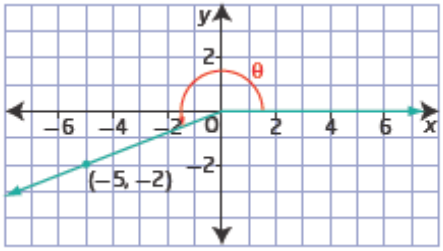
a)



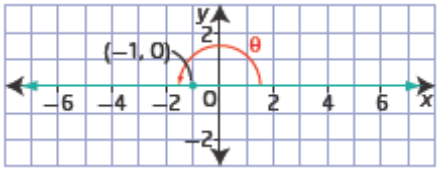
b)



c)



d)



Section 2.2 Page 96 Question 2

a) $\sin 60° = \frac{\sqrt{3}}{2}$, $\cos 60° = \frac{1}{2}$, $\tan 60° = \sqrt{3}$

b) $\sin 225° = -\frac{1}{\sqrt{2}}$ or $-\frac{\sqrt{2}}{2}$, $\cos 225° = -\frac{1}{\sqrt{2}}$ or $-\frac{\sqrt{2}}{2}$, $\tan 60° = 1$

c) $\sin 150° = \frac{1}{2}$, $\cos 150° = -\frac{\sqrt{3}}{2}$, $\tan 150° = -\frac{1}{\sqrt{3}}$ or $-\frac{\sqrt{3}}{3}$

d) $\sin 90° = 1$, $\cos 90° = 0$, $\tan 90°$ is undefined

Section 2.2 Page 96 Question 3

a) Use the Pythagorean Theorem to determine the hypotenuse: $r = 5$.

$$\sin\theta = \frac{y}{r},\ \cos\theta = \frac{x}{r},\ \tan\theta = \frac{y}{x}$$

$$\sin\theta = \frac{4}{5},\ \cos\theta = \frac{3}{5},\ \tan\theta = \frac{4}{3}$$

b) $r^2 = x^2 + y^2$

$r^2 = (-12)^2 + (-5)^2$

$r^2 = 144 + 25$

$r^2 = 169$

$r = 13$

$$\sin\theta = \frac{y}{r},\ \cos\theta = \frac{x}{r},\ \tan\theta = \frac{y}{x}$$

$$\sin\theta = \frac{-5}{13},\ \cos\theta = \frac{-12}{13},\ \tan\theta = \frac{-5}{-12} = \frac{5}{12}$$

c) $r^2 = x^2 + y^2$

$r^2 = (8)^2 + (-15)^2$

$r^2 = 64 + 225$

$r^2 = 289$

$r = 17$

$$\sin\theta = \frac{y}{r},\ \cos\theta = \frac{x}{r},\ \tan\theta = \frac{y}{x}$$

$$\sin\theta = \frac{-15}{17},\ \cos\theta = \frac{8}{17},\ \tan\theta = \frac{-15}{8}$$

d) $r^2 = x^2 + y^2$

$r^2 = (1)^2 + (-1)^2$

$r^2 = 2$

$r = \sqrt{2}$

$$\sin\theta = \frac{y}{r},\quad \cos\theta = \frac{x}{r},\quad \tan\theta = \frac{y}{x}$$

$$\sin\theta = \frac{-1}{\sqrt{2}} \text{ or } -\frac{\sqrt{2}}{2},\ \cos\theta = \frac{1}{\sqrt{2}} \text{ or } \frac{\sqrt{2}}{2},\ \tan\theta = \frac{-1}{1} = -1$$

Section 2.2 Page 96 Question 4

a) The cosine ratio is negative and the sine ratio is positive in quadrant II.

b) The cosine ratio and the tangent ratio are both positive in quadrant I.

c) The sine ratio and the cosine ratio are both negative in quadrant III.

d) The tangent ratio is negative and the cosine ratio is positive in quadrant IV.

Section 2.2 Page 96 Question 5

a) First calculate r.

$r^2 = x^2 + y^2$
$r^2 = (-5)^2 + (12)^2$
$r^2 = 25 + 144$
$r^2 = 169$
$r = 13$

$\sin\theta = \frac{y}{r}$ $\cos\theta = \frac{x}{r}$ $\tan\theta = \frac{y}{x}$

$\sin\theta = \frac{12}{13}$ $\cos\theta = \frac{-5}{13}$ or $-\frac{5}{13}$ $\tan\theta = \frac{12}{-5}$ or $-\frac{12}{5}$

b) $r^2 = x^2 + y^2$
$r^2 = (5)^2 + (-3)^2$
$r^2 = 25 + 9$
$r^2 = 34$
$r = \sqrt{34}$

$\sin\theta = \frac{y}{r}$ $\cos\theta = \frac{x}{r}$ $\tan\theta = \frac{y}{x}$

$\sin\theta = \frac{-3}{\sqrt{34}}$ or $-\frac{3\sqrt{34}}{34}$ $\cos\theta = \frac{5}{\sqrt{34}}$ or $\frac{5\sqrt{34}}{34}$ $\tan\theta = \frac{-3}{5}$ or $-\frac{3}{5}$

c) $r^2 = x^2 + y^2$
$r^2 = (6)^2 + (3)^2$
$r^2 = 36 + 9$
$r^2 = 45$
$r = \sqrt{45}$

$\sin\theta = \frac{y}{r}$ $\cos\theta = \frac{x}{r}$ $\tan\theta = \frac{y}{x}$

$\sin\theta = \frac{3}{\sqrt{45}} = \frac{1}{\sqrt{5}}$ or $\frac{\sqrt{5}}{5}$ $\cos\theta = \frac{6}{\sqrt{45}} = \frac{2}{\sqrt{5}}$ or $\frac{2\sqrt{5}}{5}$ $\tan\theta = \frac{3}{6} = \frac{1}{2}$

d) $r^2 = x^2 + y^2$
$r^2 = (-24)^2 + (-10)^2$
$r^2 = 576 + 100$
$r^2 = 676$
$r = 26$